
Research

An analysis of Scotland's performance in the Commonwealth Games – 1950-2010

A study for **sportscotland** by Girish Ramchandani, Simon Shibli & Darryl
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Table of contents

Table of contents.....	ii
List of graphs.....	iii
List of tables.....	v
1. Introduction	1
2. Aim and objectives	1
3. Methodology.....	2
4. Results	3
4.1 The Commonwealth Games in context.....	3
4.2 Evidence of increasing competition for medals?	9
4.3 Scotland's performance in the Commonwealth Games.....	12
4.4 Detailed analysis of Scotland's performance in 2010 compared with 2006	16
4.5 How does Scotland perform relative to how it might be expected to perform?	22
4.6 Analysis of the sports in which Scotland has won medals.....	25
4.7 Benchmarking against other nations.....	29
4.8 Analysis of success by sport.....	33
4.8.1 Performance in athletics	35
4.8.2 Performance in boxing.....	38
4.8.3 Performance in swimming.....	40
4.8.4 Performance in shooting.....	42
4.8.5 Performance in other sports.....	45
4.9 Elite Athletes with a Disability (EAD).....	46
4.10 The progression of Scotland's women athletes 2002-2010.....	48
5. Concluding remarks	51
Appendix A – Scotland's performance in sports not medalled in at Delhi 2010.....	52

List of graphs

Graph 4.1: The number of nations taking part in the Commonwealth Games	3
Graph 4.2: The number of athletes taking part in the Commonwealth Games	4
Graph 4.3: The number of sports contested at the Commonwealth Games	4
Graph 4.4: The number of events contested at each Commonwealth Games.....	5
Graph 4.5: The number of events by gender	6
Graph 4.6: Sports, disciplines and the number of events contested in Delhi 2010.....	7
Graph 4.7: The change in the number of events contested in 2010 v 2006	8
Graph 4.8: The number of nations winning a gold medal and any medal.....	9
Graph 4.9: The number of nations winning a gold medal and any medal: men	10
Graph 4.10: The number of nations winning a gold medal and any medal: women	11
Graph 4.11: Scotland's medal winning performance by edition	12
Graph 4.12: Scotland's points 1950 – 2010	13
Graph 4.13: Scotland's points sub analysed by gender from 1950 - 2010	13
Graph 4.14: Scotland's market share 1950 - 2010	14
Graph 4.15: Scotland's market share by gender	15
Graph 4.16: Change in gold medals against change in total medals 2006-2010	18
Graph 4.17: Scotland's change in gold medals won against change in total medals by gender 2006 - 2010	19
Graph 4.18: Home nations' changes in gold medals won against change in total medals by gender 2006 - 2010.....	20
Graph 4.19 Scotland's performance in 2010 by sport.....	21
Graph 4.20 Scotland's change in gold medals won against change in total medals won by sport 2006 - 2010.....	21
Graph 4.21: The residual scores for medal winning nations in Delhi 2010	23
Graph 4.22: Time series analysis of market share relative to population	24
Graph 4.23: The number of sports Scotland has medalled in at each edition.....	26
Graph 4.24: The number of sports Scotland has medalled in by gender.....	27
Graph 4.25: The number of sports medalled in by Scotland and the comparator nations	28
Graph 4.26: The number and proportion of medals won by gender 1950 - 2010.....	31
Graph 4.27: The number and proportion of type of medals won.....	32
Graph 4.28: Scotland's absolute achievement in athletics	35
Graph 4.29: Scotland's market share in athletics	36
Graph 4.30: The change in gold medals won against change in total medals won for athletics	37
Graph 4.31: Scotland's absolute achievement in boxing	38

