

This item is the archived preprint of:

Towards a sustainable financial model for professional tennis players

Reference:

Balliauw Matteo, Verlinden Thomas, Van Den Spiegel Tomas, Van Hecke Jani.- Towards a sustainable financial model for professional tennis players
Antwerp, University of Antwerp, Faculty of Applied Economics, 2017, 22 p.(Research paper / University of Antwerp, Faculty of Applied Economics ; 2017-006)
To cite this reference: <https://hdl.handle.net/10067/1429110151162165141>

DEPARTMENT OF TRANSPORT AND REGIONAL ECONOMICS

**Towards a sustainable financial model
for professional tennis players**

Matteo Balliauw, Thomas Verlinden, Tomas Van Den Spiegel & Jani Van Hecke

UNIVERSITY OF ANTWERP
Faculty of Applied Economics



City Campus
Prinsstraat 13, B.226
B-2000 Antwerp
Tel. +32 (0)3 265 40 32
Fax +32 (0)3 265 47 99
www.uantwerpen.be

FACULTY OF APPLIED ECONOMICS

DEPARTMENT OF TRANSPORT AND REGIONAL ECONOMICS

Towards a sustainable financial model for professional tennis players

**Matteo Balliau, Thomas Verlinden,
Tomas Van Den Spiegel & Jani Van Hecke**

RESEARCH PAPER 2017-006
MAY 2017

University of Antwerp, City Campus, Prinsstraat 13, B-2000 Antwerp, Belgium
Research Administration – room B.226
phone: (32) 3 265 40 32
fax: (32) 3 265 47 99
e-mail: joeri.nys@uantwerpen.be

**The research papers from the Faculty of Applied Economics
are also available at www.repec.org
(Research Papers in Economics - RePEc)**

D/2017/1169/006

Towards a sustainable financial model for professional tennis players

Matteo Balliauw*, Thomas Verlinden, Tomas Van Den Spiegel, Jani Van Hecke

Abstract

In professional tennis, the income is distributed unequally among the different levels. This paper quantifies and analyses the prize money income and costs of professional tennis players from a sports economics viewpoint. The current prize money distribution is linked to the organisational structure of tennis. Because of high career investment costs, it is difficult for players with a ranking below 250 to cover their expenses. Interviews with all involved stakeholder groups were held to gain deeper insight in the current issues and to formulate possible solutions to come to a more acceptable and sustainable individual financial model of professional tennis. Less players should consider themselves professionals. The professional players should compete for increased and more horizontally distributed prize money. The other players may opt for a semi-professional status. In addition, the development track for young and promising talented players cannot be neglected, in order to guarantee the future development of the sport.

Keywords: Tennis, Income inequality, Financial model, Organisational policy, Sports economics.

1. Introduction

Like other popular sports, professional tennis is perceived as a lucrative profession. Recently however, international media have focused on an income gap in tennis. Bane & Gescheit (2015), Beaton et al. (2014) and Kutz (2014) found that world's best ranked tennis player earned almost ten times more prize money than the 32nd best ranked player. Furthermore it has been indicated that more than half the total available prize money goes to the top 1% of all ranked tennis players. This is different from other individual sports, e.g. golf, with a more horizontal prize money distribution. Moreover, income in tennis is strongly related to the individual sporting success, as opposed to team sports, e.g. football, where players earn a salary from their club. The question can be posed whether all so-called professional tennis players are able to live from playing tennis as their professional occupation. In academic literature so far, little attention has been given to this issue. The aim of this paper is to fill this gap by quantifying and analysing the financial situation of professional tennis players.

In order to study professional tennis, an initial working definition of a professional tennis player is based on the criteria of ITF (International Tennis Federation). As a professional tennis player is considered a player who registered for a Pro IPIN (International Player Identification Number) Membership, allowing players to earn ranking points by participating in official tournaments. By this definition, ITF identifies about 9000 male and 5000 female professional players (ITF, 2014). The research question in this study is as follows: 'Is there a problematic, but solvable income inequality between the different levels at the professional tennis circuit?' This question can be divided into different sub-topics. First, the existence of the income inequality and its size have to be identified from an economic perspective. Subsequently, the question is asked to what extent this inequality poses a problem to the professional tennis world. Afterwards, causes of the inequality are formulated in order to propose possible solutions in a final stage of this research. Because the differences between male and female players are rather limited from a qualitative perspective, in this paper the male circuit is used to analyse the financial model of professional tennis.

To give answers to the research questions, the currently limited literature is supported by numerical data. Additionally, to explore the financial situation in more detail, interviews were conducted with members of each stakeholder group involved in the Flemish framework of professional tennis¹. Throughout this analysis, three major elements constituting the financial situation of players are identified and studied in greater detail: the prize money earnings for a professional tennis player, his costs (which are the investments to develop his career) and the organisational side of professional tennis. Other factors that may increase the income inequality in tennis are earnings from starting fees, sponsorships and licensing and other occupations. They are however omitted due to a lack of accurate data. Because the interviews concentrate on the international context in which the stakeholders are involved, most of the results are applicable to the entire circuit.

The structure of this paper is as follows: Section 2 identifies the income inequality from the available literature. Section 3 extends the current knowledge of the income inequality by numerical substantiation. Section 4 explains the methodology that was used to conduct interviews with the involved stakeholder groups. Section 5 presents the results of the interviews, indicating the problems of the current financial situation, its causes and possible solutions. Section 6 brings together the main conclusions of this research, leading to recommendations for the sector and suggestions for further research.

2. Identification of the income inequality in professional tennis

In this section, the income inequality in professional tennis is identified. Income is defined by Case & Fair (2013) as the sum of wages, salaries, profit, interest and loans earned over a certain period. There are four possible sources of income for a tennis player: prize money, starting fees, earnings from sponsorship and licensing and earnings from other occupations (e.g., interclub tennis or teaching). In this study, starting fees, sponsorships and licensing and other earnings are omitted from the analysis for different reasons. First of all, the available information on these aspects of prize money is limited. Secondly, by focusing on prize money, a more unambiguous source of income is used. It can be overseen by the organising bodies of tennis and it is directly related to a player's level, ranking and tournament progress. The earnings from sponsoring however are not solely related to the sporting performance, but also personal characteristics have an influence on a player's popularity and hence on a sponsor's willingness to pay (Garcia-del-Barrio & Pujol, 2015). Thirdly, starting fees and sponsorship and licensing earnings are mainly received by the top players. For these players, prize money makes up for 10 to 50% of the total income, following calculations based on Forbes (2017). The share of prize money in the total income increases sharply for lower ranked players, although exact figures are not available. At this lower level, sponsoring rather consists of free materials, if it is already present. As a result, these omitted sources of income do not have an impact on the financial situation of the majority of professional tennis players, but only for players who already earn a lot of money from prize money. Finally, the other earnings come from occupations where a professional player does not engage in when his revenues from being a professional player are sufficiently high. Additionally, the lower ranked players who earn these additional gains indicate that such earnings are merely sought to cover costs as much as possible. They vary a lot between individual players.

The concept of income inequality is determined by the distribution of total income among the players. When each player has the same income, individual income is equal to the average

¹ In Belgium, tennis is governed and organised by the individual regions.

