C O N T R I B U T I   D I   R I C E R C A   C R E N O S

UNIVERSITÀ DI CAGLIARI UNIVERSITÀ DI SASSARI
CENTRE FOR NORTH SOUTH ECONOMIC RESEARCH
CRENoS
CENTRO RICERCHE ECONOMICHE NORD SUD

IMPACT OF IMPORTING FOREIGN TALENT ON PERFORMANCE LEVELS OF LOCAL CO-WORKERS

Jaime Alvarez
David Forrest
Ismael Sanz
Juan de Dios Tena

WORKING PAPERS

2009/14

CUEC

**CENTRO RICERCHE ECONOMICHE NORD SUD
(CRENoS)
UNIVERSITÀ DI CAGLIARI
UNIVERSITÀ DI SASSARI**

Il CRENoS è un centro di ricerca istituito nel 1993 che fa capo alle Università di Cagliari e Sassari ed è attualmente diretto da Stefano Usai. Il CRENoS si propone di contribuire a migliorare le conoscenze sul divario economico tra aree integrate e di fornire utili indicazioni di intervento. Particolare attenzione è dedicata al ruolo svolto dalle istituzioni, dal progresso tecnologico e dalla diffusione dell'innovazione nel processo di convergenza o divergenza tra aree economiche. Il CRENoS si propone inoltre di studiare la compatibilità fra tali processi e la salvaguardia delle risorse ambientali, sia globali sia locali.
Per svolgere la sua attività di ricerca, il CRENoS collabora con centri di ricerca e università nazionali ed internazionali; è attivo nell'organizzare conferenze ad alto contenuto scientifico, seminari e altre attività di natura formativa; tiene aggiornate una serie di banche dati e ha una sua collana di pubblicazioni.

www.crenos.it
info@crenos.it

CRENOS – CAGLIARI
VIA SAN GIORGIO 12, I-09100 CAGLIARI, ITALIA
TEL. +39-070-6756406; FAX +39-070- 6756402

CRENOS - SASSARI
VIA TORRE TONDA 34, I-07100 SASSARI, ITALIA
TEL. +39-079-2017301; FAX +39-079-2017312

Titolo: IMPACT OF IMPORTING FOREIGN TALENT ON PERFORMANCE LEVELS OF LOCAL CO-WORKERS

ISBN: 978 88 84 67 554 5

Prima Edizione: Novembre 2009

Via Is Mirrionis, 1
09123 Cagliari
Tel./Fax 070291201
www.cuec.it

Impact of Importing Foreign Talent on Performance Levels of Local Co-Workers

Jaime Alvarez
Universidad Complutense, Spain
David Forrest
University of Salford, UK
Ismael Sanz
Universidad Rey Juan Carlos, Spain
Juan de Dios Tena
Università di Sassari and CRENoS, Italy, Universidad Carlos III, Spain, *

Abstract

When skilled labour is imported, skill levels of local workers may be raised by contact with new techniques and practices. European basketball offers an opportunity to test this general claim. For a panel of 47 countries observed over more than twenty years, we model probability of qualification for, and performance in, international tournaments. We demonstrate that an increase in the number of foreigners in a domestic league tends to generate an improvement in the performance of the national team (which comprises only local players). Given this, we develop a theoretical framework for how a regulator might take this into account.

Keywords: basketball, migration, spillovers
JEL Codes: J6, J7

J.Alvarez, Departamento de Economía Financiera III, Universidad Complutense de Madrid, Spain, E-Mail: jaime@jaimealvarez.com.
I. Sanz, Departamento de Economía Aplicada I, Universidad Rey Juan Carlos, Spain, E-Mail: ismael.sanz@madrid.org.
J.D. Tena, Departamento de Estadística, Universidad Carlos III, Spain and DEIR and CRENoS, Università di Sassari, Italy, E-Mail: juande@uniss.it.

* We acknowledge financial support from the Consejo Superior de Deportes of Spain.

1. Motivation

In an era of globalisation of labour markets there are few developed countries where the issue of whether immigration brings net benefits to the host economy does not lie at the heart of political debate. In this paper we focus on skilled immigrants. On the one hand, they may boost national output but, on the other, labour unions argue that they depress wages and/ or reduce employment for their members.

Unions are perhaps particularly vocal in the creative industries where employees work together in teams to produce a co-operative output. Examples are scientific research teams, architectural practices and symphony orchestras. In such settings, unions tend to be very active in promoting the case for restrictions on recruitment of foreign labour, probably because the domestic workers they represent have highly specialised skills, acquired through lengthy investment in training, and face a substantial reduction in wages if they are displaced by migrants and compelled to work in another sector. To be sure, unions in this situation may concede that using foreign workers will bring levels of skill into the productive process that will increase quality of output in the short-run. But they argue that an open labour market is likely to have negative longer-run consequences by impeding the development of a vigorous indigenous industry. The potential mechanism is that it may prevent young local workers gaining positions that allow them to accumulate the early experience necessary for subsequent success.

The union argument for protectionism is often successful (for example, American restrictions on foreign actors are notoriously inflexible) as it accords with the aspiration of most countries to acquire an internationally respected creative sector in which its own citizens reach world levels of achievement. However, like any other case for protectionism, this particular justification should not be accepted uncritically. There is an equally plausible argument that domestic workers engaged in team production learn new approaches and techniques from face-to-face contact with colleagues trained in another tradition and that this will permanently raise the value of their human capital (Battu et al., 2003). On this view, the local creative sector will develop more, not less, vigorously than otherwise if labour markets are open and domestic workers have the opportunity to learn from foreign colleagues.

The matter can plainly be settled only empirically. Sport offers a unique environment to test whether there are productivity spillovers from foreign employees participating in production in a creative sector and whether these are strong enough to generate an enhanced level of achievement from nationals in that sector. This is because of two features which, amongst the creative industries, are perhaps present together only in sport. First, a country's stature can be measured objectively by its record in international tournaments. Second, sport is organised such that there is domestic competition where local and foreign workers engage together in teams; but at the same time indigenous workers are also formed into their own representative team that competes in inter-country events. It is therefore possible to test whether raised levels of contact with foreign workers enhances or diminishes subsequent levels of achievement by indigenous performers.

In this paper, we model how a labour market regulator might identify an optimal level of openness of the relevant labour market. An input into its decision is the strength of any productivity spillovers from migrant to indigenous workers. We seek to evaluate whether such spillovers exist, and whether they are strong, from a large panel of data we assembled for European basketball from 1986 to 2008. The advantage of the data set is that countries in Europe varied considerably in how permissive they were to the employment of foreign (mainly American) players; and additional variation appears in the data as a result of both the judicial ruling in the Bosman case of 1995 and the opening up of formerly communist states in the early 1990s, which each introduced exogenous liberalisation of labour markets in European sport. We test whether different levels of employment of imported players in a domestic league are associated with greater or lesser success in Olympic, World and European championships, taking into account success in qualifying for those tournaments as well as ranking where qualification is achieved.

The rest of the paper is structured as follows. Section 2 reviews relevant literature on migrant labour in general and sports labour markets in particular. We emphasise here how we propose to improve on existing sports studies. Section 3 offers a theoretical framework for understanding how sports bodies may decide on levels of restriction on foreign players. Section 4 describes the data we have assembled for use in empirical analysis. The evidence from this analysis, presented in Section 5, is that a lower degree of restriction on foreign players in domestic club competition appears to have had a significant payoff in terms of performance by national basketball teams. Finally, our most important conclusions are briefly outlined in Section 6.

2. Literature Review

The tendency to gradual opening up of international markets, with more capital mobility and increasing free trade in goods and services, has been accompanied by growing concern over movements of people (World Bank, 1995). This is despite evidence at the macro level showing that immigration has an overall positive effect on growth through three channels. First, immigration speeds up convergence to the long-run steady state growth path through enhancing openness of the host economy and increasing the demand for new investment (Barro and Sala-i-Martin, 1995). Second, immigration brings new ideas, which promotes innovation, entrepreneurship, and increasing total factor productivity (Borjas, 1986). Third, immigration improves economic efficiency because immigrants are more responsive to economic signals and changes, further enhancing total factor productivity.

The most relevant of these channels for our study is the innovation that immigration may stimulate. This is likely to be more intense in the case of skilled immigrants. Thus, a positive net inflow of skilled migrants is claimed to provide new ideas and technologies and hence foster an area's competitiveness (Porter, 1990). Mobility of skilled labour offers efficiency gains by allowing organisations that need talent to draw from a wider base. It also contributes to the diffusion of knowledge, enhancing the productivity of the individual's human capital (Battu *et al.*, 2003). Knowledge can flow tacitly, as a result of the contact of individual workers within a firm, or through movement of embodied human capital, due to the local mobility of labour between firms. Channels, in particular the tacit flows, are highly contextual and difficult to codify and therefore mediated by face-to-face contact. In fact, spillovers are more important when workers produce in teams, causing a worker's productivity to differ across different teams. Krugman (1991) suggests that localised knowledge and technology spillovers can foster growth of localised economies of agglomeration, giving rise to further attraction of skilled workers. Further, Kremer (1993) argues that the extent to which knowledge spillovers affect a worker's productivity depends on his ability: the more skill a worker already has, the more he will benefit from these spillovers.