Graph 4.32: Scotland's market share in boxing.....	38
Graph 4.33: The change in gold medals won against change in total medals won for boxing.....	39
Graph 4.34: Scotland's absolute achievement in swimming	40
Graph 4.35: Scotland's market share in swimming.....	40
Graph 4.36: The change in gold medals won vs. change in total medals won for swimming.....	41
Graph 4.37: Scotland's absolute achievement in shooting.....	42
Graph 4.38: Scotland's market share in shooting.....	43
Graph 4.39: The change in gold medals won vs. change in total medals won for shooting ..	44
Graph 4.40: The change in total medals won vs. change in market share for EAD events...	47
Graph 4.41: Performance of Scottish women in 2010 by sport	48
Graph 4.42: Performance of Scottish women between 2002 and 2010	49

List of tables

Table 4.1: The top nations in 2010 using four different performance measures.....	16
Table 4.2: The performance of the four home nations 2010 v 2006 - Overall.....	17
Table 4.3: The performance of the four home nations 2010 v 2006 - Men.....	17
Table 4.4: The performance of the four home nations 2010 v 2006 - Women.....	17
Table 4.5: The performance of the four home nations 2010 v 2006 - Mixed	18
Table 4.6: Index of market share achieved relative to population	24
Table 4.7: Scotland's overall performance by sport 1950 - 2010	25
Table 4.8: The performance of the comparator nations 1950 - 2010	29
Table 4.9: The market concentration for Scotland and the comparator nations	29
Table 4.10: Scotland's performance in Delhi 2010 by sport	33
Table 4.11: Scotland's performance 2002-2010 by sport and discipline	34
Table 4.12: Scotland's performance in sports not medalled in	45
Table 4.13: EAD events contested in 2010.....	46
Table 4.14: The Delhi 2010 EAD medals' table	46
Table 4.15: Progression of women's performance 2002-2010 by sport	50

1. Introduction

This report has been written by staff from the Sport Industry Research Centre (SIRC) at Sheffield Hallam University on behalf of **sportscotland**, the national agency for sport in Scotland. The research updates two previous studies¹ examining Scotland's performance in the Commonwealth Games in the post Sport Lottery Fund era. First, we analyse the results of the Delhi 2010 Commonwealth Games and thereby continue the time series analysis begun in the 2004 study. Second, we make a detailed comparison between Scotland's performance in 2010 compared with 2006 and 2002.

The significance of this research is that for the first time it is possible to make comparisons between three editions of the Commonwealth Games in which Scotland's athletes have benefited from elite athlete development programmes that have been in place for complete four year cycles. Thus in addition to updating an historical record of performance, this research also contributes to the forward planning of Scotland's performance in future editions of the Commonwealth Games. Given that the City of Glasgow has secured the right to host the 2014 Commonwealth Games, this report is timely in terms of planning for the next Commonwealth Games cycle.

2. Aim and objectives

The aim of this research is to provide a comprehensive analysis of Scotland's performance at the Commonwealth Games in Delhi 2010. The research provides comparisons over time (1950 - 2010) between:

- Scotland, other Commonwealth countries and specifically the home countries (England, Wales and Northern Ireland);
- Athletes representing Scotland in different types of events including men, women and men and women combined (mixed) events;
- Different sports or disciplines in which Scottish athletes competed.

The research specifically includes:

- An overview of the Commonwealth Games held since 1950 covering the number of sports, the number of events, the number of athletes and the number of nations;
- The number of nations winning a gold medal or any medal between 1950 and 2010 overall and by gender;
- Scotland's points through medals 1950 – 2010 where a gold medal equals three points, a silver two points and a bronze one point;

¹ **sportscotland** (2004) An analysis of Scotland's performance in the Commonwealth Games 1950 – 2002, **sportscotland**, Edinburgh.
sportscotland (2006) An analysis of Scotland's performance in the Commonwealth Games 1950 – 2006, **sportscotland**, Edinburgh.