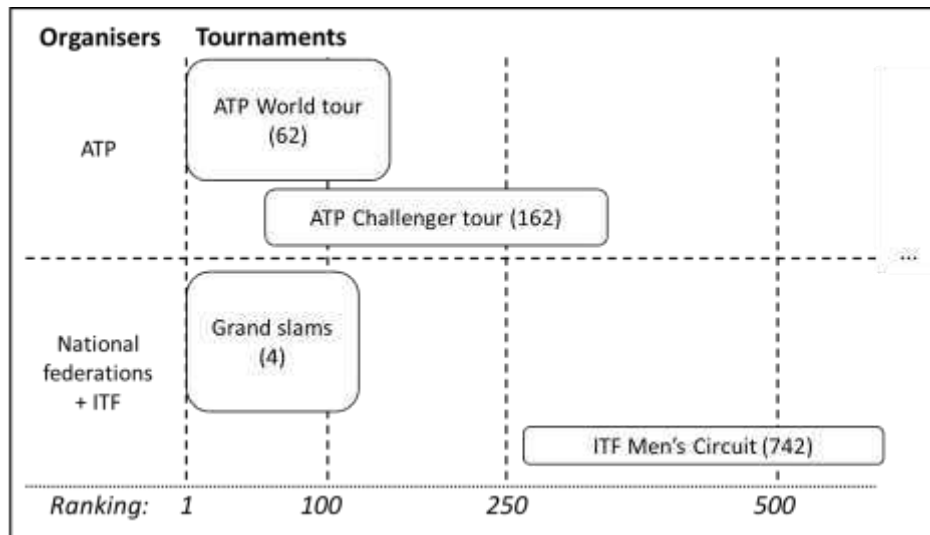
income and there is no inequality. When one person only earns all the available income, the inequality is maximal (De Borger et al., 2015). This section qualitatively identifies the prize money income inequality by looking at the origins of and evolutions in tennis organisation. Subsequently, the findings are analysed from a sports economic perspective.

2.1 The evolution of tennis organisation: the root of the income inequality

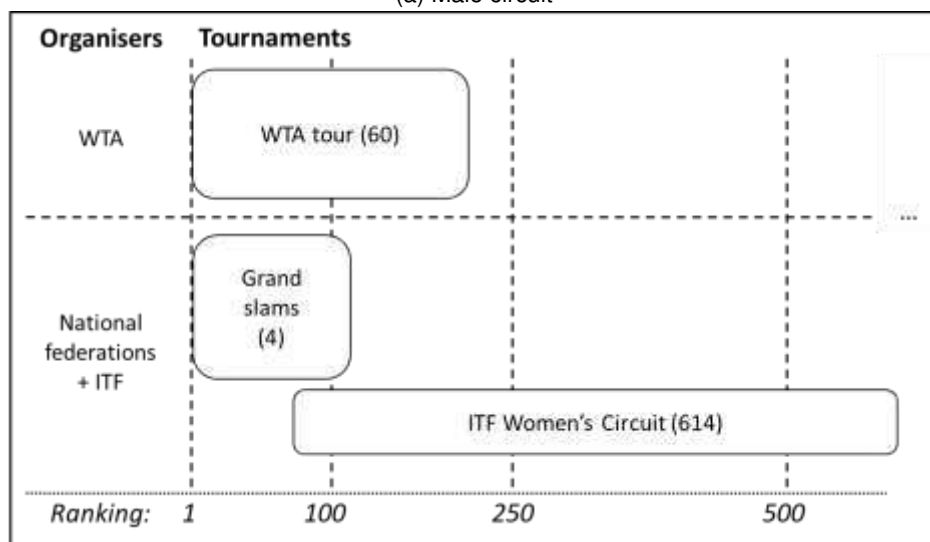
At the beginning of tennis, there was a discrepancy between professional tour tournaments with prize money and the prestigious amateur tournaments organised by the national federations and the International Lawn Tennis Federation (ILTF, now known as ITF). Players were not authorised to compete in both, as amateurs were not allowed to have an income from playing tennis. In 1968, this situation changed when a tour of 12 open tournaments with prize money was organised. This is considered as the start of professional tennis as it is known nowadays. This professional circuit led to an increase in popularity of the sport, income from broadcast contracts and hence the availability of prize money. Nevertheless, conflicts between national federations, ILTF and other commercial tours remained. The ongoing dispute led to the foundation of the syndicate Association of Tennis Professionals (ATP) by male professional tennis players as a protection of their interests against federations and commercial tours in 1972. The foundation of the Women's Tennis Association (WTA) followed one year later (Bowers, 1999; 2001; Lorge & Bruce, 2014).

The history and reasons behind the emergence of the main tennis organisations still play an important role in how tennis is organised today by ATP, WTA, ITF and to a lesser extent by the national federations. In order to distribute prize money and starting fees to the players, the tournament organisers rely on revenues from ticket sales, sponsorships and TV-rights.

Figure 1 represents the total prize money distribution over the different associations per gender. The vertical height of a tour or circuit represents the amount of prize money available per tournament. The number of tournaments per tour is given between brackets. Figure 1 graphically illustrates the unequal distribution of prize money among the different organisations and tournaments.



(a) Male circuit



(b) Female circuit

Figure 1: Tournaments available per ranking (number between brackets), with prize money distributions (width of the block).

Source: own composition based on ATP (2016), ITF (2014), ITF (2016) and WTA (2016)

A different focus per association can be distinguished from the structures represented in Figure 1. The ITF mainly concentrates on low ranked players and facilitates smaller tournaments. The only exception are the Grand Slams. They are organised by national federations, in co-operation with the ITF, because the latter is the coordinating association of national federations. ATP and WTA focus rather on high ranked players, within or close to the top 100. These organisations provide more prize money per tournament. Also within the tournaments there is an unequal prize money distribution. The distribution of prize money is discussed in the next paragraph from an economic perspective.

As previously pointed out, the remuneration of the tennis clubs for players engaged in interclub tennis is beyond the scope of this paper, as only limited information is available on this part of a player's income. Nevertheless, clubs are responsible for the organisation of tennis on the non-professional circuit. They provide tournaments and playing time for recreational tennis players. They also provide tennis lessons for these recreational players. Also for the young professional players, the tennis schools of a club have an important educational role. It is here that the education of future professional players starts, before they are further trained by professional coaches in an academy, or privately.

2.2 Sport economic insights and considerations about prize money amounts and distributions within tournaments

As pointed out, in this paper, prize money is considered as a player's income. The amount and distribution of prize money has a direct impact on the differences in income between tennis players. Sport economic theory presents some considerations about the choice for a specific distribution scheme or model. They are presented here, as they allow to better understand the policies of the different tennis associations and their underlying justifications.

The team sports typology of Kesenne (2014) can be used to categorise and understand professional tennis organisation. The product is a match of tennis, often part of a tournament. The producers of tournaments are ATP, WTA, ITF and the national federations, organising the Grand Slams. Their main production factor is labour through the performance of tennis players, who earn prize money as their variable wage or income. The audience can be seen as the consumer. Win-maximisation is not an objective for a league, association or federation, their objective is to maximise profits. Associations can maximise their profit by attracting as much income from ticket sales and broadcast contracts as possible. It might additionally be argued that associations, federations or individual tournament organisers are maximising quality under their budget constraint. This interesting analytical problem is however beyond the scope of this paper and has no influence on the following analysis considering an individual player's financial model.

Tennis is known as a sport with a broad, but not a deep fan base. This implies that tennis is followed and watched by a lot of people worldwide, but most of them are only interested in seeing the top players playing. In order to attract sufficient media coverage, interest by the public and money to the tournaments to maximise profit, organisers try to foresee sufficient total prize money and enough earnings for the top players. Those few top players competing for the higher amounts of prize money have the status of superstars. This characteristic is often found in a winner-take-all market (Frank & Cook, 1995). Garcia-del-Barrio & Pujol (2015) consider the market for professional tennis as such a winner-take-all market, where the best performing people earn proportionally more than their lower ranked colleagues.

Rosen (1981) gives an economic explanation for the much higher income of superstars (e.g. in sport, music, authors, doctors, ...). The revenue curve as a function of talent is convex and increasing. This is because the audience's interest and willingness to pay to see the best players playing is a lot higher than for players at a slightly lower level. This results in a higher price and a bigger market demand for the best players, leading both to the convex revenue curve. On the cost side, the marginal cost of extra spectators in the stadium is negligible, and this is even more facilitated through technology like television and online match coverage. As a result, superstars can serve their high market demand easily, generating high revenues and incurring low costs, resulting in their more than proportionally high income.

The winner-take-all market in tennis is also the result of the prize money distribution strategy followed. The choice for a certain strategy is determined by a trade-off between more concentration of prize money for the best achieving players (vertical distribution) and a more equal distribution, in which more money is given to the other participants (horizontal distribution). The arguments in favour of each choice are discussed. This choice is influenced by the format of tennis competitions. Tennis is organised as knock-out match play, as opposed to an all-against-all format (e.g. in golf). Moreover, the best players with the highest ranking are protected in the first rounds by being seeded. As opposed to a random

draw, the best players will not play each other in the first rounds in a guided draw. This substantially increases the probability of the best players winning the tournament (Sandy, Sloane & Rosentraub, 2004; Leband, 1990).