International labour mobility can also have negative effects, if immigration tends to reduce domestic workers' wages. Concern over this, together with cultural and social barriers, explains why international mobility of labour is significantly lower than that of goods, services and capital. Nevertheless, Longhi et al. (2005) show that the mean estimate in the empirical literature is that an increase by 1 percentage point in the proportion of migrants in the workforce reduces wages by a modest 0.1 %.

Given that spillovers within the workplace generally occur in groups working as teams to produce goods or services (Idson and Kahane, 2004), benefits appear particularly likely to be found in team sports as well as in other creative activities, such as scientific research, music and management consultancy. A distinction has to be made here between transitory and permanent effects. It is well documented in the sports literature that playing with higher quality team-mates improves a player's statistics. For example, for the present case of basketball, Zak et al. (1979) argue that his team's ability to acquire the ball via rebounds and turnovers influences the shooting skills of a player. Kendall (2003) contends that a high quality player tends to draw more attention from the opposing defence, opening up clearer paths for his team-mates. Using a sample of NBA players from season 1988-1989 to 2000-2001, Kendall finds that a 10% increase in team-mates' productivity –measured as points per shoot attempt- leads to a 4.5% increase in own productivity. He also shows evidence, consistent with Kremer (1993), that benefits from spillovers are higher for better players. Idson and Kahane (2004) find that individual players' pay increases with their own and team productivity – measured by minutes played, points, assist, rebounds, steals and blocks- using data for NBA players who switched teams between seasons 1994-1995 and 1996-1997. Similar results are reported for other team sports. Idson and Kahane (2000) find that team attributes affect individual player performance and pay in the National Hockey League. Torgler and Schmidt (2007) report that team youth, more exchanges and fewer sendings-off increased goals and assists by individual football players in the German Bundesliga between 1995-1996 and 2003-2004.

The spillovers referred to in these studies are externality effects, produced during a game from the general performance of the rest of the team. The results could reflect merely a positive effect on an individual's productivity when he works with higher quality complementary inputs, i.e. a transitory effect. In contrast, what we seek to identify and measure here is a more *permanent* concept of spillovers, where working with foreign co-workers raises the value of an individual's human capital. In other words, we investigate whether playing with foreigners not only improves an athlete's statistics but also makes him a better player.

It appears likely that foreign players will, on average, be more skilled, since clubs can draw talent from a wider base[1], and they may in addition bring with them different approaches and techniques. Consequently, national players will learn from training and playing with foreign players of their own team (and indeed by playing against foreign players on their opponents' teams). This interaction in team sports resonates the face-to-face interaction required for the diffusion of tacit knowledge. Moreover, the enhanced competition from foreign players may lead national players to compete harder to win the confidence of their coach. The presence of foreign players may lead to an agglomeration dynamic, analogous to the Krugman (1991) economies of agglomeration, in which concentration of skilled players improves the quality of the league, attracting further skilled players and fostering spillovers.

Our study examines whether, in fact, spillovers not only improve local player performance while they play alongside imports in the domestic league but also have a more *permanent* effect whereby they raise the quality of these local players for the long term. If there is indeed not just an impact on local player statistics in the domestic league (the result of improved quality of complementary inputs) but also an impact on their human capital, then this should be reflected in improved performance of domestic players participating in another environment and team, i.e. international competitions between national teams. We analyse whether countries with more foreign players in their leagues perform better in the most important national team basketball competitions, European and World Championships and the Olympic Games. We control for other determinants of national team success such as demography in order to isolate the effects of the presence of foreign players (Hoffmann et al., 2002).

We have emphasised the possibility that spillovers from foreign players will be powerful. If they are, then a country that eases restrictions on foreign players in its domestic league should benefit from improved performance when its domestic players represent it in international competition. However, this result is not inevitable. As in the general debate on immigration, attention has been drawn to potential negative effects from international labour mobility in sports. The most obvious is

---

[1] If it is not in fact the case that foreign players are more skilled, then it is less likely that we will find a positive effect on national team performance from their presence in the domestic league.

the crowding-out effect on national players. The crowding-out effect reduces the accumulation of experience of national players and diminishes the opportunities to play at high level competition as more foreign players are imported (Baur and Lehmann, 2007). In particular, young players will acquire less experience in their clubs in the sensitive first stages of their careers. A further possible negative effect is that audiences might become less interested in their teams if there is an excessive number of foreign players. This decrease in enthusiasm may then reduce revenues from tickets, television fees and merchandising which, in turn, would reduce the potential of teams to hire good players, diminish the quality of the competition, and perhaps lower the ability to invest in training of local players. On the other hand, foreign players could also have a positive effect on the audiences if they significantly increase the quality of the game. Frick (2007) finds that there is no evidence that managers or spectators prefer German players in the German Bundesliga.[2]

An article related to ours is Milanovic (2005). The paper develops a model with increasing returns to scale and endogeneity of skills, in which free circulation of labour produces higher overall quality in the game, increasing inequality of results among clubs but lowering inequality in national teams' performances. Milanovic argues that equality -measured as the number of teams that are part of the élite - has been reduced in European Champions' League football (soccer), in line with the predictions of his model. In contrast, the degree of equality in national team competitions has increased: countries with low quality football leagues have benefited from increased labour mobility by exporting players to high quality leagues. The case of African players in European football leagues and the subsequent beneficial effect on the performance of African countries in the World Cup would be a good example.

Another relevant article for our study is the recent work by Baur and Lehmann (2007). They find a positive effect of imported and exported football players on the national team FIFA ranking, based on

[2] As with skilled migrants in the general labour market, permitting foreign players may also draw criticism if they put downward pressure on national players' wages. The crowding-out effect and possible downward pressure on wages together explain the protectionist stance of sport players' unions towards the number of foreign players allowed. Nevertheless, these negative effects could be offset if national players take advantage of the opening-up of the sport labour markets to play for foreign clubs.

previous World Cups and the period 2003-2005, as well as on the market value of the national team.

Our study seeks to overcome a number of problems in Baur and Lehmann. First, their measure of imported (exported) players is the number of players of a country's league (national team) taking part in the 2006 World Cup but in a different national team (country league). In contrast, our measure of imported players covers all the foreign players taking part in a country's league, independent of whether they play in national teams' competitions. Thus our measure of openness is more representative of foreign player spillovers. We avoid identifying a country with few foreign players as highly open because those foreigners also play for their national teams and avoid representing a country with many foreign players as being restrictive because they are not called on for their national teams. We focus on all European countries for which data are available, independent of whether they take part in national team competitions: we examine the determinants of the probability of participating in international competitions and, in a second stage, of the probability of enjoying success. This avoids bias from eliminating information relating to countries which do not qualify for tournaments. Equally importantly, it permits inferences to be drawn concerning qualification itself, which is likely to be the principal goal of many national basketball associations.

A second limitation of Baur and Lehmann is that the measure of international football labour mobility they constructed related only to the year 2006. Then, the presence of a country which was previously very closed (open) and now open (closed) could bias the results since they link current labour mobility to rankings which are based on past performances of the national team. Our measure of the presence of foreign players covers country leagues, from 1986, relating international labour mobility to contemporaneous national team success.

A third advantage of our analysis is that the sample covers periods either side of the Bosman ruling at the European Court of Justice. Amongst other things, this freed the player market, increasing the percentage of foreign-born players in European leagues (Frick, 2007). Thus we are able to examine the effects on national team performance of such an exogenous regulatory change on the sports labour market.

We employ two-stage Heckman estimation, in which the first stage is the probability of qualifying for the tournament and the second is the performance in the tournament, measured by final ranking. At each stage, we test for the influence of the number of foreign players engaged in a country's domestic league. Following Bernard and Busse (2004), who report that the most important determinant of the number of Olympic medals won by a country is its previous performance, we include the previous rankings achieved by the senior and youth national teams as additional determinants of its level of achievement in the next international basketball competition. Again like Bernard and Busse, we also account for the influence of the size of a country's population and economy.

Given that we are interested in potential positive spillovers from skilled migrant workers, our focus sport of basketball appears to offer a cleaner environment than football for testing the hypothesis. In football, a net importing country may indeed improve the prospects of its national team to the extent that local players refine their skills through contact with the imported talent. However, the benefit is reciprocal. For example, many football players from the Nordic countries and Eastern Europe are engaged to play in the English Premier League. English players' standards may improve as a result but there will also be enhancement of the human capital of the imported players whose home countries are too small to expose them to the same level of club play as in the English game. Reliance on national team performance to test for whether knowledge has been transmitted through migration is then problematic: England's ranking may fall despite an improvement in its player quality because the imported players have also improved and they then take part in matches against England. In European basketball, by contrast, imports are mainly from the United States and, though high quality by world standards, are not good enough to be in the NBA, nor to be candidates for the American national team. They will not therefore play against the national teams of the countries where they are employed in club competition. Observing whether there is an improvement in a country's ranking in international tournaments following increased exposure to imported talent therefore offers a more clear cut test of our hypothesis than would be possible in the case of football (or indeed cricket or rugby).