- Scotland's overall market share 1950 – 2010 (where market share is defined as the percentage of points won expressed as a proportion of the total points available) and market share by gender;
- Detailed analysis of Scotland's performance in 2010 compared with 2006 and 2002;
- Detailed analysis of the other home countries' (England, Wales and Northern Ireland) performance in 2010 compared with 2006 and 2002;
- Regression analysis to determine how Scotland performs relative to other medal winning nations on the basis of its macro level economic resources such as population and Gross Domestic Product;
- Time series performance analysis of Scotland compared with the other 'home nations' (England, Wales and Northern Ireland);
- Analysis of the sports in which Scotland has won medals overall and by gender;
- Comparison of the sports in which Scotland has won medals compared with selected other nations;
- Analysis of the Scotland's performance in 2010 for each of these sports: athletics, badminton, boxing, cycling, gymnastics, hockey, lawn bowls, swimming, squash, shooting, table tennis, weightlifting and wrestling;
- Breakdown of the number and proportion of medals won by gender for Scotland and the comparator nations;
- Analysis of Scottish women's performance and progression in 2010 from 2006 and 2002;
- Breakdown of the number and proportion of medals won by type (gold, silver, bronze) for Scotland and the comparator nations; and
- Analysis of performance in events contested by Elite Athletes with a Disability (EAD events).

3. Methodology

The method used to compile this report was desk research, whereby a programme of secondary analysis was conducted on the results' database of the Commonwealth Games from 1950 – 2010. The Commonwealth Games takes place every four years and thus the results are based on 16 editions of the event. This report updates our previous work for **sportscotland** and we have added the results of Delhi 2010 to our existing databases. The prime sources for our data were:

- the official website of the Commonwealth Games (www.thecgf.com);
- the official website of the Delhi 2010 Games (www.cwgdelhi2010.com);
- the official website of the Glasgow 2014 Games (www.glasgow2014.com); and
- the Commonwealth Games Council for Scotland official website (www.cgcs.org.uk).

For each edition of the Commonwealth Games 1950 - 2010 we have reanalysed the overall final medals' table into subsidiary tables such that it is also possible to view:

- overall performance by gender including mixed events;
- overall performance in specific sports or disciplines; and
- performance in specific sports or disciplines by gender where this is possible, for example in athletics.

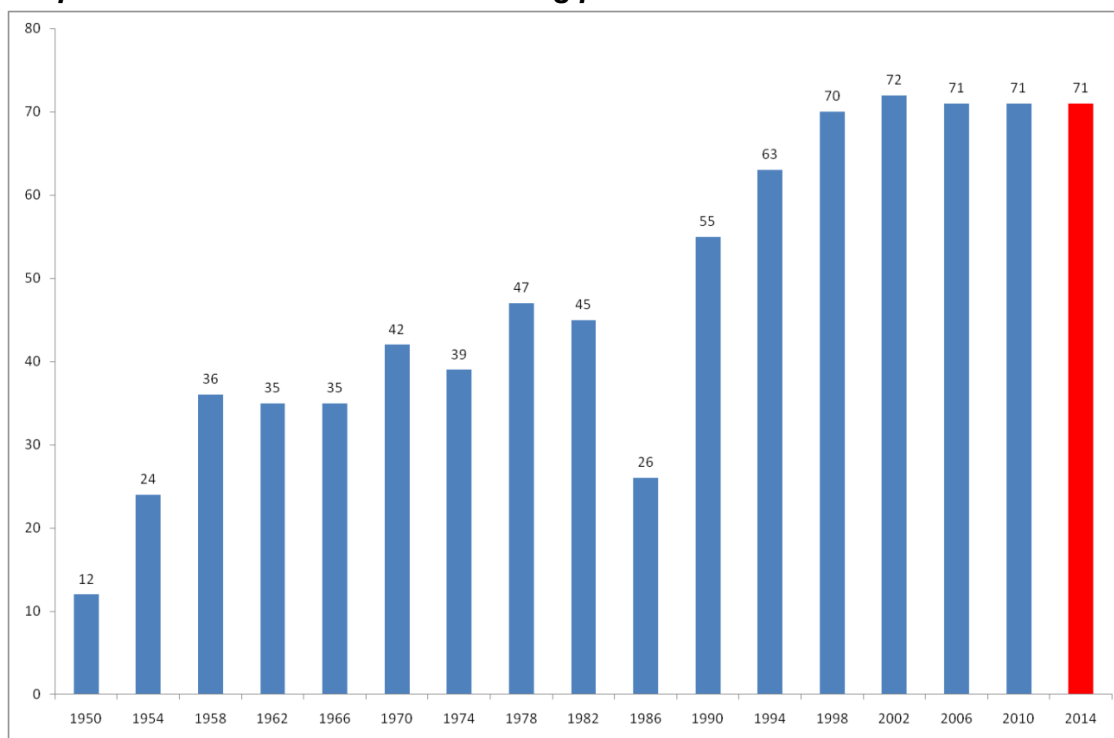
The data broken down by gender and sport have been fully reconciled back to the overall data and as such this report and the data it is based on supersedes all previous versions and derivatives.