To formally describe this competition format, Szymanski (2006) and Muehlheusser (2006) apply the non-discriminating Tullock's competition, wherein two players compete for a prize and personal success is correlated with the personal effort undertaken to win (Tullock, 1980). Moreover, the own efforts reduce the win probability of the other player. Since winning a point in tennis is complex, strategic and influenced by circumstantial random effects², the link between effort and success in tennis is stochastic to some extent. This slightly weakens the link between effort and success in tennis.

In tennis, more than two players compete in a tournament. Therefore, every round can be seen as a mini Tullock competition, which are chained to arrive at a final winner. The winner of each round (mini competition) earns a prize. By earning more points and proceed further, higher total prize money is obtained. Muehlheusser (2006) and Szymanski & Valletti (2003) show that distributing of prize money over participants results in a higher total effort made by the players, because weaker players see the opportunity to also win a part of the prize. It in turn induces the better players to increase their own effort. Such an increase in total effort is attractive for the supporters of tennis, and offers an argument in favour of prize money distribution.

The trade-off between horizontal and vertical distribution is based on two considerations. The first consideration in favour of vertical distribution is that professional sports players agree on the fact that the reward to progress to the next round should be high enough. It is seen as a motivational bonus for players to attempt to reach the final victory (Barget, 2006). This reasoning leads to a more vertical distribution in match play than in an all-against-all format. In a match-play setting, their only needs to be a difference between each round, whereas in the latter there needs to be a more continuous and horizontal distribution to offer an incentive for every individual player to finish just one place higher. This results in lower differences in prize money between the places and a more horizontal distribution for an all-against-all format than a match play format (Jordan, 2013). The bonus argument can however be countered by the fact that also other human factors play a role in effort maximisation. Indeed, sports players are known to be very competitive and unlike profit-maximising associations, they want to maximise their wins and athletic achievements.

The argument in favour of a horizontal distribution is that the player's cost for participation should be taken into account when deciding on the prize money distribution. If this participation cost is higher, prize money in that sport should be distributed more horizontally. Playing tennis worldwide involves a rather high player's cost (e.g. for travelling, see the next section for a more quantitative calculation) that is often underestimated. In addition, by seeding, top players are much more likely to win a tournament (Leband, 1990). Because this significantly reduces the chances for talented junior players³ or less strong players to progress and to cover their costs, a more horizontal distribution is recommended in tennis.

² As e.g. opposed to a more straightforward 100 meter sprint.

³ In tennis, the term junior player is often used to denote players with an age below 18. In this paper, also transition players are included in this term. Transition players are players that are above 18 and in transition to becoming a top level professional player. By resorting both players under this single term, emphasis is put on the young age at which these players are not yet expected to be among the top of tennis. As a result, a player of 30 year old would not be considered as a junior or transition player in this paper.

This would guarantee that enough players get the chance to compete in a tournament and cover their costs.

The previous analysis demonstrates that distributing prize money is required. The amount of distribution is the result of a trade-off and is the choice of tournament organisers. However, It has an important impact on the income inequality in tennis. It also impacts the number of tennis players that can cover their costs and live from playing professional tennis. A quantification of these considerations is presented in the next section.

3. A quantification of the issues

In this section, a quantification of the income inequality and the impact of the costs at different levels can be realised in two ways. First, the macroeconomic approach of the Lorenz curve and the Gini coefficient is presented. Secondly, a microeconomic cost simulation of a professional tennis player is made.

3.1 The amount of income and inequality

The previous discussion indicates that an income inequality exists in many sports. This follows from a vertical distribution of prize money, rewarding the best players for their efforts made to win and their importance as a production factor for the producers of sports events. In this subsection, a quantification of the amount of income inequality in tennis is made. To gain insight in the distribution of income over the population, macroeconomists use the Lorenz Curve and the corresponding Gini coefficient. The cumulative procentual income is plotted for the entire population (ranked from poorest to richest) and is then compared to the 45 degree line. The more it deviates, the higher the income inequality. This consideration is quantified by the Gini coefficient, which is comprised between 0 (perfect equality) and 1 (all the income concentrated with one person). It is calculated as the ratio of the surface between the Lorenz-curve and the 45 degree line on one hand and the total surface below the 45 degree line on the other hand (De Borger et al., 2015).

The Lorenz curve for professional male tennis is shown in Figure 2. As indicated before, the results for the male and female circuit are almost identical. For this reason, only the curve for the male circuit is presented. All male players who earned prize money in 2015 are taken into account. In this way, some professional players (following the initial ITF working definition) are omitted. It has two advantages: data is more accurate and an overestimation of the income inequality is impossible in this way.

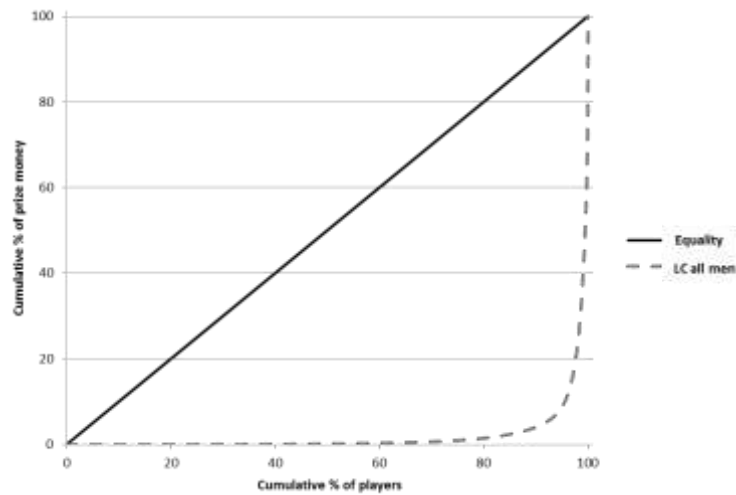


Figure 2: Lorenz curve of professional male tennis players.
Source: own composition based on ATP (2015).

The shape of the Lorenz curve is a reflection of the information in Figure 1, showing that the majority of the prize money is only available for the top 100 of players. The Gini coefficient corresponding to Figure 2 is given in Appendix 1. The appendix also contains the Gini coefficient for the female circuit. For the male circuit, it is 0.95, indicating a very unequal distribution of the income in what is considered as professional tennis. These results mean that the top 10% of the population earns 96% of the available income. This conclusion is supported by the almost identical findings of Bane & Gescheit (2015) for 2014.

When comparing this inequality in tennis to other sectors, it is confirmed that the inequality is extremely high. In each western country, the Gini coefficient lies much lower than in tennis. It lies between 0.25 and 0.45. For some African countries it is between 0.6 and 0.7, which is still lower than the inequality in tennis (World Bank, 2016). When it is compared to other sport competitions, 0.96 remains an extremely high value. In the strongest American professional golf (PGA Tour) and basketball (NBA) competitions, the coefficient lies merely between 0.5 and 0.6 (Pielke, 2014).

To individual players, the degree of inequality matters less than the actual amount of money they earn. As pointed out before, this paper focuses on prize money as the income. Starting fees, earnings from sponsorship and licensing and from other occupations are omitted. To discuss the income differences between players with a ranking between 101-250 and 251-500, the year-end prize money ranking from the ATP (2015) website is used to obtain data. To go from gross to net income, a correction for taxes of 25% is made. Since calculations showed that male and female players have a similar income distribution, here the male distribution is shown.

Table 1: Net prize money income of a professional male tennis player.

Ranking	101-250	251-500
Minimum	€ 49 810	€ 12 394
Maximum	€ 266 522	€ 49 089
Standard deviation	€ 59 045	€ 10 074
Coefficient of variation	47.3%	41.3%
Average	€ 124 818	€ 24 367

Source: own calculation based on ATP (2015).