3. The dynamic effect of restrictions on foreign players

We propose here a theoretical model to illustrate the dynamic effect of restrictions on the entry of foreign players to a national league. In this framework, a regulator, such as a national governing body for a sport, sets the policy instrument, i.e. the restriction in the excess number of foreign over national players, in order to maximise its utility function. Two alternative cases are considered. In the first one, the regulator is totally captured by unions whose only concern is not to allow the presence of foreign players in the national league. If we denote by $w_{N,t}$ the number of national talented players and by $x_{N,t}$ the total number of talented players in the national league at time t, the utility of this regulator can be represented by

$$U = -(x_{N,0} - w_{N,0}). \qquad (3.1)$$

Note that, for this type of regulator, the optimal number of foreign players in the national league is always zero.

In the alternative case, the utility function of the type two regulator is increasing in the number of national talented players at the time of an international tournament, as this affects positively the performance of the national squad, and decreasing in the total number of foreign players in the different basketball clubs inside the country in line with a desire to placate unions. We represent this regulator's utility function by

$$U = \sum_{t=0}^{T} -\delta^{t}(1-\beta)(x_{N,t} - w_{N,t}) + \delta^{T}\beta w_{N,T} \qquad (3.2)$$

where δ is the intertemporal rate of substitution; β is a positive scalar that weights the importance of success of the national team compared with the presence of many foreign players; and T is the moment when the international tournament takes place.

In this case, when deciding the restriction on the number of foreign talented players, the regulator faces a trade-off that comes from the fact that the interaction between insiders and foreign players generates a spillover effect that increases the number of national talented players in the following period. Also to be taken into account is that a proportion of the endowment of talented players is lost through depreciation from period t to $t+1$. A third element to be considered comes from the fact that the endowment of talented players is affected at every period by a stochastic shock. We consider this point as relevant in appraising the importance of political shocks that hit European countries during the period of analysis. All these elements are taken into account by assuming that $w_{N,t}$ evolves according to the following law

$$w_{N,t} = \begin{cases} |x_{N,t-1} - w_{N,t-1}| + \alpha w_{N,t-1} + \sigma\varepsilon_t & \text{if positive} \\ 0 & \text{otherwise} \end{cases} \quad (3.3)$$

where ε_t is a serially uncorrelated shock generated by a stochastic function; σ is a positive parameter; and $0 < \alpha < 1$ accounts for the fact that a percentage of talented players depreciates from one period to another.

Once the regulator has decided the restriction in the excess number of foreign players over national players, denoted by $x_{N,t} - w_{N,t} \leq R$, the national league determines the demand for players in the following $T + 1$ periods, $\{x_{N,t}, t = 0, \dots, T\}$. The model is closed by assuming a foreign league, that represents the rest of the word, with a fixed endowment of players, $\{w_F, t = 0, \dots, T\}$, that also demands basketball players at each period, $\{x_{F,t}, t = 0, \dots, T\}$. We assume that profit in each league is an increasing and concave function of the number of talented players. Two simple representations of these profit functions are given by

$$\pi_N = x_{N,t} - C_N {x_{N,t}}^2, \quad (3.4)$$

$$\text{and} \qquad \pi_F = x_{F,t} - C_F {x_{F,t}}^2, \quad (3.5)$$

together with the restriction

$$x_{N,t} + x_{F,t} = w_{N,t} + w_F = W_t, \quad (3.6)$$

where C_N and C_F are parameters of the model representing the cost of bringing talented players to the national and foreign leagues respectively.

We assume that $W_0 < 1/C_N$ and $W_0 < 1/C_F$. This ensures that the optimal demand for talented players in the national and foreign league is higher than zero. We also assume that the cost of hiring a given player is greater for the national league than for the foreign league

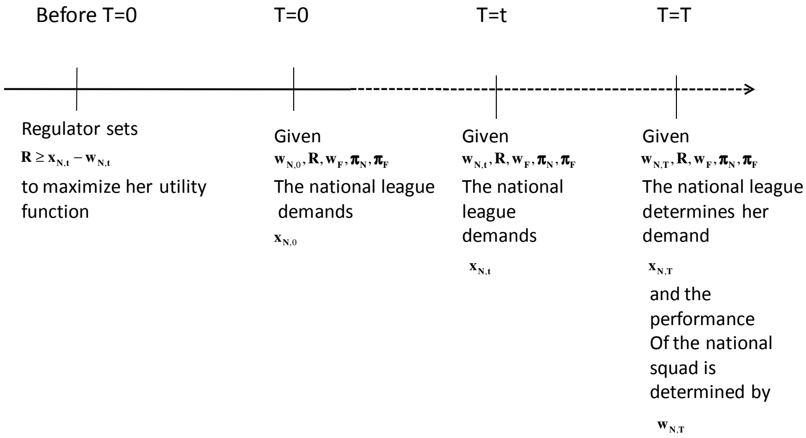
($C_N > C_F$). This restriction appears realistic for European compared to American basketball.3

In this model, we assume that the national and foreign leagues behave competitively and, therefore, they are willing to demand talented players until, either their profits are zero or they use the total endowment of talented players. Note that this is a realistic assumption, given that leagues are composed of many clubs, if they do not consider the impact of hiring additional players on the total profits of the rest of the clubs in the league.

The timing of the model is sketched in Figure 1. Before period $T = 0$, the regulator decides the restriction on the excess number of foreign over national talented players. We denote this restriction by R, such that $x_{N,t} - w_{N,t} \leq R$. Then, in the following $T + 1$ periods, the national and foreign league set their demand for talented players given the total endowment, the profit function and the restriction imposed by the regulator. At period T, the regulator observes the utility obtained from its decision on R.

[3] Changing this assumption does not have any substantive implications for the interpretation of the model. When $C_N < C_F$, demand is increasing in the total endowment of players. Therefore, increasing R will push up future demand and the trade-off between reducing the pressure of unions and increasing the probability of success of the national team will continue to exist.

Figure 1. Game dynamics



In this model, the optimal R for the type one regulator is always zero as its only concern is the number of talented foreign players in the national league in the second period.

However, the solution is not so trivial for the type two regulator. In this case, the model can be solved by backward induction. Thus, for a given R, the regulator anticipates the expected value, at $t = 0$, of its utility function given the expected demand for talented players in the national league and the endowment of national players, denoted respectively by $E_0 x_{N,t}$ and $E_0 w_{N,t}$, $\{t = 0, \ldots, T\}$. But these expected values will depend on the magnitude of the stochastic shocks, ε_t. Generally, there is not an analytical solution for this model. Here, we first develop some intuition on the sensitivity of $E_0 x_{N,t}$ and $E_0 w_{N,t}$ and, then, we evaluate the model numerically for different scenarios.

Note that it is straightforward to determine $x_{N,0}$. This function is given by

$$x_N = \begin{cases} R + w_N & \text{if } R \leq x_N - w_N \\ \min\left(\dfrac{1 - C_F W}{C_N - C_F}, \dfrac{1}{C_N}\right) & \text{if } R > x_N - w_N \end{cases} \quad (3.7)$$

To obtain the expression above, note that if demand is not restricted by R, the number of players is determined by equalising the marginal profits of the national and foreign leagues. However, the national league will not demand more than $1/C_N$ as this would result in negative profits.

Demand in the following period is determined by the total endowment of players and the size of the stochastic shock, ε_1. We define the following parameters:

$$C_w = -\frac{A}{\sigma} \quad (3.8)$$

$$C_1 = \frac{1 - C_F(A + w_F)}{C_F\sigma} \quad (3.9)$$

$$C_3 = \frac{1 - C_N(A + w_F)}{C_N\sigma} \quad (3.10)$$

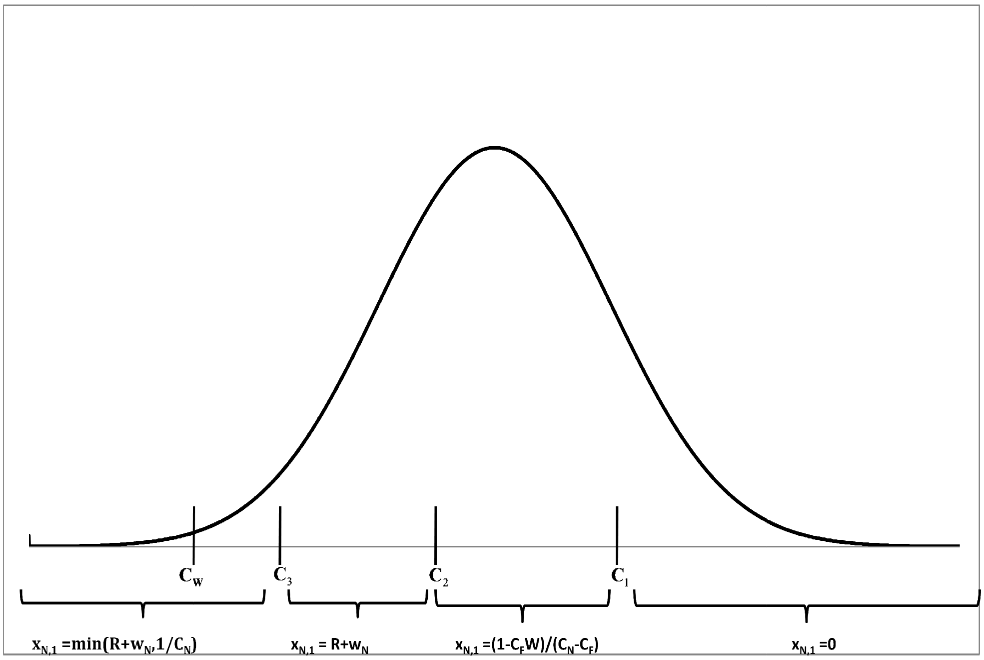
$$C_2 = \frac{1 - C_N(R + A) - C_F(w_F - R)}{\sigma C_N} \quad (3.11)$$

