



Long-term relative age effect: Evidence from Italian football

Giambattista Rossi, Luca Fumarco / 23 Apr 2016

A vast cross-discipline literature provides evidence that – in both education and sports – the youngest children in their age group are usually at a disadvantage because of within-group-age maturity differences, known as the ‘relative age effect’. This column asks whether this effect could last into adulthood. Looking at Italian professional footballers’ wages, the evidence suggests that the relative age effect is inescapable.

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What are the consequences of the relative age effect? For example, relatively young pupils (i.e. the youngest pupils in their age group) are more likely to be held back in school (Dixon et al. 2011) and receive lower grades (Bedard and Dhuey 2006, Ponzo and Scoppa 2014, Navarro et al. 2015). They also are more likely to be diagnosed with a learning disability (Dhuey and Lipscomb 2009) and with attention-deficit/hyperactivity disorder (Zoëga et al. 2012).

Could the relative age effect last into adulthood? Could people receive different wages because of childhood within-group-age maturity differences? Could people who suffered from adverse relative age effect in childhood be under-represented in top job positions? This column discusses some possible answers.

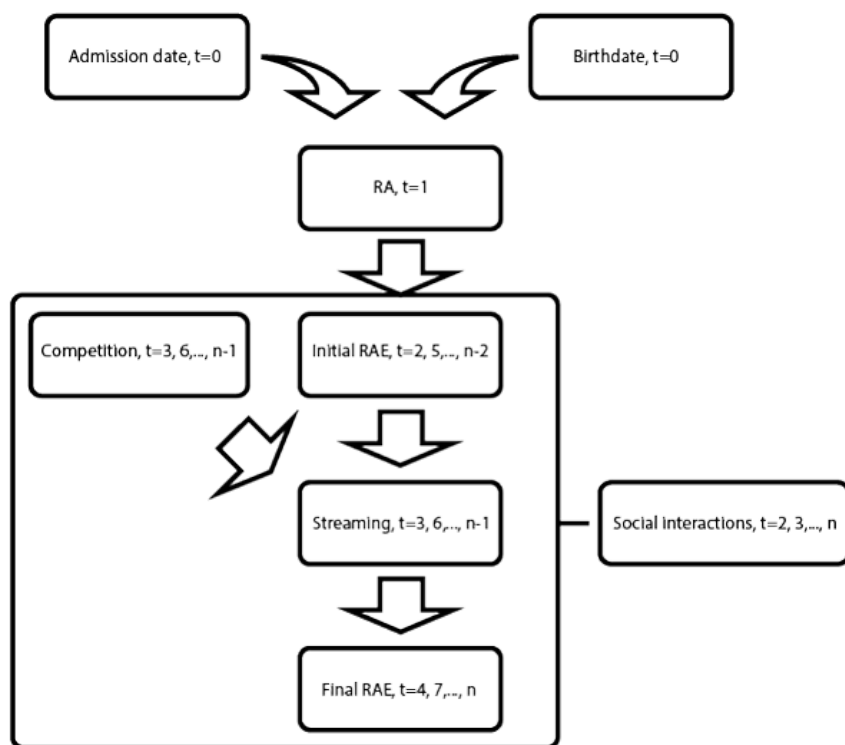
The path towards a long-term relative age effect

Children are usually grouped based on a relevant ‘cut-off date’ – in these groups, some children are relatively older than others, which causes maturity gaps and therefore performance gaps between them. For example, in some European countries, the age-grouping system in school is based on the calendar year (i.e. the cut-off date is 1 January) and children start school in September in the year when they turn six years old. In the first class, there are some children who are six before school starts (i.e. born in January-August) and others who turn six after school has started (i.e. born in September-December).

Consider the difference in maturity between children born in the two extreme months – pupils born in January are about 17% older than pupils born in December. This large maturity gap causes a performance gap – the relative age effect.

Although the relative age effect is initially caused by a pure maturity gap, social factors influence its magnitude and could provoke its persistence. In education and sport activities, children might be streamed (e.g. they are tracked into different learning/training paths) and/or selected (e.g. they are chosen to participate in optional after school classes or to play in their soccer team’s starting lineup) based on their perceived skills. Furthermore, streaming and selection are affected by the level of competition between kids (e.g. there is a limited and pre-established number of spots for after school classes or in starting lineups of soccer teams). Finally, the whole process is affected by interactions (e.g. the Pygmalion effect, see Hancock et al. 2013 – soccer trainers will provide special attention to those children whom they perceive are more talented, who as a result become more talented due to this greater attention). The process that affects the initial relative age effect can be summarised in Figure 1, taken from Fumarco and Rossi (2015).