Table 1 shows that the income ratio between the two considered ranking categories is 5/1. For women's tennis, it is 6/1. Even within the categories, the coefficients of variation are high (above 40%) and the ranges of the incomes broad, another indication of the strong income inequality. The table shows that the average incomes would be sufficient to live from. Nevertheless, unlike players signed by a club, tennis players incur a lot of costs at their own expense. These costs differ between the categories as well, and have a reinforcing effect on the income inequality, complicating the financial situation of professional tennis players that fall outside the top 100. In the next subsection, these costs are analysed, and the remaining *net* income for a tennis player is calculated.

3.2 The cost of playing professional tennis and its affordability

The costs of professional tennis players are divided into different categories. The data is obtained from an ITF (2014) study⁴, Kim Clijsters Academy (2014) and interviews with Flemish players and directors of Tennis Vlaanderen⁵. The following six categories can be identified:

- *Coaching costs* are calculated as the annual coach wages. Not included are the costs of the coach traveling with the player to a tournament. These costs are included in the following categories.
- *The cost of traveling* includes flight tickets and airport transfers for the player and the coach.
- *The cost of accommodation* is the hotel cost for the player and the coach, under the assumption that they share a room.
- *The cost of food* comprises the weekly food costs for a player and his coach during a tournament. Costs of eating at home are excluded, as they are not directly related to the profession of tennis.
- *The stringing cost* is a weekly cost for stringing rackets during a tournament.
- *The cost of clothes* and other materials includes a yearly cost and an additional weekly cost for washing clothes during a tournament.

Additionally, a distinction between three forms of financing is made:

- *Private*: in this category is considered a player who is not enrolled in an academy and who has to pay all his costs himself.
- *Academy*: in this category are included players who enrol in a private academy (e.g. Kim Clijsters Academy). In this example, players pay a monthly fee for coaching, stringing and a part of their material. These costs are included in the coaching costs category (which is in such case considered as a monthly enrollment fee). Additional material costs are included in the correct category.
- *Tennis Vlaanderen Academy (Nat. Fed.)*: young players who are selected on a yearly basis to enrol in the academy programme of the Flemish Tennis Federation pay an admission fee of €12 000. In return they are allowed to train in the accommodation of the federation, are fully supported by the tennis and physical coaches and the experts of the federation and get a budget of about €15 000 to 25 000 to pay for traveling, accommodation and food for player and coach. This budget decreases with age and level, as the aim is to give support in financially breaking even for junior players (age below 23 for women and 25 for men) believed by the federation to have the required talent to make it to the top of professional tennis. This believe is based on the federation's judgement and objective progress made by the player. The working budget has to be paid back at the end of the season, but this refund is limited to 60% of the prize money, thus reducing the exposure to the risk of not being able to recover costs as expected. Costs exceeding the budget however have to be paid by the players themselves. As a result, in the higher category, the same logic applies, but now players earn more prize money which would result in repaying the full working budget. Nevertheless, the other benefits (e.g. in coaching costs) are still

⁴ which omits coaching costs from the analysis, as opposed to the present simulation.

⁵ Tennis Vlaanderen is the Flemish tennis federation. Education of junior tennis players is one of their major aims.

included in the €12 000 admission fee, as the federation emphasises on a complete programme with a full time coach, both during training as a tournament.

Table 2 presents an average cost calculation for male tennis players with a ranking between 101-250 and 251-500. The extreme cost-cutting (coaching, housing, etc.) or extensively investing in guidance (taking next to a coach also a private physiotherapist, cook, etc. on tour) approaches are not incorporated in this table. However, the costs are heavily influenced by the intended quality of the setting, which in turn may have an impact on the results. Additionally, the cost structures of men and women are found to be similar, as was also the case with the incomes. The only difference is the absolute value, which again is slightly lower for women.

Table 2: Operational costs of a professional male tennis player.

Ranking cat.	101-250			251-500		
# tournaments	29 tournaments			25 tournaments		
Financing plan	Private	Academy	Nat. Fed.	Private	Academy	Nat. Fed.
Equipment	€ 2 376	€ 534	€ 2 376	€ 3 223	€ 460	€ 3 223
Restringing	€ 4 006	€ 33 240	€ 4 006	€ 2 878	€ 30 840	€ 2 878
Coaching	€ 43 680		€ 12 000 (*)	€ 43 680		€ 12 000 (*)
Travel	€ 15 791	€ 15 791	€ 15 000 + € 31 716 (**)	€ 15 297	€ 15 297	€ 14 620
Hotel	€ 14 901	€ 14 901		€ 12 645	€ 12 645	+ 16 756 (***)
Food	€ 16 024	€ 16 024		€ 13 814	€ 13 814	
Total	€ 96 778	€ 80 490	€ 65 098	€ 91 537	€ 73 056	€ 49 477

Source: own calculations.

(*) Admission fee.

(**) Full refund of €15 000 working budget + additional costs (above available working budget).

(***) Refund of 60% of €24 367 prize money, which is below the budget of €25 000 + additional costs.

Note that additional costs have been calculated as the sum of travel, hotel and food minus available budget.

Table 2 shows that coaching costs are always the major expense for a player. In the privately financed scenario, this cost is the highest, and a coach is paid a wage per hour of training. The advantage of an Academy is that the coaching cost is semi-fixed, including a fixed number of tournaments and some other advantages (e.g. stringing of the racket) for which no extra charges have to be paid. In the federation academy, the fixed cost is even a lot lower, as they can use their subsidies and other income to support junior players in their development. Moreover, some of the costs are covered by the budget of the federation and are not to be repaid if income from prize money is not sufficient (see notes (**) and (***) in Table 2). Table 2 also indicates that some academies offer equipment to their players. Private or federation players do not have to pay this cost either when they have an individual sponsorship agreement. Such agreements and the corresponding value however differ between individual players and is left beyond the scope of this paper. As a result, individual sponsorship agreements are not considered in Table 2.

In order to compare the bottom line of each programme, Table 3 presents the net profits for each category, calculated as the incomes from Table 1 *minus* the costs from Table 2. By definition, an acceptable and sustainable investment and income model does not only imply that the costs are covered. It also implies some additional money which allows the players to live from tennis during their career and save some money for their life after their professional tennis career.

Table 3: Profit calculation for male professional tennis players.

Ranking cat.	101-250			251-500		
Financing plan	Private	Academy	Nat. Fed.	Private	Academy	Nat. Fed.
Average income - average costs	€ 28 040	€ 44 328	€ 59 720	- € 67 170	- € 48 689	- € 25 110.2
Max. income - max. costs	€ 169 744	€ 186 032	€ 201 424	- € 42 448	- € 23 967	- € 10 768
Min. Income - min. costs	- € 46 968	- € 30 680	- € 15 288	- € 79 143	- € 60 662	- € 29 899.4

Source: own calculations.

Note: for the Nat. Fed. 251-500, the cost includes the variable 60% of the prize money. This prize money income varies in the average, maximum and minimum case and can be found in Table 1. For all Nat. Fed 101-250 and 251-500 in the max. situation, it assumed that the full working budget is to be repaid.

Table 3 shows that there is no acceptable neither sustainable financial model for players ranked between 251-500. Once a player gets better and reaches the 101-250 category, an acceptable and sustainable income is available for the players. Nevertheless, high investments have been made in the past to achieve this level, and only from this point pay-back starts. Full private financing is always more expensive than an academy or a subsidised national federation, because fully paying private coaching costs is very costly.

Another way of looking at the acceptability of the income and investment model, is by analysing the break-even ranking of the players. Table 4 presents the break-even ranking for every type of player. It is based on a comparison between the cost structure from Table 2 and the average year-end prize money rankings of 2015, corrected for 25% taxes (ATP, 2015). It is remarkable that from category 251-500, only the players who are selected to train in a nationally subsidised federation academy and who had an exceptional season are close to covering their expected costs. In the other category (101-250), it is possible under every form of financing, although there is a difference in profitability.

Table 4: Break-even rankings for male professional tennis players.

Ranking cat.	101-250			251-500		
Financing plan	Private	Academy	Nat. Fed.	Private	Academy	Nat. Fed.
Break-even ranking	183	206	227	187	215	233 (*)

Source: own calculations.