where

$$A = \left|x_{N,1} - w_{N,1}\right| + \alpha w_{N,1} \quad (3.12)$$

Note that, under the assumption $C_N > C_F$, demand is a decreasing function of the total endowment of players at period 1, W_1. Indeed, it is possible to define all the possible equilibria at period 1 depending on the size of ε_1, see Figure 2. Thus, there will not be any demand for talented players when $\varepsilon_1 > C_1$. If $C_2 < \varepsilon_1 \leq C_1$, the domestic league is willing to hire new players until there is equality between the marginal profits of the national and the foreign league, that is $x_{N,1} = \frac{1 - C_F W_1}{C_N - C_F}$. The demand for players is restricted by R when $\frac{1 - C_F w_F - C_N w_{N,1}}{C_N - C_F} \geq R$. This happens when $\varepsilon_1 \leq C_2$. Of course, $x_{N,1}$ cannot be higher than $\frac{1}{C_N}$, otherwise the national league will have negative profits.

Figure 2. Distribution function for the stochastic shock in T=1



Accordingly, we denote the following probabilities

i) $\Pr(0 > x_{N,1}) = \Pr(\varepsilon_1 > C_1) = 1 - \Phi(C_1)$

ii) $\Pr(0 \leq x_{N,1} < R + w_{N,1}) = \Pr(C_2 \leq \varepsilon_1 < C_1) = \Phi(C_1) - \Phi(C_2)$

iii) $\Pr\left(R + w_{N,1} \leq x_{N,1} < \frac{1}{C_N}\right) = \Pr(C_3 \leq \varepsilon_1 < C_2) = \Phi(C_2) - \Phi(C_3)$

iv) $\Pr\left(\frac{1}{C_N} \leq x_{N,1}\right) = \Pr(\varepsilon_1 < C_3) = \Phi(C_3)$

Therefore, the expected value of $x_{N,1}$ at period $t = 0$, denoted by $E_0 x_{N,1}$, is given by:

$$E_0 x_{N,1} = E_0\big(x_{N,1}/x_{N,1} < E_0 w_{N,1} + R\big)\Pr\big(0 \le x_{N,1} < E_0 w_{N,1} + R\big) + E_0\big(x_{N,1}/\,1/C_N > x_{N,1} \ge E_0 w_{N,1} + R\big)\Pr\big(1/C_N > x_{N,1} \ge E_0 w_{N,1} + R\big) + E_0\left(x_{N,1}/x_{N,1} \ge \frac{1}{C_N}\right)\Pr\left(\frac{1}{C_N} \le x_{N,1}\right). \quad (3.13)$$

If we define, the cumulative and density functions of ε_t by $\Phi(\bullet)$ and $\phi(\bullet)$ respectively, expression (13) can be written as

$$E_0 x_{N,1} = \left\{\frac{1 - C_F W_1}{C_N - C_F} + \frac{\sigma\phi(C_1) - \phi(C_2)}{\Phi(C_1) - \Phi(C_2)}\right\}\big(\Phi(C_1) - \Phi(C_2)\big) + \left\{R + A - \frac{C_F\sigma\big(\phi(C_2) - \phi(C_3)\big)}{(C_N - C_F)\big(\Phi(C_2) - \Phi(C_3)\big)}\right\}\big(\Phi(C_2) - \Phi(C_3)\big) + \frac{1}{C_N}\Phi(C_3). \quad (3.14)$$

The expected value of $w_{N,1}$ is given by the following expression

$$E_0 w_{N,1} = \big(1 - \Phi(C_w)\big)A + \sigma\phi(C_w). \quad (3.15)$$

In order to get some intuition about the effect of an increase in R on equations (14) and (15), consider first the case when $R < \frac{1-C_F W}{C_N - C_F} - w_{N,0}$. In this situation, an increase in R moves $E_0 w_{N,1}$ up but the effect on $E_0 x_{N,1}$ is ambiguous. On the one hand, a higher R reduces the probability of having a positive demand for talented players but, on the other hand, it will increase the expected magnitude of $x_{N,1}$ conditional on having positive demand. Whether, $E_0(x_{N,1} - w_{N,1})$ will increase or not will depend on the form of the distribution function of ε_t.

However, if R does not restrict demand at $t = 0$, a marginal increase of R does not affect $E_0 w_{N,1}$ but it will raise $E_0 x_{N,1}$. Therefore, it is possible to state that if $T = 1$, the value of R that maximises the utility of the regulator lies in the interval $\left[0, \frac{1-C_F W}{C_N - C_F} - w_{N,0}\right]$. Having a value of R of higher magnitude than the upper limit of that interval will not improve the expected utility of the regulator because it will increase the demand for foreign players without affecting the endowment of talented players.

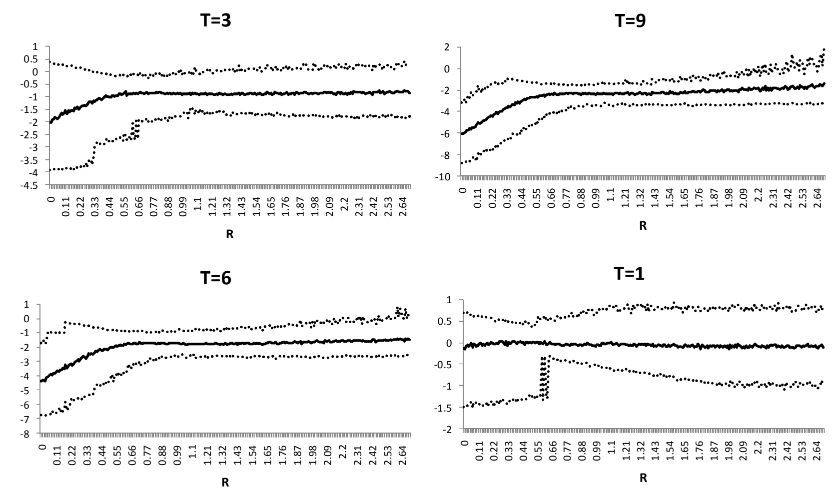
This framework is evaluated numerically. Initially, we set the following values for the parameters of the model: $\sigma = 0.5$, $\delta = 0.9$, $\beta = 0.5$, $\alpha = 0.5$, $C_N = 0.3$, $C_F = 0.1$, $w_{N,0} = 1.7$, $w_F = 2.7$ and $T = 3$.

The procedure we follow in the simulation is described as follows:

- We set a value for R.
- Pick a sequence of $T - 1$ shocks $\{\varepsilon_1, \dots, \varepsilon_{T-1}\}$ from a standard normal distribution.
- Given $\{\varepsilon_1, \dots, \varepsilon_{T-1}\}$ and R, the sequence of values $\{w_{N,1}, \dots, w_{N,T-1}\}$, $\{x_{N,1}, \dots, x_{N,T-1}\}$ and $U(R)$ is computed.
- This process is repeated N times to obtain N different values for $U(R)$, $\{U_1(R), \dots, U_N(R)\}$. Then, an average value $\bar{U}(R)$ is computed. We set $N = 1{,}000$.
- For a set of different values of R, $R \in [0, w_F]$, the different $\bar{U}(R)$ are computed.

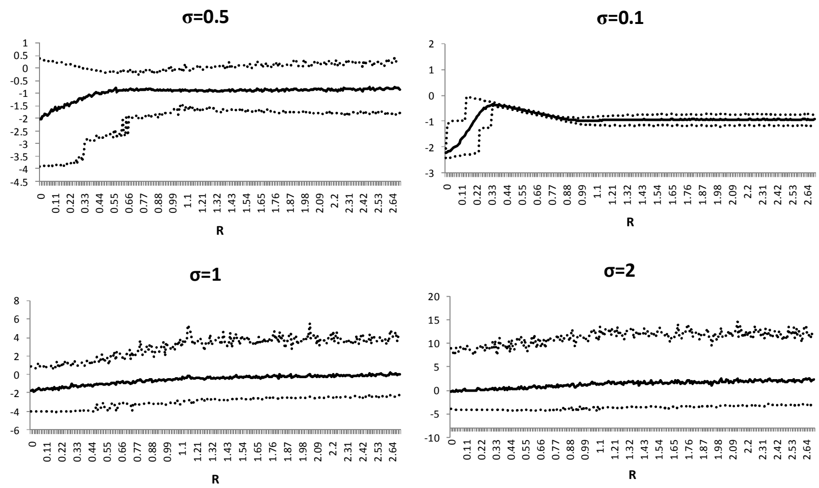
Following the procedure described above, we evaluate the effect of different values of T and σ on the expected utility function. The intuition for the effect of the time length, T, in the model is that a myopic regulator will have less incentive to relax the restriction in the number of foreign players as the benefit of these policies can be observed only in subsequent periods. In this sense, the type one regulator can be considered as an extreme case of a myopic regulator. Figure 3 exhibits the estimated utility functions for different values of T. Note that, as expected, a higher value of T makes an expansionary policy more appealing to the regulator. More specifically, the values of R that maximises its utility function are 2.7 for $T = 9$, 2.6 for $T = 6$, 2.47 for $T = 3$ and 0.61 for $T = 1$.