Figure 1. Process affecting initial relative age effect



This process could lead to a possible long-lasting relative age effect, and therefore could be visible even when initial maturity differentials disappear. In particular, paraphrasing Cascio's (2008) paper – long-lasting relative age effects are likely to occur when children are streamed and selected based on perceived skills since the beginning of their training or education.

Evidence of a long-term relative age effect

Studies that investigate the existence of a relative age effect in adulthood are limited and often display discordant results. Some studies do not find evidence of a relative age effect on wages (e.g. Crawford et al. 2013, Larsen and Solli 2012). Other studies provide evidence of a negative relative age effect on wages and employment rates (e.g. Peña 2015, Black et al. 2011, Plug 2001). Results are also contradictory when the focus shifts to the relative age effect on tertiary education performance. Roberts and Stott (2015) find that students born toward the end of the selection year perform better and Peña (2015) finds that relatively older students graduate from college more frequently, whereas Kniffin and Hanks (2015) do not find any gap in the possibility to earn a doctoral degree. It is likely that one of the main reasons for not obtaining clear and coherent results on a long-term relative age effect is the lack of very detailed data.

The sports labour market provides a more suitable framework than that of the standard labour market and tertiary education system for studying long-term relative age effects because of the (often public) very rich data. Studies that use these data typically provide one result: because of streaming and selection, older athletes are over-represented in the population of athletes in any given tournament – for example, in top football leagues (Musch and Hay 1999), the Olympic Games (Joyner et al. 2013), and the NFL (Böheim and Lackner 2012).

However, the sports literature has rarely explored possible long-term effects also in terms of wages. To contribute to this limited literature, in a recent paper (Fumarco and Rossi 2015) we investigate relative age effects on footballers' wages in a very large and detailed dataset, where players are followed over several seasons, in one of the most competitive football leagues – the top Italian league, Serie A.2

Relative age effects on representativeness and on wages of Serie A footballers

The dataset contains information on all Italian players from seven consecutive Serie A seasons, 2007-08 to 2013-14, for a total of 508 Italian footballers who have played for at least one Serie A team over these seven seasons. In Serie A there are 20 teams – at the end of each season the last three teams are relegated, while the top three teams from the second league are promoted. We focus only on Italian players because information on age-group systems of other countries is difficult to retrieve, and we do not feel comfortable assuming that foreign Serie A players trained under the same cut-off date. In fact, we know from other studies that until the mid-1990s, different cut-off dates were adopted in different EU and non-EU countries, such as, Belgium, Germany, Australia and Brazil (1 August), Japan (1 April), and Great Britain (1 September, which is still the current cut-off date).

In Italy, the cut-off date for the age-grouping system is 1 January (for complete details on the youth system, see Fumarco and Rossi 2015). In the presence of the relative age effect, players born soon after this date are expected to have enjoyed an advantage over relatively younger players born on dates approaching 31 December throughout their youth. This advantage could be reflected in at least two ways on Serie A players – distribution of players' birthdates (i.e. relatively older players could be over-represented in the population of Serie A Italian players,

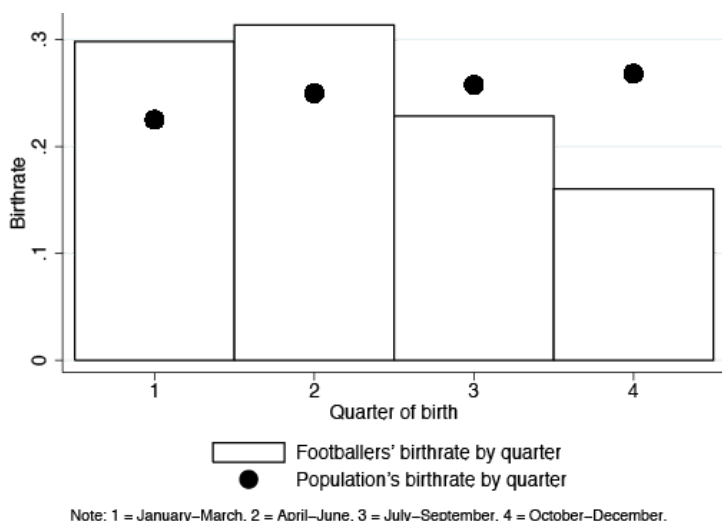
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Representativeness

Figure 2 represents the distribution of quarters of birth among Serie A Italian players.