(*) Taking the variable repayment of the federation fee into account.

Although being beyond the scope of this paper, the income of female players is also given in Appendix 2. This learns that female players in the same category earn about 30 to 40% less than their male counterparts. As a result for each category, a lower number of female players manage to reach the break-even point. However as was stated before, the structure of income and costs and the resulting inequality is similar for both genders and is not further discussed in this work.

A certain extent of inequality is widely accepted by professional sports players. Nevertheless, the financial situation should be sustainable for the involved players as well. To gain better insight in the acceptability and the causes of the financial situation of professional tennis players, empirical research based on semi structured in-depth interviews was conducted. The next section discusses the used methodology and the sample of interviewed professional tennis stakeholders.

4. Interviews: methodology and data

From the limited amount of literature and data available, it was possible to indicate and quantify a substantial income inequality between different rankings in tennis. Semi-structured in-depth interviews with all involved stakeholder groups were held in order to accurately examine the problematic extent of this inequality, its underlying causes and its possible solutions. This allows gaining comprehensive insights in the issues and how the people involved in the tennis sector perceive them.

The approach of semi-structured interviews is well suited for this exploratory research. The advantages of structured and unstructured interviews are combined, leaving sufficient room for respondents to present their vision and all their ideas on the topic that is researched. Moreover, respondents can bring up topics that were not foreseen or expected after the desk research phase. When necessary however, it allows the researchers to redirect the interview again towards the research questions, guaranteeing the covering of all required topics. (Edwards & Holland, 2013)

To select appropriate respondents, at least two respondents from each identified stakeholder group in the professional tennis framework in Figure 3 were selected. Next to coaches and players, with their ranking at the moment of the interview in spring 2016 between brackets, also national and international federations determine the organisation of tennis. In Flanders, Sport Vlaanderen is the part of the government responsible for sport policy, influencing Tennis Vlaanderen. Finally, experts are included, as their specific professional tennis experience allows them to add valuable insights to exploratory research. All interviews were held face to face in Dutch, except one. Kris Dent from ITF was interviewed in English through Skype.



Figure 3: Stakeholder groups and respondents.
Source: own composition.

The QUAGOL framework was used to support the information processing and analysis. It allows the translation from interview transcriptions to a well-structured analysis. NVIVO software was used to code the information and concepts in multiple dimensions: per research question and per concept or theme. The outcomes of the analysis are presented in the next section. (Dierckx de Casterlé et al., 2012; Mortelmans, 2011)

5. Deeper insights in the financial situation of tennis players: results from the interviews

The previous sections already brought up some elements that influence the financial situation of professional tennis players. The focus was on prize money (the income) and the costs (an investment a player has to make). The income inequality between different rankings has been quantified. This inequality was confirmed by all respondents of the interviews. To obtain comprehensive insight in this issue, attention should be given to the underlying causes, before solutions can be thought out. The interviews allow gaining accurate and nuanced additional insights into the complex issues of the financial model of professional tennis. First follows a discussion to which extent the current situation with the present income inequality poses a problem to the tennis sector and its stakeholders.

5.1 Is the current financial model acceptable?

In sports, a certain extent of income inequality is generally accepted. The best players should be rewarded for their outstanding performances. This consensus is also present among the group of interviewed stakeholders. Nevertheless, good and talented players that are not ranked at the top have an uncertain income that is not sufficient to cover their costs, let alone earn enough prize money to live from it. Given the amount of revenue that is generated by the broad but not deep fan base of tennis, ITF and the other tennis organisations are not able to provide a wage for every registered professional player under its current definition.

Players below the ranking of 250 in the sample confirm encountering this problem of not being able to cover their costs. Federations consider the tournaments where these players compete in as an educational circuit (e.g. ITF Pro Circuit). As a result, the low income below position 250 does not necessarily pose a problem for them. Still, the question should be asked whether it is acceptable that so many players live in the illusion of being a professional tennis player. Tennis is characterised as an 'early investment, but late performance' sport. Players that are not good enough to make it to the top are often investing high sums of money for a long period of time. Their illusion of being suited for a professional career should be countered on time. Professional tennis should not provide all so-called professional players with an income that is too low for a majority of them. It would be more acceptable to provide a sustainable income model for a smaller group of players, who have obtained a sufficient level or who have the talent to reach the top. Additionally, talented junior players are currently competing in the same tournaments as older players who are not good enough to make it to the top. This may be a blocking factor for junior talents to develop their capabilities as a tennis player and to reach the top where sufficient prize money can be won. To guarantee future development of the sport, talented players should be offered the possibility to progress and grow without incurring high financial burdens.

Next to the acceptability and sustainability of the current income model, the low income for lower ranked players can form an incentive for a different problem in sports: match fixing. In

tennis, cheating is not difficult, because giving away a set or a point is less obvious than, for example, letting a goal in in football. The incentive to cheat may increase for people with a lower income. However, drawing a causal relationship between a low income and cheating can never be correct. It is possible at all levels and it depends mainly on the integrity of the individual. Therefore, anti-corruption and anti-doping programmes may be an effective approach to deal with these issues, but they fall outside the scope of this research.

5.2 Three types of financial player situations under the current professional tennis organisation

All respondents agree on two breaking points as a result of the income inequality in tennis. These breaking points divide the circuit in three types of individual financial situations. These breaking points are given and explained in Table 5. They are used to base the rest of the analysis on.

Table 5: Breaking points in the current organisation of professional tennis.

Breaking point	Ranking	Available tournaments above threshold
1	100	Grand slams and ATP/WTA tour
2	200 - 250	Qualifications Grand Slams and ATP/WTA tour ATP Challenger tour/ Top of ITF Women's circuit

Source: own composition based on the interviews.

The first breaking point is situated at about ranking position 100. Up until this point, players are directly qualified for the lucrative Grand Slams and can compete in the main tour (ATP or WTA tour). These players are able to have an income that covers their costs and allows them to live from professional tennis. Also at this absolute top, there exists a substantial difference between the players of the absolute top. This is however visible in many sports with a winner-take-all market where the absolute top players have a superstar status. This is widely accepted by sports players. The second breaking point is situated somewhere in between position 200 and 250. The players between the first and second breaking point can compete in qualifiers for the Grand Slams and ATP or WTA tours. They also play tournaments in the ATP Challenger Tour or the best tournaments of the ITF Women's Circuit. As a result, they earn a certain income, which is more or less sufficient to cover their costs. This confirms the observation in the cost simulation in Section 3.2. Players ranked below the second breaking point remain under the break-even point and incur losses by playing professional tennis. Staying in this situation for too long without having the perspective to pass this breaking point, would mean investing in the own career without having sufficient returns. This would result in an unacceptable financial situation causing high financial burdens.

5.3 Causes of and solutions for the current financial model

Based on the insights from the interviews and the presence of breaking points in tennis, the major cause of the issues is that the overall available prize money is divided among too many so-called professional players under the current model. About 200 players (per gender) earn an acceptable income from professional tennis, leaving more than 4000 players losing (a lot of) money in an unacceptable and unsustainable investment and income model. Professional tennis organisations should not foresee an income for all players. This is impossible with the revenues generated from the fan base. They should rather offer a sufficient income for an acceptable amount of good players and junior talents. This objective is recognised by Kris Dent from ITF. The Lorenz curves in Figure 4 and the corresponding

Gini-coefficients in Appendix 1 show that reducing the number of professional tennis players would result in an acceptable and sustainable distribution. Under the current situation, only the top 250 or 100 per gender would qualify as a professional player with an acceptable income. The underlying determining factors of the current financial model are identified and solutions to enhance this situation are presented in this section.