Figure 3. Evolution of the Utility Function for Different Values of T



Understanding the influence of σ in the model is also interesting given that European basketball has been subject to a highly uncertain political environment due to the balkanisation process in many Eastern European Countries. Figure 4 shows the expected utility function for different σ values. The computed optimal values of R are 0.34, 2.47, 2.63 and 2.64 for σ=0.1, 0.5, 1 and 2 respectively. The intuition for this result is that, in an uncertain environment, the regulator loses control over the future endowment of talented players and a higher value of R will be necessary to maximise its expected utility.

Figure 4. Evolution of the Utility Function for Different Values of σ^2



According to this model, restrictions on the entrance of foreign players reduce the possibility of spillover effects and therefore damage the future performance of the national team. However, these restrictions are still imposed, to satisfy union pressure. According to this, we should expect that the increase in the number of foreign players as a result of the Bosman ruling should have improved the performance of the European national teams.

4. Data

The assembly of the data base for analysis represents a major contribution from this paper. The number of foreign players comes from the Fédération Internationale de Basketball (FIBA). According to Chapter IX, "club competitions", and Article 81, "FIBA Europe Player Licences", of the regulations of FIBA Europe, national federations must register all foreign players taking part in the first and second divisions of the national championship. Thus foreign players must be in possession of an "A" Licence, or a "B" Licence if they are participating in a FIBA Europe Club Competition. Licences are issued by FIBA Europe and are valid for one season. The Eligibility Department of FIBA provided us with the number of Licence "A" and "B" players for each year over the period 1986-2007 for almost all European national basketball competitions.[4] Our data base therefore incorporates accurate and extensive time series information about the presence of foreign players in European national basketball championships. Data on the final rankings in the Eurobasket, World and Olympic Games Basketball tournaments comes from the FIBA Events Archive which includes rankings not only of the main national team competitions but also of national youth teams. We have followed FIBA conventions in assigning a rank where countries were tied (for example, in some tournaments, the teams finishing ninth to twelfth do not take part in further play-offs to determine finishing order and all are treated as coming ninth). Information on the club teams participating in the Euroleague Final Four are based on Euroleague Basketball: Final Four History.

Despite the comprehensive data collected, the panel is nevertheless unbalanced. We have some information for almost all countries in Europe, but not with the same length of time series for all of them over 1986-2007. One factor here is the creation of new European states in the period. As of 2007, there were 51 countries affiliated to FIBA Europe, but as many as fifteen of these entered the organisation during or after 1992. The collapse of the Soviet Union and the former Yugoslavia lie behind the increase of 30% in the number of countries affiliated to FIBA Europe.[5]

Table 1 shows five columns for each country. Column 1 is the number of years in the period 1986-2007 for which we have information on foreign players taking part in the basketball top and second league in each country. Column 2 displays the data availability as a share of the number of years for which there could have been information, taking into account when countries were created. Thus, for example, we have information for fourteen years on the number of foreign players taking part in the top and second basketball division in Croatia. As this country gained independence and joined FIBA in 1992, this means we have the full information available: 100%. Column 3 shows the number of times in which each European national team has taken part in the final tournament of the European Championship (Eurobasket), World Cup

[4] We thank Marina Arlati, Eligibility Administrator of FIBA Europe, for providing us with this information.

[5] In 1992, eleven new countries joined FIBA Europe: Armenia, Belarus, Bosnia and Herzegovina, Croatia, Estonia, Georgia, Latvia, Lithuania, Moldova, Slovenia and Ukraine. In 1993 the Slovak Republic and the F.Y.R of Macedonia followed these countries as did Azerbaijan one year later. Montenegro affiliated more recently, in 2006.

and Olympic Games since 1986, and column 4 represents this participation as a share of the number of years the country had the opportunity of qualify, i.e. number of years affiliated to FIBA Europe. Column 5 presents the average position of each European country in the international competitions in which it participated. These country averages show clearly that there is no significant problem of sample bias with our data. The correlation between data availability on foreign players (as a share of the number of years affiliated to FIBA Europe) and the number of times the country participated in tournaments is very modest (+0.27) and significant only at 10%. There are countries, such as Austria, Switzerland and the United Kingdom, with full data availability, which have not taken part in even one Eurobasket, World Cup or Olympic Games since 1986. Belgium, Cyprus, Finland, Iceland, Luxembourg and Portugal are further examples of countries providing information on most of the years in the period 1986-2007 that have not taken part in international basketball tournaments. Correlation between data availability and average position in Eurobasket, World Cup or Olympic Games is close to zero (-0.04, where the lower the position, the better the performance) and very far from being significant. So, we do not have any evidence that country data availability is not as if random.

Table 1: Data coverage by country and success in international competitions of European national basketball teams (1986-2007).

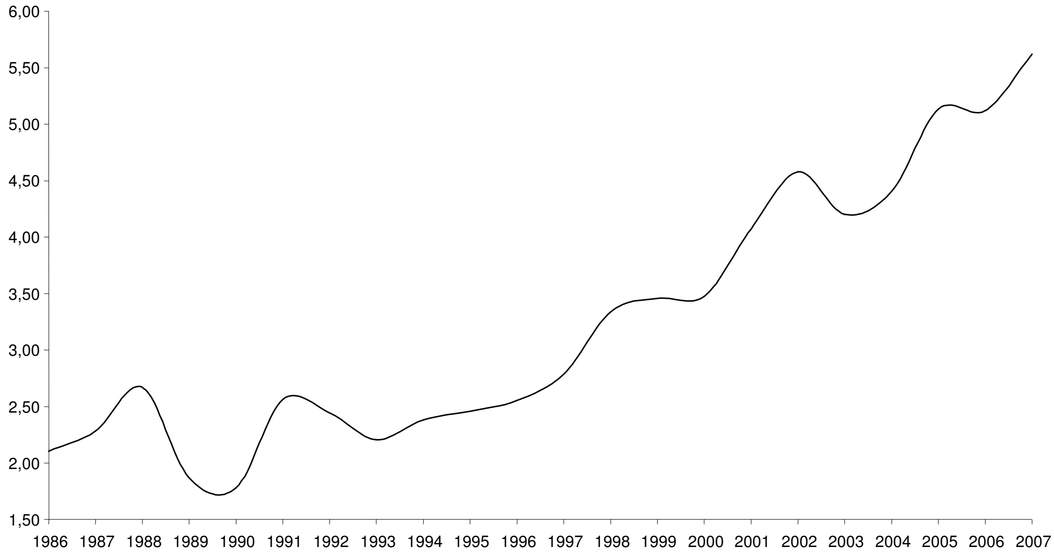
Country	Available years (1986-2007)	Availability as % years in FIBA	Times participating In competitions	Participation as % years in FIBA	Average position competitions
Albania	8	36.4	0	0.0	-
Andorra	1	5.6	0	0.0	-
Armenia	0	0.0	0	0.0	-
Austria	22	100.0	0	0.0	-
Belarus	5	35.7	0	0.0	-
Belgium	22	100.0	1	4.5	12.0
Bosnia and Herzegovina	7	50.0	6	42.9	13.4
Bulgaria	12	54.5	4	18.2	10.9
Croatia	14	100.0	11	78.6	6.5
Cyprus	20	90.9	0	0.0	-
Czech Republic	17	77.3	4	18.2	10.3

Denmark	15	68.2	0	0.0	-
Estonia	13	92.9	2	14.3	10.0
Finland	19	86.4	1	4.5	14.0
France	22	100.0	14	63.6	6.4
Georgia	3	21.4	0	0.0	-
Germany	22	100.0	15	68.2	7.2
Greece	15	68.2	17	77.3	5.0
Hungary	22	100.0	1	4.5	14.0
Iceland	18	81.8	0	0.0	-
Ireland	0	0.0	0	0.0	-
Israel	21	95.5	10	45.5	9.9
Italy	22	100.0	16	72.7	5.5
Latvia	10	71.4	6	42.9	12.4
Liechtenstein	0	0.0	0	0.0	-
Lithuania	14	100,0	13	92,9	4.7
Luxembourg	21	95,5	0	0,0	-
Macedonia, FYR	14	100,0	1	7,7	13.0
Malta	1	4,5	0	0,0	-
Moldova	0	0,0	0	0,0	-
Monaco	0	0,0	0	0,0	-
Netherlands	20	90,9	3	13,6	10.7
Norway	11	50,0	0	0,0	-
Poland	17	77,3	4	18,2	9.3
Portugal	22	100,0	1	4,5	10.0
Romania	4	18,2	1	4,5	12.0
Russian Federation	12	54,5	17	77,3	4.2
San Marino	1	4,5	0	0,0	-
Serbia	6	27,3	19	86,4	4.2
Slovak Republic	14	100,0	0	0,0	-
Slovenia	12	85,7	9	64,3	11.3
Spain	22	100,0	21	95,5	5.2
Sweden	22	100,0	3	13,6	13.3
Switzerland	22	100,0	0	0,0	-
Turkey	16	72,7	10	45,5	9.2
Ukraine	7	50,0	4	28,6	14.4
United Kingdom (England)	22	100,0	0	0,0	-