4. Results

4.1 The Commonwealth Games in context

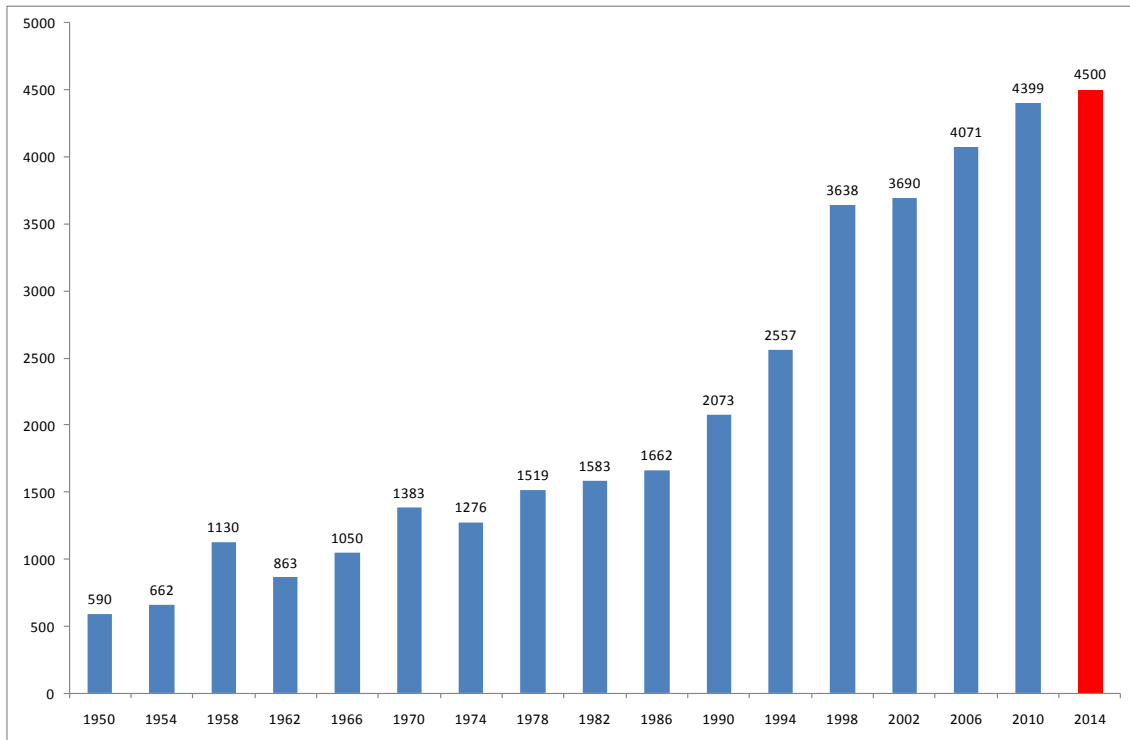
The substantive part of the context has been described in previous reports of which this report is an update. Therefore, only new data is included in this deliberately brief scene setting. In 2010 the Commonwealth was an alliance of 71 nations, crown dependencies and protectorates. Between 2006 and 2010 Fiji withdrew from the Commonwealth whilst Rwanda joined the Commonwealth sending its first ever team of some 22 athletes. One of the ways in which the alliance expresses itself is via a quadrennial Commonwealth Games. In 2010 all 71 nations took part in the event as shown in Graph 4.1 and Glasgow is targeting full attendance in 2014.