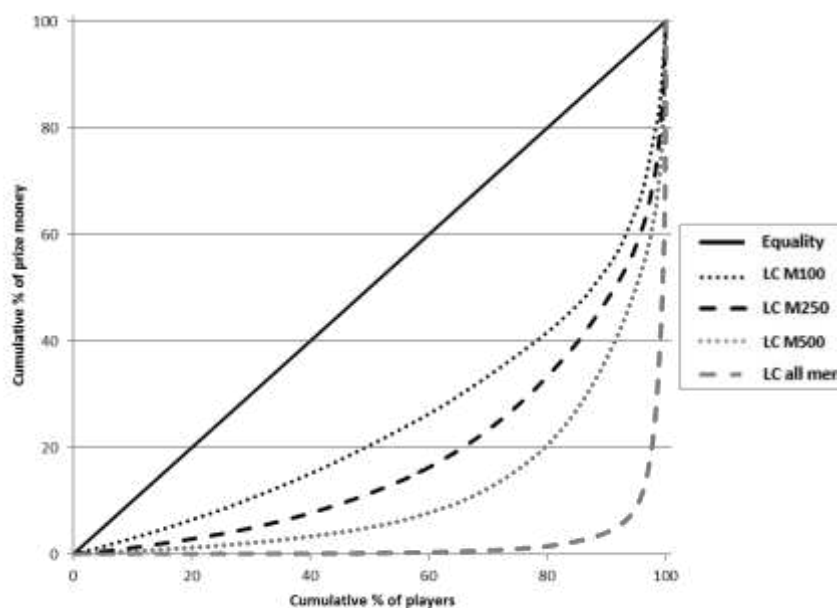


Figure 4: Lorenz curve for different rankings (men).
Source: own composition based on ATP (2015).

5.3.1 Reducing the number of tournaments

Reducing the number of professional players could in first place be obtained by reducing the current inflation of tournaments and ranking points. A possible way to do this is by increasing the prize money barriers of the ITF 10,000 and 15,000 dollar tournaments and obliging organisations to foresee player hospitality. This would on the one hand reduce the programme cost for players and the amount of tournaments as a consequence of the increased difficulty for the organising committee to find the required prize money. On the other hand, it would increase the quality and image of the tournaments and the available prize money for the reduced amount of players. Under the current tournament structure, talented players are dispersed over simultaneous tournaments, organised at different continents. In this way, these talents cannot compete against each other to gain experience at a high professional level.

The question that could be posed here is whether all parties are equally willing to accept this measure. First, the revenues for the organisers of tennis (especially ticketing and TV-rights) are proportional to the number of tournaments, which in turn are increasing in the number of players. However, the revenues from TV-rights and sponsorships for the organisers may increase as well when the quality of the tournaments increases. The top tournaments represent the majority of the income for the organisers, while the smaller tournaments only contribute marginally to this income. Tickets are cheaper than those of the best tournaments, and it are the best tournaments that attract the majority of sponsorship contracts and TV-rights. As a result for the organisers of tennis, a reduced number of players with a professional status and a reduction of the number of low-end tournaments would not pose a substantial problem, as long as the quality of tournaments increases. This will also justify the

existence of a tournament from an economic perspective. A professional tournament should only take place when the revenues generated by this tournament are sufficiently high to remunerate professional players in an acceptable way.

Secondly, some players, especially juniors, perceive a reduced tournament market as a threat for their entry possibilities. However, the increased prize money and hospitality availability offer the junior talents the possibility to engage in a sustainable investment and income model. But indeed, it would eliminate a big group of so-called professional players, according to the initial ITF working definition, to get stuck at ranking 1000 for 20 years. These players do not have sufficient talent to generate additional revenues for the organisations that produce tennis. As a result, an alignment between the tennis demand and supply would be realised. Nevertheless, there has to be thought about the junior development track to offer the talented juniors the possibility to reach the top of tennis. An expansion on this topic is presented in Section 5.3.3. First, a further reorganisation of the current circuit is developed, based on the interview insights.

5.3.2 Rethinking the prize money and ranking point distributions at entry level

In addition to a reduction of tournaments, adapting the distribution of prize money and the attribution of ranking points could help to cancel the illusion of low ranked players that they are a fulltime professional tennis player with a sufficient income from playing tennis. In order to maintain an open entry level tour and effectively support the strategy of reducing the number of true professional players without hampering junior talents in their development, the participation to the tours should be self-selective.

A possible approach is to foresee hospitality at the entry-level ITF tournaments from the first round only for players with a ranking above the desired threshold for professional tennis. Another possible complimentary approach could be to refund hospitality only if a player survives one or two rounds in the tournament. Additionally, in these tournaments, prize money and ranking points could be distributed more horizontally, but spread over a lower number of rounds, e.g. starting from the second or third round. This is to prevent a participation demand surplus for tournaments, requiring qualifying rounds, and a re-emerging inflation of the number of professional players. As a result, fewer players would earn a higher and sustainable income. The difficulty of this trajectory to the top would be age-independent, but only viable for those who have the capabilities of reaching the highest level of professional tennis. For those players, the higher level of income would be a fair remuneration of the participation cost, which was discussed in Section 2.2. The reduced amount of ranking points available and the more horizontally distributed prize money would imply about 300 to 500 players obtaining a ranking of a professional player with a sustainable income and an affordable investment model. The actual amount is conditioned by the interest and willingness to pay of the audience and sponsors.

The presented self-selective mechanism would prevent many players investing to obtain a level they can never reach. The income inequality in professional tennis as measured by the Gini coefficient, should become more acceptable and sustainable in this way. Players who fall outside the pro category could opt for a semi-professional status. They can enjoy playing tennis at a high level and earn some additional money, next to their income from being a tennis or sports teacher, interclub player or any other professional activity.

Another important effect that the self-selective mechanism should comprise is the prevention of some experienced players participating in tournaments far below their level in order to

relatively easily collect some prize money to cover costs. This would be detrimental for the development of the talented junior players in these tournaments. This play down prevention could be achieved through correct economic incentives, again based on the prize money and ranking point distribution, so that playing at the correct level is a more profitable option than constantly collecting a small amount of prize money and ranking points⁶.

The difficulty of the discussed trajectory above is considered to be age-independent. For junior players however, it may prove difficult to reach the top through this circuit. They need possibilities to train, gain experience and cover their early investment costs they have to make before they can start to perform at the highest level. To guarantee these necessary development opportunities for the younger players, a possible strategy for a junior development circuit is presented in the next subsection.

5.3.3 Guaranteeing junior development

Because junior players do not have the same experience as 30-year old players, they require an adapted junior development circuit. When a talented player has to play continuously ITF entry tournaments and compete with older players, who are not particularly better based on their intrinsic talent, but who may win because of their experience, it could slow down their development. Like in football, the existence of a complementary⁷ protected Under-21 circuit can offer training possibilities for these players to reach the top of professional tennis in a sustainable way, both from a sports and financial perspective. It could even take the form of a World Cup or Regional Cup.

It is important in such junior tournaments to offer hospitality to the players, in order to support their programme costs and costs of participation. The reward of the tournament should be the reflection of an acceptable distribution of professional ranking points and limited prize money, taking into account that these tournaments are part of an educational development tour. It should also offer a correct incentive for participation, compared to the other tournaments available. Covering costs and offering opportunities to gain experience are more important than prize money. The prize money and ranking points distribution should offer an incentive for juniors who are not yet at the top level, to compete in these tournaments, possibly through a qualification stage. National subsidies for individual talented junior players, identified through standardised performance indicators, can be aligned accordingly to further reduce individual costs for these players.

A more important reward than money and points, is that the four or eight⁸ best players of each junior tournament should automatically qualify for a major ATP or WTA circuit tournament through wildcards. When in addition, the junior tournaments are organised one week before at the same location as the major tournament, they can reduce the cost of travelling for the junior players. Moreover, such a system would allow organising junior tennis tournaments at a more regional scale, reducing travelling costs even more. In this way, the best junior players can earn sufficient points, money and experience on their own continent during their development phase. When they are ranked sufficiently high and their earnings allow it, they can automatically participate in the other lucrative international tournaments of ATP or WTA. Then, they would no longer experience the need to participate

⁶ Note that the product of a small amount and a high frequency may result in high earnings, both in terms of prize money and ranking points.

⁷ Participation in an Under-21 category should not exclude ITF, WTA and ATP participation.

⁸ This depends on the level of the major tournament. The stronger it is, the less positions that should be available.

in the junior circuit, as they can earn sufficient and even more prize money at the top level. In this way, the junior tour should be considered as a tailor-made road to the professional circuit, parallel to the entry-level ITF circuit.