From the raw data, there is no clear pattern in the performance of recently created countries in international basketball competitions. There are countries that often qualify but with different results: good average rankings (Croatia and Lithuania) and poor average rankings (Bosnia and Herzegovina, Latvia and Slovenia). There are countries not showing up in international competitions at all (Armenia, Belarus, Georgia, Moldova and Slovak Republic) and others (Estonia, Macedonia and Ukraine) that qualify rarely and get poor results. The correlation between the dummy capturing whether the country became affiliated to FIBA since 1986 and participation is positive (0.08) but not significant. Similarly, these new countries do not perform differently from the rest when they qualify: correlation with mean position is positive (0.22, they get worse results) but insignificant.

Figure 5 illustrates the average number of foreign players by team in European basketball leagues. There is a clear upward trend over the period 1986-2007. The increase in the number of foreign players by team becomes particularly large after the 1995 Bosman ruling. Between 1986 and 1995 the number of foreign players by team in the top and second division basketball leagues in Europe increased from 2.11 to 2.46. After 1995, the presence of foreign basketball players increased more significantly: from 2.46 to 5.62 by 2007.

Figure 5. Number of foreign players per team (1986-2007 simple average of European basketball leagues)



5. Empirical Analysis

In this section, we investigate empirically the determinants of the success of European national basketball teams. If the introduction of foreign players into a national league had a harmful effect, or even if it had no effect at all, then there would be no point in the regulator allowing their employment. In this case, according to our model from Section 3, a type two as well as a type one regulator would maximise its objective function by excluding foreign players. However, if there are significant positive spillover effects associated with the interaction of national and foreign players, a type two regulator would have to confront a trade-off problem, as in the theoretical model. The empirical results test whether spillovers are in fact important enough for regulators to have to focus on the trade-off.

In our analysis, two different dimensions of performance of national teams are considered: qualification for a tournament and final position in the tournament. We make this distinction because the two performance measures might be (and indeed appear to be) influenced by different variables. It is also plausible to suppose that heterogeneity in qualifying for tournaments is likely to be endogenous, affected by factors that also influence the degree of success in the tournament. The presence of endogenous sample selection may then result in inconsistent estimates of the coefficients in a model that accounts for tournament rankings if the shocks that affect the probability of participating are highly correlated with the shocks that determines the degree of success in the competition. Based on this premise, we estimate a model for the success of basketball teams, controlling for sample endogeneity by means of Heckman's (1979) two step methodology. In the first stage, we estimate a probit for qualifying for a tournament. This allows us to obtain the Mills ratios that are necessary to correct the OLS estimates of the performance equation estimated in stage two.

Our baseline specification of the performance equation is:

$$y_{i,t} = c_t + \beta_1 f_{i,t} + \beta_2' x_{i,t} + \varepsilon_t \quad (5.1)$$

where y_{it} is the ranking of national team i in a certain competition at time t; since the winner is ranked '1', the runner-up '2', and so on, a lower value of y denotes a superior level of performance. c_t is the constant term specific to tournament t (i.e. we have a series of time dummies), $f_{i,t}$ is the number of foreign players playing in the national league of country i in the season preceding tournament t, and $x_{i,t}$ is a set of economic and sporting variables relevant to performance at tournament t, β_1 and β_2 are scalar and vector parameters to be estimated,; and ε_t is an error term. Details of all the variables included in the model are set out in Table 2.

Note that the specification shown in (5.1), which includes time dummies, yields the same estimates of β_1 and β_2 as if the model had been specified in terms of deviations from the mean rather than levels of variables. The estimate of β_1 can then be employed to assess the impact of one more foreigner in the domestic league of country i on the performance of its national team at tournament t, with number of foreigners playing in other countries held constant.

A related issue is whether the estimate of β_1 truly reflects a causal impact from variation in the number of foreign players to performance or whether, notwithstanding that that the number of foreign players variable relates to an earlier time than the date of the tournament, there might still be a risk of endogeneity. However, to guard against endogeneity (for example, if more foreigners were attracted to stronger basketball countries), we include in (5.1) measures of past achievement by the country's basketball organisation, such as qualification for a previous tournament, success in European club level competition and success in youth tournaments.

Table 2. Variable definitions and sources of data

Variable	Definition	Source
New country	Dummy that takes the value 1 if the country was formed during the period 1986-2007	FIBA Structure: National Federations and leagues www.fiba.com
Host	Dummy that takes the value 1 if the country is host for the international competition and 0 otherwise.	FIBA Events Archive www.fiba.com
Youth	Index of performances by the national youth squad in international age group competitions in the five years previous to the subject tournament (see footnote 9).	FIBA Events Archive www.fiba.com
Per-capita GDP	GDP per capita in constant US Dollars	World Bank: World Development Indicators (November 2007)
Population	Mid-year estimate of all residents in a country	World Bank: World Development Indicators (November 2007)
Runner up Euroleague	The number of teams from a country taking part in the Euroleague final four of that year.	Euroleague Final Tour History www.euroleague.net
Winner Euroleague	Dummy that takes the value 1 if a team from the country won the Euroleague in that year and 0 otherwise.	Euroleague Final Tour History www.euroleague.net
Performance (Eurobasket, World Cups and Olympic Games)	Ranking achieved in the relevant tournament (1 for the winner, 2 for the runner-up, and so on)	FIBA Events Archive www.fiba.com
	Dummy that takes the value 1 if	FIBA Events Archive

Qualification	the country qualifies for the international competition and 0 otherwise (dependent variable in the probit).	www.fiba.com
Nba draft	Number of national players in the NBA draft in the previous year.	
Foreign players	Number of foreign basketball players with licence A in European country leagues (scaled in some specifications, see text, by the size of the country's top division).	FIBA Eligibility Department
Previous participation	Dummy that takes the value 1 if the country had qualified for the preceding tournament in the category (world or European)	FIBA Events Archive www.fiba.com

Given the heterogeneity of the different competitions, we differentiate between, and estimate separate models for, world competitions (World Cups and Olympic Games, up to and including the 2008 Olympics) and the European competition (Eurobasket). Results are shown as Table 3. For each category of tournament, world and European, we report in the first column estimates where the focus variable refers to the total number of foreign players in a country's domestic league. However, we consider that this might not be the most appropriate measure for capturing the impact of foreign players, given that it does not control for the size of the basketball league in the different countries. To avoid this potential weakness, we report in the following column estimates where the focus variable is the total number of foreign players divided by the total number of teams in each league. [6]

Table 3. Determinants of performance in world and European tournaments

	European competitions		**World competitions**	
Performance equation				
New country	0.73	0.64	-0.89	-0.88

[6] This information was obtained from Media Guide.

	(1.18)	(1.18)	(1.90)	(1.90)
Host	-2.17 (*) (1.22)	-2.15(*) (1.23)	0.39 (2.05)	0.45 (2.06)
Youth	-1.78 (1.88)	-1.88 (1.88)	1.18 (1.87)	1.13 (1.89)
Per capita GDP	-0.00003 (0.00006)	-0.00003 (0.00006)	0.0001 (0.0001)	0.0001 (0.0001)
Population	$-1.58x10^{-8}$ ($1.32x10^{-8}$)	$-1.71x10^{-8}$ ($1.33x10^{-8}$)	$9.13.x10^{-9}$ ($2.03\ x10^{-8}$)	$8.52x10^{-9}$ ($2.01\ x10^{-8}$)
Euroleague	-1.44 (1.03)	-1.51 (1.04)	-3.44 (1.44) (**)	-3.49 (1.42) (**)
Draft	-0.41 (0.67)	-0.40 (0.67)	0.36 (0.39)	0.36 (0.39)
Foreign players	-0.02 (0.007) (**)	-0.31 (0.12) (***)	-0.02 (0.01) (**)	-0.27 (0.13) (**)
Constant	9.77 (1.40) (***)	10.02 (1.41) (***)	10.17 (2.91) (***)	10.05 (2.87) (***)
		Selection equation		
Previous participation	1.59 (0 .25) (***)	1.60 (0 .25) (***)	1.03 (0.26) (***)	1.07 (0.25) (***)
New Country	0.29 (0.32)	0.26 (0.32)	0.73 (0.38) (*)	0.76 (0.39) (*)
Countries in Europe	0.06 (0.03) (*)	0.07 (0.03) (**)	-0.01 (0.03)	-0.01 (0.03)
Euroleague	1.07 (0.65)	1.07 (0.65)	0.76 (0.42) (*)	1.08 (0.39)
Youth	7.75 (2.83) (***)	7.42 (2.81) (***)	1.20 (0.66) (*)	1.70 (0.49) (**)
Foreign players	-0.003 (0.004)	-0.08 (0.54)	0.01 (0.003)	0.10 (0.04)