Graph 4.1: The number of nations taking part in the Commonwealth Games



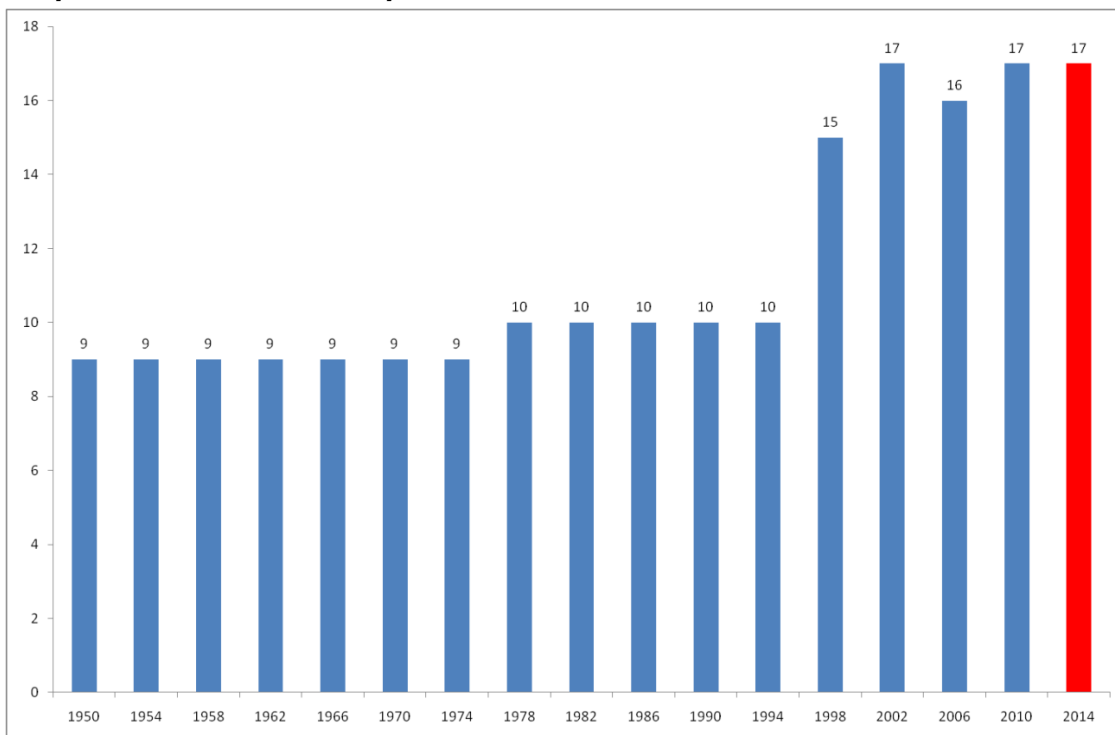
In the same way that the number of nations taking part in the Commonwealth Games has increased, so too has the number of athletes. In Delhi 2010 a record breaking 4,399 athletes took part in the event, which was the highest number of athletes ever to compete in the Commonwealth Games (see Graph 4.2). Organisers of Glasgow 2014 are planning for 4,500 athletes and 2,000 support staff to the athletes' village.

Graph 4.2: The number of athletes taking part in the Commonwealth Games



The number of sports contested at each edition of the Commonwealth Games since 1950 is shown in Graph 4.3 and shows considerable expansion from ten in 1994 to the maximum 17 in 2010. Glasgow 2014 has agreed and published its schedule of sports relatively early compared with previous hosts. There will be 17 sports contested in Glasgow 2014.