For more senior players, this junior circuit is not a possible road to the top. They can compete through the regular, reworked circuit from Section 5.3.2. Late bloomers that are strong enough should be able to reach the top through the ITF professional circuit, especially if they could occasionally be supported by the attribution of wild cards in case of bad luck.

5.3.4 Prize money distribution and the organisation of tennis

The way to reduce the income inequality of professional tennis at the lower level of tennis has already been discussed. Further at the top level, a more equal distribution could allow more players to earn a sufficient income to pay back previously made investments, without significantly reducing the wealth of the top players. For this reason, it is suggested to distribute prize money more horizontally in the top-class tournaments and let participants of the first round earn relatively more prize money. This can be achieved by converting starting fees into prize money for the first rounds of every tournament.

Moreover, as was already discussed, the top players in the ATP and WTA tours generate the majority of the revenues for tennis. They attract money from tournament sponsors, broadcast contracts and a paying audience. It could be worthwhile to install some type of cascade system to redistribute money from the top level to the entry level tournaments and the junior tour. It would not significantly reduce the wealth of the top players, and the younger players have the opportunity to grow and gain experience under a sustainable investment model with affordable costs. The overall distribution of prize money in tennis would become more horizontal, resulting in a more equal income distribution for a smaller number of players. This model would fit in the shared interest of all tennis federations and associations, to guarantee talent development, while still having superstars attracting interest in tennis.

In order to achieve a cascade of prize money over the different levels of tennis, the current organisational structures might need adaptation. The ITF aims at different player categories than ATP and WTA. As a result, some level of coordination and integration of these three organisations might be required. This is approved by Kris Dent from ITF. Next to the income redistribution over different levels, other opportunities comprise the exploitation of economies of scale and scope when organising different tournaments at the same location and attracting fan interest to the sport. Effectuating such a reorganisation might however be complicated by the current power for high ranked players and tournament directors in the boards of the ATP and WTA.

5.3.5 Attracting additional sources of income to professional tennis

Next to a better distribution of the available money, increasing the total amount of prize money could be another important element of the strategy to resolve the financial issues of professional tennis players. This might be achieved through well thought-out communication and organisation of the tournaments. For example, by linking workshops and local events to these tournaments, the interest and willingness to pay of the audience and sponsors could increase. In addition, players could attract more individual sponsors as well to cover their costs. A first way would be to allow more individual player advertisement (e.g. on their tennis outfit), especially for the entry-level and junior tournaments. Moreover, young and promising players could try to involve their local community to support them through crowdfunding. In

this way, they attract more money to cover their costs and they connect with the local community who will follow and support their career more actively. Quantifying those and other measures would be an interesting approach for further research.

5.4 The outcome: a sustainable financial model

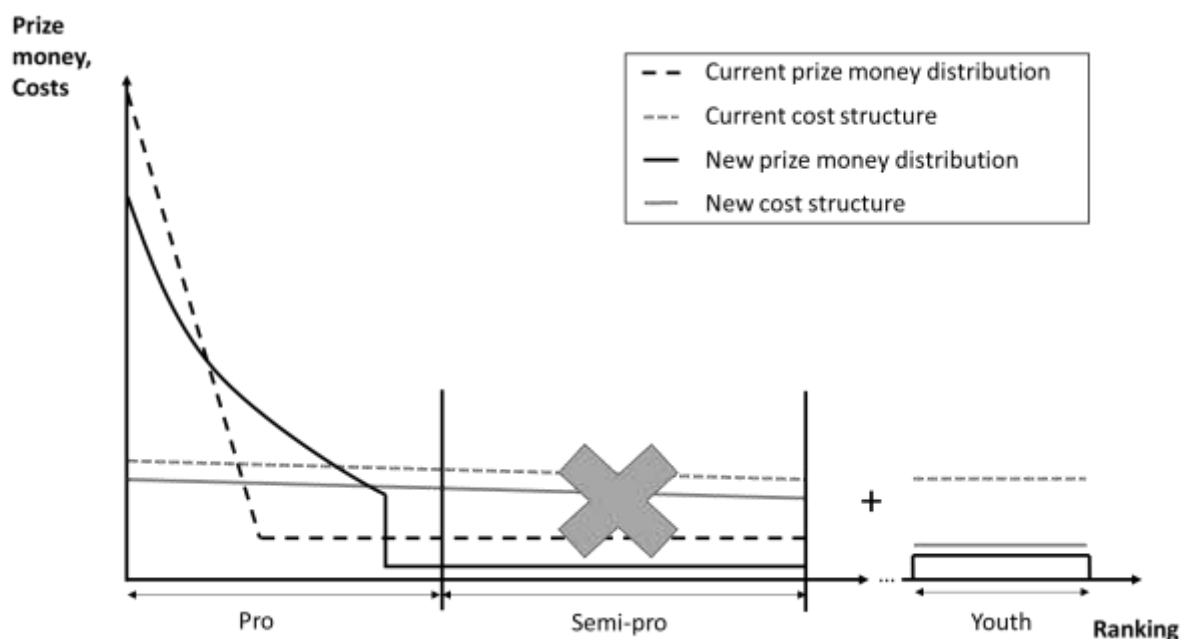


Figure 5: Alternative financial model for professional tennis players.
Source: own composition.

Figure 5 presents the predicted outcomes of the suggested solutions for the current financial issues. It can be seen that the income curve of the professional players on the left is a reflection of the Lorenz curve with less players considered as professionals. As a result of the proposed cost reductions (e.g. by offering hospitality) and the more horizontal distribution of prize money, about 500 players per gender should be able to cover the costs of their career. This would mean the double of the current situation. The additional, complementary junior circuit with a link to the major tour guarantees the future of professional tennis with sufficient overall competition. For the well-performing youngsters, the costs would decrease substantially, as hotel, food and traveling costs can be reduced and coaching costs can be linked to their (limited) prize money income as a result of national subsidies. This would only leave a small but acceptable investment cost for these junior players to grow towards the higher levels of professional tennis.

It is also apparent that a small part of the professional players cannot yet cover their costs, but they are close to this level of professional tennis and are supposed to have the talent to reach the break-even ranking. For the large group of other players who are not able to reach this level, tennis cannot foresee a sustainable and acceptable income and investment model. The suggestion is that they should not be considered as professional players. The proposed self-selective mechanisms of the restricted and horizontal ranking points and prize money distributions should cancel the illusion of those people being professional tennis players. Of course, they can still participate in tournaments, as the entry-level circuit should remain an open tour. Nevertheless, this will be more on an occasional base and rather in local tournaments as a result of the trade-off between costs and benefits of participating in those tournaments. Such types of players are considered to be semi-professional players. They will not attract sufficient revenues for tennis, because of which tennis organisations are

not able to provide an income for them either. As a result, they have to rely on additional activities such as interclub, teaching or other professional occupations, next to their occasional appearances in local professional tournaments.

6. Conclusions and further research

The financial model of professional tennis players and its influencing factors are thoroughly analysed in this paper. It was brought to light that too many players, considered as professional players, are competing for too little money. Under the current financial model, the professional tennis organisations are not able to foresee an acceptable income for each player who considers tennis as his professional occupation. Per gender, only the 250 best ranked players can cover their costs. Wide consensus about this observation exists among the different stakeholder groups of professional tennis. Some important causes were identified in this paper. First, there is a distorted prize money distribution between and within tournaments. Secondly, there has been a worldwide inflation in the number of entry-level professional tournaments with little prize money and ranking points to be gained. Thirdly, the cost for a player to be able to participate in those tournaments is substantial. As a result, the ITF definition of a professional player is not in equilibrium with the market for professional tennis and the fan base's willingness to pay.