			(***)	(**)
Draft	0.02 (0.30)	0.04 (0.31)	-0.006 (0.24)	-0.04 (0.23)
Per-capita GDP	-6.57×10^{-6} (0.00001)	-2.37×10^{-6} (0.00001)	-0.00003 (0.00002)	-0.00003 (0.00002)
Population	1.38×10^{-8} (5.84×10^{-9}) (**)	1.53×10^{-8} (5.85×10^{-9}) (***)	9.59×10^{-9} (4.09×10^{-9}) (**)	1.05×10^{-8} (4.05×10^{-9}) (**)
Constant	-4.51 (1.64) (***)	-4.75 (1.65) (***)	-1.56 (1.42)	-1.67 (1.41)
Mills ratio	2.52 (0 .75) (***)	2.47 (0 .75) (***)	-3.22 (1.09) (***)	-3.01 (1.03) (***)
Observations	262	262	304	304
Censored	171	171	259	259
χ^2	37.05 (***)	38.38 (***)	25.89 (***)	27.48 (***)

Standard errors appear in parentheses. (*), (**) and (***) denote rejection of the null hypothesis at the 0.10, 0.05 and 0.01 significance levels respectively.

Identification of the model is facilitated by the fact that the foreign players variable in the selection equation refers to the number of foreign players in the year previous to obtaining qualification for the tournament whereas in the performance equation it refers to the number of foreign players in the year before the tournament itself. These are different, especially for Eurobasket where the right to participate can be obtained two or four years before, depending on the performance of the team in the world championship and Olympic Games.[7] On the other hand, in

[7] To be specific, countries participating in the previous World Cup and Olympic Games go directly to the Eurobasket. Also a country which wins the Olympic tournament (World Cup) qualifies automatically for the next World Cup

world competitions, variables for the number of foreign players in the performance and selection equations are more similar as qualification is either obtained within a few months previous to the tournament or in the Olympic Games or World Cup played the year before.

We also include in the regressors for stage one (only) the number of European countries eligible to qualify. Our prior was that this variable would be signed positive. For example, suppose a country's ranking suggested that it had a marginal chance of progressing to the tournament. Its prospects would appear likely to be enhanced if the countries close to it in the rankings split up into component parts.

This factor could not, however, help in the subsequent tournament, if it indeed reached that stage, and therefore 'number of countries in Europe' is a classic example of a variable that facilitates identification of the model because it can be excluded from one of the two equations.

From the results for stage 1, the probit, we have our first substantive result for testing the spillover hypothesis. It is evident that the number of foreign players has a highly significant and positive influence on the probability of qualifying for world tournaments; this constitutes strong support for the hypothesis. However, the result is not replicated for Eurobasket.

Qualification for world competitions is, of course, much harder than for Eurobasket, because the number of places available (to European teams) is far smaller. Together, the results from the two sets of probits imply that, on the margin in world competitions, where only the stronger countries have a serious chance of succeeding, spillovers from foreign players exert the influence anticipated in the spillovers literature. However, the strongest countries nearly always qualify for Eurobasket. Here, competition for the marginal places is between teams with relatively modest ability. This time, contact with foreign players has no significant effect. We hypothesise that the lack of a spillovers effect for the Eurobasket reflects that spillovers from foreign players matter for improving level of performance for top, but not middle, range national teams. This would be consistent with the proposition in Kremer (1993)

(Olympic Games). Therefore, a team that wins a World Cup ensures its participation in the next two Eurobaskets.

that the more skill indigenous workers already have, the more they can benefit from spillovers.[8]

Considering now the estimates from stage two (performance in tournaments), it may be noted that the coefficient on the inverse Mills ratio is significant in each model (world and European), suggesting that it is indeed appropriate to correct for selection bias. Signs on the inverse Mills ratio are, however, different as between the models. This is likely again to be related to the large discrepancy in how hard it is to qualify for the two types of tournament. Recalling that performance is measured by finishing position in the tournament (i.e. an increase in the dependent variable signifies worse performance), the positive sign on the inverse Mills ratio in the Eurobasket results may be interpreted as follows. Some teams observed in the set of Eurobasket observations have been enabled to participate only because of the influence of the variable 'countries in Europe' (which is present and significant in the stage one equation but absent from stage two). These teams are selected into stage two despite possessing relatively low endowment of some unobserved characteristic that influences success. Such teams, which are there only because of this fortunate circumstance, then do less well in the tournament than their *observed* characteristics might suggest they should. This would give negative correlation between the errors in the first stage probit and the errors in the second stage performance equation, yielding a positive sign on the inverse Mills ratio. By contrast, the World Cup and Olympic events have only a small number of places available to those who enter the European qualifying events. Here the number of countries variable is insignificant because it does not affect the relative standings of the teams, like Greece and Spain, which are invariably in contention with each other for the places available. Now the negative sign on the inverse Mills ratio implies a negative correlation between stage one and stage two errors; and the implication is the straightforward one that teams which qualify typically possess unobserved characteristics that also improve their performance at the world event itself.

---

[8] A potential drawback of our specification is that we measure the influence of foreign players only from the number in the previous year. This is justified because there is a strong serial correlation in the number of foreign players in the different leagues and including all lags could generate a serious problem from colinearity. Moreover, including variables with different lags in the regression produces a significant reduction of degrees of freedom in the estimation.

In the stage two results, which account for ranking in a tournament, the variables measuring the presence of foreign players in a domestic league are consistently signed negative (i.e. they exert a favourable impact on performance) across the world and European competition categories. These results, for competitions restricted to strong national teams, support the hypothesis underpinning this paper, that there are positive spillovers in interaction between European and (mostly) American players and these dominate any negative effect on national team performance that may follow from importing more playing talent. The result has implications beyond basketball. For example, English commentators have proposed restrictions on the number of foreign players permitted in domestic football and cricket because they blame the deterioration in national team performance on increasing numbers of imports. On the basis of our examination of the impact of player mobility in another major world sport, the intensification of restrictions would not be evidence based and may well prove counter-productive.

Although the findings here are relevant to these (and other) sports, two caveats apply. First, in football and cricket, in contrast to European basketball, it is the case in some countries, such as England, that imported players are often internationals and thus interaction between players affects not only ability in the host country national team but also ability in their opponents' national teams. This introduces some ambiguity into predictions concerning the effect of foreign players on host country international ranking. Second, there is likely to be a limit to the extent to which more and more foreign players can raise standards of indigenous players since if, to take an extreme case, all players in the professional league were foreign, there would only be amateurs left to fill the national team and it could scarcely hope to compete on the world stage. For basketball, we tested whether the square of the number of foreign players was significant in any of our equations but it never was. Thus there was no indication of an upper limit beyond which further increases in foreign numbers would lead to deterioration of national team performance. But of course, there could be such a turning point beyond the range of the number of foreign players variable observed in our data set and it is, in principle, possible that some leagues in some sports operate beyond such a turning point.

Finally, in our comments on the estimation, we note the more interesting findings with respect to the control variables included in our specification. From the stage 1 regression, there is evidence of strong inertia in qualification for tournaments. This reflects that some countries, such as Norway, Belgium and Denmark, never qualified for a tournament, even once, during the period of analysis whereas Italy, Greece, Russia and Spain were present in almost all. Host countries qualify automatically for all tournaments and the corresponding dummy variable is therefore excluded from the selection equation. Evidence from the performance equation that host countries benefit from their home advantage is weak and limited to the Eurobasket competition.

A second striking feature is the positive influence, at least on the probability of qualification, from having developed a pool of talented young players (as reflected by the performance of the national youth squad in the preceding five years[9]). However, there appears to be no benefit to international performance from countries having had players in the NBA draft. This variable might have been anticipated to be important as a proxy for star quality. However, those close to being or already in contract with American teams are not perhaps motivated to expose themselves to an injury or any other problem that could put at risk their professional life in the NBA. This may affect their effort when representing their home country. And, in some cases, their clubs may even deny permission for them to play at all.

Population and per capita income have been proposed as significant determinants of international sporting success (Bernard and Busse, 2004, Moosa and Smith, 2004) but prove to play only a limited role here. Countries with larger populations have significantly enhanced probabilities of qualification for international tournaments; but, amongst teams that finally go to the tournament, population size does not help to account for final rankings. Per capita income is insignificant in all specifications of both the qualification and performance equations. The insight from this finding is that basketball is not a luxury sport, probably because it has limited requirements in terms of equipment and facilities, and countries with relatively low per capita income can therefore obtain good results in international competitions. In fact, this is the case for Eastern countries such as Serbia, Lithuania, Croatia and Russia and the

[9] The index of performance in youth tournaments is a weighted average of the number of countries taking part in a (European or world) tournament divided by the finishing position of the subject country. Weights are allocated according to age limits in the tournament, e.g. an under-22 competition counts three times as much as one for under-16 players. The series is available from the authors on request.

policy implication is that this is a sport on which an emerging nation might be advised to focus if it aspires to improve its international sporting profile.