Graph 4.3: The number of sports contested at the Commonwealth Games



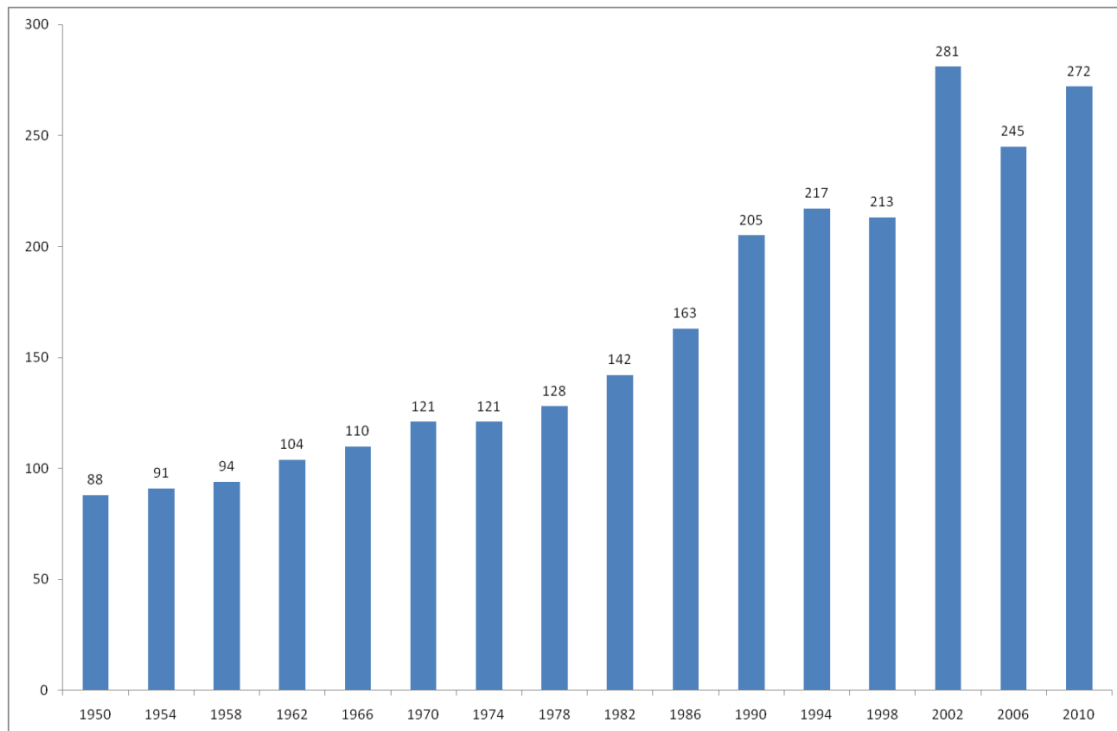
The choice of sports contested at each Commonwealth Games is set by the host city subject to a degree of constrained choice from a predetermined list of ten 'core' and a maximum of seven additional 'approved' sports. The precise rules for the composition of the sport programme are contained within Article 21 of the Commonwealth Games Federation's constitution and an edited extract is reproduced below.

1. The programme of the Commonwealth Games shall consist of a minimum of 10 sports and a maximum of 17 with no more than 4 Team sports.
2. Ten sports shall be obligatory – Athletics, Swimming, Badminton, Boxing, Hockey, Lawn Bowls, Netball, Squash, Rugby Sevens and Weightlifting.
3. A Candidate City/OC may select up to a further 7 sports from those listed below: Archery, Basketball, Canoeing, Cycling (Road and/or Mountain Bike and/or Track), Diving, Gymnastics, Judo, Rowing, Sailing, Shooting, Softball, Table Tennis, Tennis, Tenpin Bowling, Taekwondo, Triathlon and Wrestling.
4. The maximum number of events for Para Sport Athletes under clauses 5 & 6 below shall not exceed 15.
5. Para Sport events in each of the following four core sports shall be obligatory – Athletics, Swimming, Lawn Bowls and Powerlifting as directed by the Federation.
6. A Candidate City/OC may select additional Para Sport events from the sports listed: Cycling (Track), Table Tennis and Wheelchair Basketball.