The major contribution of this paper is that, next to a profound analysis of the current situation, suggestions for solutions are identified and elaborated, based on an extensive sector analysis and consultation. It is found that increasing the minimal amount of prize money and obliging organisations to foresee player hospitality could achieve a reduction of the number of entry-level tournaments and subsequently reduce the amount of professional tennis players at the lower level, for who no sustainable and acceptable income model is available. Another solution to reduce the number of professional players is by limiting the amount of prize money and ranking points distributed in the first rounds of those tournaments, and use these compensations to achieve a more equal distribution among the subsequent rounds. Another important factor in guaranteeing the future of professional tennis, are the junior players. Their education and possibilities to gain experience have to be protected by installing a parallel junior tour. This should guarantee the inflow of talent to tennis and reduce the financial risks of engaging in professional tennis to an acceptable level. The achievability of the described solutions is subject to the condition of aligning the objectives of the different organising entities in tennis, both international and national. Federations working together could also facilitate initiatives to increase the fan base of tennis and supporters and sponsors willingness to pay.

The present research can be extended in the future in three ways. First, by interviewing additional stakeholders (e.g. ATP and WTA), an even more complete view on the international setting of professional tennis would become available. Secondly, a quantitative study to test the outcomes of the suggested solutions could confirm the findings of this research in a formal way. More detailed simulations, with private data of the individual players (including also their starting fees and earnings from sponsorships, licensing and other occupations) and the different federations, could generate variables that allow doing regression analysis with the objective of estimating the impact of each policy measure on the revenues for the tennis sector in general and for the individual players. Subsequently, a test phase can be organised on the male or female circuit. When proven successful, a full-scale implementation can be developed. Finally, questioning a larger sample through surveys could help to measure the acceptance and successfulness of the proposed solutions and gain insight in the opinions of a large group of stakeholders.

Acknowledgements

The authors would like to thank prof. dr. Stefan Kesenne for his excellent feedback and suggestions to improve previous versions of this paper.

References

- ATP. (2015). *ATP Year End Prize Money Rankings*. Retrieved from <http://www.atpworldtour.com/en/media/rankings-and-stats> on 9 July 2016.
- ATP. (2016). *Tournaments*. Retrieved from <http://www.atpworldtour.com/en/tournaments> on 22 July 2016.
- Bane, M., & Gescheit, D. (2015). *Rich rewards for those at the top in tennis, but what of the rest?*. Retrieved from <http://theconversation.com/rich-rewards-for-those-at-the-top-in-tennis-but-what-of-the-rest-35961> on 10 October 2015.
- Barget, E. (2006). The economics of tennis. In W. Andreff, & S. Szymanski, *Handbook on the economics of sport* (pp. 418-431). Edward Elgar Publishing, Massachusetts.
- Beaton, A., Thompson, S., & Kutz, S. (2014). *No 1 vs No 32: how much does the 32nd Player Make in Tennis and Other Sports?*. Retrieved from <http://graphics.wsj.com/us-open-32> on 10 October 2015.
- Bowers, R. (1999). *Suzanne Lenglen and the First Pro Tour*. Retrieved from http://www.tennisserver.com/lines/lines_99_10_31.html on 6 April 2016.
- Bowers, R. (2001). *History of the Pro Tennis Wars, Chapter 2, part 1 1927 - 1928*. Retrieved from http://www.tennisserver.com/lines/lines_01_03_01.html on 5 April 2016.
- Case, K., & Fair, R. (2007). *Principles of Economics*. Pearson Education, New Jersey.
- De Borger, B., Van Poeck, A., Bouckaert, J., & De Graeve, D. (2015). *Algemene economie*. Uitgeverij De Boeck, Antwerpen.
- Dierckx de Casterlé, B., Gastmans, C., Bryon, E., & Denier, Y. (2012). QUAGOL: a guide for qualitative data analysis. *International Journal of Nursing Studies*, 49(3), 360-371.
- Edwards, R., & Holland, J. (2013). *What is qualitative interviewing?*. A&C Black, London.
- Frank, R. H., & Cook, P. J. (1995). *The winner-take-all society: How more and more Americans compete for fewer and bigger prizes, encouraging economic waste, income inequality, and an impoverished cultural life*. Free Press, New York.
- Forbes. (2017). *The World's Highest-Paid Athletes*. Retrieved from <https://www.forbes.com/athletes/list/> on 18 August 2017.
- Garcia-del-Barrio, P., & Pujol, F. (2015). Sport talent, media value and equal prize policies in tennis. In S. Kesenne, R. Koning, & P. Rodriguez, *The Economics of Competitive Sports* (pp. 110-151). Edward Elgar Publishing, London.
- Gibson, A. D. (2009). The association of Tennis Professionals: From Player Association to Governing Body. *The Journal of Applied Business and Economics*, 10(5), 23-32.
- ITF. (2014). *ITF Pro Circuit Review Stage One: Data Analysis*. Retrieved from <http://www.itftennis.com/media/194256/194256.pdf> on 22 October 2015.
- ITF. (2016). *About pro circuit*. Retrieved from <http://www.itftennis.com/procircuit/about-pro-circuit/overview.aspx> on 22 July 2016.

- Jordan, D. (2013). *Why do golfers earn more than tennis players?*. Retrieved from <http://www.sportseconomics.org/sports-economics/category/tennis> on 30 June 2016.
- Kesenne, S. (2014). *The Economic Theory Of Professional Team Sports* (2nd ed.). Edward Elgar Publishing, London.
- Kim Clijsters Academy. (2014). KCA Full Time Players cost overview.
- Kutz, S. (2014). *How Tennis's Pay Gap Compares to Other Sports*. Retrieved from <http://www.wsj.com/articles/how-tennis-pay-gap-compares-to-other-sports-1408997701> on 22 July 2016.
- Leband, D. (1990). How the structure of Competition Influences Performance in Professional Sports: The Case of Tennis and Golf. In B. L. Goff and R. D. Tollison (eds.), *Sportometrics*, Texas A&M University Press, pp. 133-150.
- Lorge, B. S., & Bruce, M. G. L. (2014). *Sport: Tennis*. Retrieved from <http://www.britannica.com/sports/tennis> on 1 April 2016.
- Mortelmans, D. (2011). *Kwalitatieve analyse met Nvivo [Qualitative analysis through NVIVO, in Dutch]*. ACCO Uitgeverij, Leuven.
- Muehlheusser, G. (2006). Implications from the theory of contests for modelling and designing sport competitions. In S. Szymanski, & W. Andreff (eds.), *Handbook on the Economics of Sport*, Edward Elgar Publishing, London, pp. 342-347.
- Pielke, R. J. (2014). *There's Income Inequality in Golf, Too*. Retrieved from <http://fivethirtyeight.com/features/theres-income-inequality-in-golf-too/> on 30 July 2016.
- Rosen, S. (1981). The economics of superstars. *The American economic review*, 71(5), 845-858.
- Sandy, R., Sloane, P., & Rosentraub, M. (2004). *The economics of Sport: An International perspective*. Palgrave MacMillan, New York.
- Szymanski, S. (2006). The theory of tournaments. In S. Szymanski, & W. Andreff (eds.), *Handbook on the Economics of Sport*, Edward Elgar Publishing, London, pp. 342-347.
- Szymanski, S., & Valletti, T. (2003). *First and second prizes in imperfectly discriminating contests*. CEPR discussion papers (no. 4484), London.
- Tullock, G. E. (1980). Efficient rent-seeking. In J. M. Buchanan, G. Tullock and R. D. Tollison (eds.), *Toward a Theory of the Rent-Seeking Society*. Texas A&M University Press, pp. 97-112.
- World Bank (2016). *GINI index (World Bank estimate)*. Retrieved from data.worldbank.org/indicator/SI.POV.GINI on 14 September 2016.
- WTA. (2016). *Tournaments*. Retrieved from <http://www.wtatennis.com/tournaments> on 22 July 2016.

Appendix 1. Gini coefficient of different rankings.

Included rankings	All	Top 1000	Top 500	Top 250	Top 100
Male	0.96	0.84	0.75	0.63	0.50
Female	0.95	0.86	0.77	0.63	0.48

Source: own composition based on ATP (2015).

Appendix 2. Net prize money income of a professional female tennis player.

Ranking	101-250	251-500
Minimum	€ 32 967	€ 7 831
Maximum	€ 220 520	€ 31 955
Standard deviation	€ 54 486	€ 6 314
Coefficient of variation	57.2%	42.0%
Average	€ 95 289	€ 15 049

Source: own calculation based on ATP (2015).