6. Concluding remarks

Globalisation of labour markets has prompted many countries to re-evaluate the merits of dependence on imported skilled labour. Amongst arguments in defence of accepting foreign workers is that, where they work in teams with domestic employees, as is typical in the creative sector, they are likely to increase the performance of those domestic employees. Amongst the mechanisms for this effect is that locals will learn new techniques and practices brought from the origin countries of the immigrants.

Team sports offer a natural environment in which to test this idea since the athletes work in teams by definition. We have assembled a unique and comprehensive data set on European basketball and use it above to examine whether countries with increased numbers of imported players in clubs witness greater achievement by local players when the latter compete on behalf their country in Olympic, World and European Championships. We avoid potential bias by modelling qualification for tournaments as well as performance in tournaments. Adoption of the Heckman two-step approach avoids this bias. Further, in practice, qualification for tournaments is a criterion of success in itself for most countries and deserves to be modelled.

Clear and consistent results emerge. It is true that arguments can be constructed for some negative effects from the importing of foreign talent; for example there may be a delay in local players securing a first team place and vital experience. However, empirically, any negatives are unambiguously dominated by the positive influence of foreign players. Openness to imports has in practice proven beneficial for the health of the national sport as measured by national team qualification for world tournaments and degree of success in those world and European tournaments for which qualification was earned. Therefore, while labour market regulators may be under pressure to increase employment of domestic players by imposing restrictions on foreigners, they face a clear trade off if they are also interested in the country's international achievements. More places for domestic players in the national league is predicted to lead to deterioration in national team performance.

References

Barro, R. and X. Sala-i-Martin. *Economic Growth*. New York: McGraw-Hill, 1995.

Baur, D.G. and S. Lehmann. "Does the Mobility of Football Players Influence the Success of the National Team?." Institute for International Integration Studies, Discussion Paper No. 217, 2007.

Battu, H., C.R. Belfield and P.J. Sloane. "Human capital spill-overs within the workplace." *Oxford Bulletin of Economics and Statistics,* 65 (5), 2003, 575-594.

Bayard, K. and K.R. Troske. "Examining the employer-size wage premium in the manufacturing, retail trade, and service industries using employer-employee matched data." *American Economic Review, Papers and Proceedings*, 89 (2), 1999, 99-103.

Ben-Gad, M. "The Economic Effects of Immigration: a Dynamic Analysis." *Journal of Economic Dynamics and Control*, 28 (9), 2004, 1825-1845.

Bernard, A.B. and M.R. Busse. "Who wins the Olympic Games: economic resources and medal totals." *Review of Economics and Statistics*, 86(1), 2004, 413-417.

Borjas, G.J. "The Self-Employment Experience of Immigrants." NBER Working Paper No. 1942, 1986.

Borjas, G.J. "The labor demand curve is downward sloping: reexamining the impact of immigration on the labor market." *The Quarterly Journal of Economics*, 118 (4), 2003, 1335-1374.

Frick, B. "The Football Players' Labour Market: Empirical Evidence from the Major European Leagues." *Scottish Journal of Political Economy*, 54 (3), 2007, 422-446.

Hoffmann, R., C. G. Lee and B. Ramasamy. "The Socio-Economic Determinants of International Soccer Performance." *Journal of Applied Economics*, 5 (2), 2002, 253-272.

Idson, T. L. and L. H. Kahane. "Team effects on compensation: an application to salary determinants in the National Hockey League." *Economic Inquiry*, 38, 2000, 345–57.

Idson, T. L. and L. H. Kahane. "Teammate effects on pay." *Applied Economics Letters*, 11(12), 2004, 731-733.

Kendall, T. "Spillovers, Complementarities, and Sorting in Labor Markets with an Application to Professional Sports." *Southern Economic Journal*, 70(2), 2003, 398-402.

Késenne, S. "The peculiar international economics of professional football in Europe." *Scottish Journal of Political Economy*, 54 (3), 2007, 388–99.

Kremer, M. "The o-ring theory of economic development." *The Quarterly Journal of Economics*, 108(3), 1993, 551-575.

Krugman P. *Geography and Trade*, edited by MIT Press, Cambridge, MA, 1991

Longhi, S., P. Nijkamp and J. Poot. "A meta-analytic assessment of the effect of immigration on wages." *Journal of Economic Surveys*, 19(3), 2005, 451-477.

Milanovic, B. "Globalization and goals: does soccer show the way?." *Review of International Political Economy*, 12 (5), 2005, 829 - 850.

Moosa, I.A. and L. Smith. "Economic development indicators as determinants of medal winning at the Sydney Olympics: an extreme bound analysis." *Australian Economic Papers*, 43(3), 2004, 288-301.

Porter, M. *The competitive Advantage of Nations*, New York: The Free Press, 1990.

Rosen, S and A. Sanderson. "Labour Markets in Professional Sports." *Economic Journal*, 111 (496), 2001, 47-68.

Torgler, B. and S.L. Schmidt. "What shapes player performance in soccer? Empirical findings from a panel analysis." *Applied Economics*, 39 (18), 2007, 2355–2369.

World Bank. *Workers in an Integrating World: World Development Report 1995*. New York : Oxford University Press, 1995.

Zak TA, C.J. Huang and J.J. Siegfried "Production efficiency: the case of professional basketball." *Journal of Business*, 52(3), 1979, 379–393.

Zimmermann, K. "European labour mobility: challenges and potentials." *De Economicst*, 127(4), 2005, 425-450.

Ultimi Contributi di Ricerca CRENoS

I Paper sono disponibili in: http://www.crenos.it

09/13 *Fabio Cerina, Francesco Mureddu,* "Is Agglomeration really good for Growth? Global Efficiency and Interregional Equity"
09/12 *Federico Crudu,* "GMM, Generalized Empirical Likelihood, and Time Series"
09/11 *Francesca Mameli, Gerardo Marletto,* "Can national survey data be used to select a core set of indicators for monitoring the sustainability of urban mobility policies?"
09/10 *Emanuela Marrocu, Raffaele Paci,* "They arrive with new information. Tourism flows and production efficiency in the European regions"
09/09 *Oliviero A. Carboni,* "An Empirical investigation of the Determinants of R&D Cooperation"
09/08 *Fabiano Schivardi, Eliana Viviano,* "Entry Barriers in Retail Trade"
09/07 *Rinaldo Brau, Carlo Carraro,* "The Design of Voluntary Agreements in Oligopolistic Markets"
09/06 *Francesca Mameli, Gerardo Marletto,* "A participative procedure to select indicators of sustainable urban mobility policies"
09/05 *Claudio Detotto, Manuela Pulina,* "Does more crime mean fewer jobs? An ARDL model"
09/04 *Francesco Pigliaru,* "Persistent Regional Gaps and the Role of Social Capital: Hints from the Italian Mezzogiorno's case"
09/03 *Giovanni Sulis,* "Wage Returns to Experience and Tenure for Young Men in Italy"
09/02 *Guido Ferrari, Giorgio Garau, Patrizio Lecca,* "Constructing a Social Accounting Matrix for Sardinia"
09/01 *Giorgio Garau, Patrizio Lecca, Lucia Schirru,* "Does Deflation Method Matter for Productivity Measures?"
08/23 *Barbara Dettori, Emanuela Marrocu, Raffaele Paci,* "Total factor productivity, intangible assets and spatial dependence in the European regions"
08/22 *Fabio Cerina, Sauveur Giannoni,* "Pollution Adverse Tourists and Growth"
08/21 *Carina Hirsch,Giovanni Sulis,* "Schooling, Production Structure and Growth: An Empirical Analysis on Italian Regions"
08/20 *Fabio Cerina, Francesco Mureddu,* "Agglomeration and Growth with Endogenous Expediture Shares"
08/19 *Dimitri Paolini,* "Screening and short – term contracts"
08/18 *Massimo Del Gatto, Adriana Di Liberto, Carmelo Petraglia,* "Measuring Productivity"
08/17 *Edoardo Otranto,* "Identifying Financial Time Series with Similar Dynamic Conditional Correlation"
08/16 *Rinaldo Brau, Raffaele Doronzo, Carlo V. Fiorio, Massimo Florio,* "Gas Industry Reforms and Consumers' Prices in the European Union: an Empirical Analysis"
08/15 *Oliviero A. Carboni,* "The Effect of R&D Subsidies on Private R&D:Evidence from Italian Manufacturing Data"
08/14 *Gerardo Marletto,* "Getting out of the car. An institutional/evolutionary approach to sustainable transport policies"
08/13 *Francesco Lisi, Edoardo Otranto,* "Clustering Mutual Funds by Return and Risk Levels"

Finito di stampare nel mese di Novembre 2009
Presso **studiografico&stampadigitale Copy Right**
Via Torre Tonda 8 – Tel. 079.200395 – Fax 079.4360444
07100 Sassari

www.crenos.it

ISBN 978-88-84-67-554-5