Figure 2. Distribution of quarters of birth among Serie A Italian players

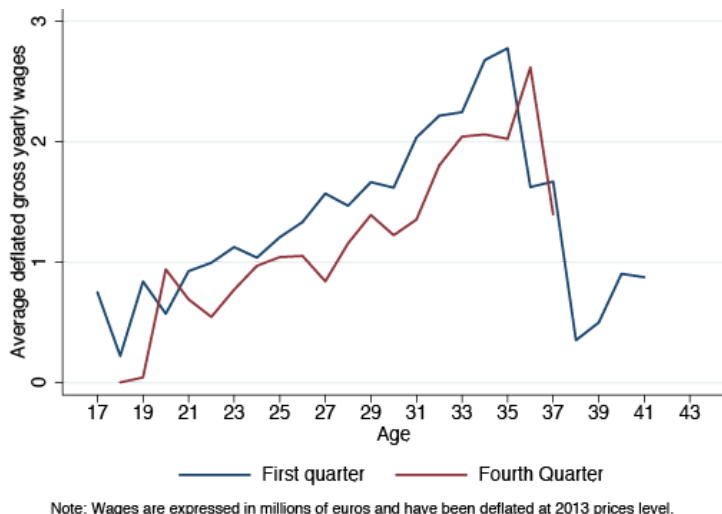


The black dots represent average quarters of birthrates in Italy between 1965 and 1995 – this is the range of years of birth in our dataset. Clearly, players born in the first quarter are over-represented, second-quarter players are still over-represented but to a slightly lesser extent, third-quarter players are under-represented and fourth-quarter players are even more strongly under-represented. When we consider months in lieu of quarters, the trend is more striking (see Fumarco and Rossi 2015). This result seems to be strongly consistent throughout European countries, as illustrated in Poli et al. (2015) — in this study authors decide to assume uniformity in European cut-off dates.

Wages

Figure 3 provides average gross yearly wages (deflated at the 2013 prices level) of Serie A Italian players born in the first and fourth quarter (the other two quarters are not reported for illustrative purposes).

Figure 3. Average gross yearly wages of Serie A Italian players



Clearly, relatively older players receive higher wages than relatively younger counterparts during most of their soccer career.

Figures 2 and 3 illustrate descriptive statistics, but their insights are confirmed by statistical methods of inference (see Fumarco and Rossi 2015).

Possible remedies and further studies

These findings provide sound evidence for a long-term relative age effect in football, in terms of both representativeness and wages, which partially satisfies our initial questions. To remediate the existence of relative age effects in the Italian football, a reform of the age-grouping system could be carried out (e.g. a shortening of the chronological distance between oldest and youngest players in the same age group). Also, football coaches could be educated on this phenomenon so they can account for it when they train children. Combatting the relative age effect in soccer is important for the sake of equity, children's happiness, and additionally because it would reduce the waste of potentially skilled (but not yet mature) relatively younger players in youth categories.

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investigations in tertiary education system and in the more general labour market to gain generalisable conclusions on the existence of long-term relative age effects.

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Endnotes

1 This result has also been observed in other very competitive labour markets. Muller-Daumann and Page (2015) as well as Du et al. (2012) find evidence that people born toward the end of the selection year are under-represented among US congressmen and among CEOs for S&P 500 firms respectively. Finally, a similar result has been observed when investigating suicide rates in Japan and Canada. Matsubayashi and Ueda (2015) and Thompson et al. (1999) find that relatively younger people have a higher suicide rate.

2 To the best of our knowledge, before this study only Ashworth and Heyndels (2007) investigate the relative age effect on footballers' wages. They used a sample that covered a shorter period of time in the German first league from mid-1990s, and before the effects of the Bosman ruling fully kicked in (this ruling affected players' mobility and introduced free agency, possibly increasing competition among them).

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