In Glasgow 2014 the seven optional sports will be: cycling, gymnastics, judo, shooting, table tennis, triathlon and wrestling.

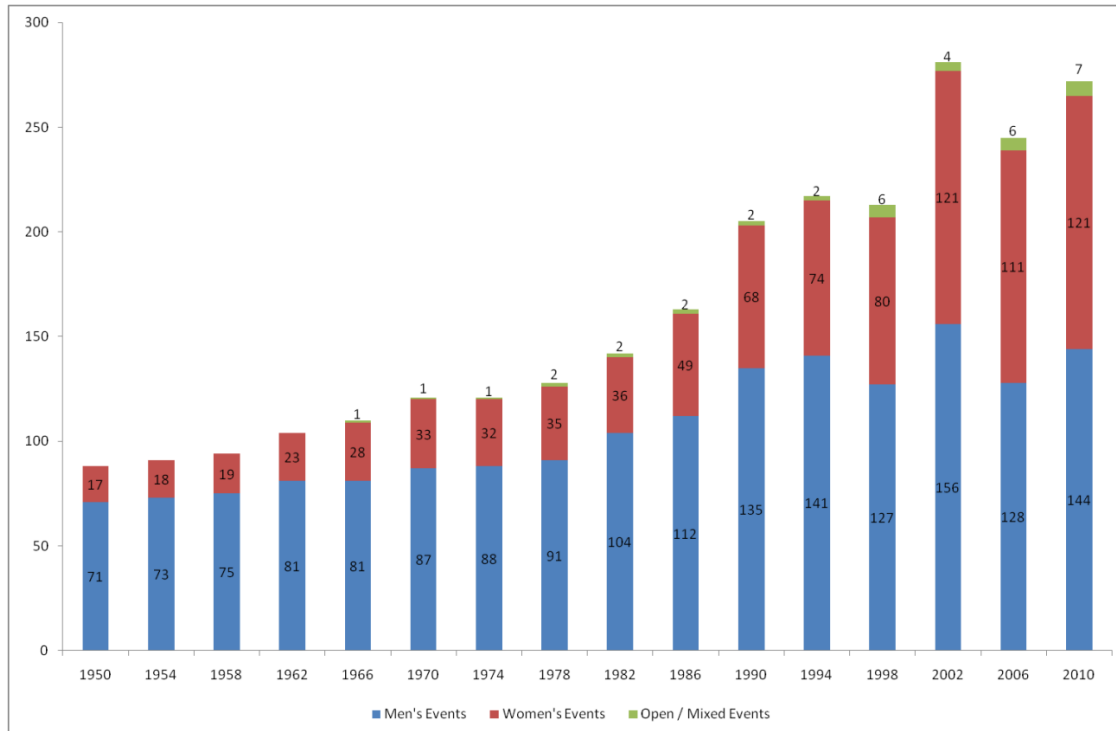
In addition to the increase in the number of sports contested at the Commonwealth Games, there has also been an increase in the number of events, which peaked at 281 in Manchester 2002 and after falling to 245 in Melbourne 2006 rose to 272 in Delhi 2010 (see Graph 4.4). The total of 272 events contested in Delhi was the second highest number of events ever featured in a Commonwealth Games programme. The number of events to be contested in 2014 is not confirmed at present, but will be at least 244.

Graph 4.4: The number of events contested at each Commonwealth Games



As was the case in the Olympic Games, early editions of the Commonwealth Games were dominated by events for men and only a minority of events were available for women. However, in recent times much of the expansion of the Commonwealth Games programme has been driven by an increase in the number of events contested by women. To illustrate this point Graph 4.5 analyses the number of events contested by men, women, and men and women (mixed events) between 1950 and 2010.

Graph 4.5: The number of events by gender



Graph 4.5 shows that although the majority of events in the Commonwealth Games are still for men, much of the growth in the number of events contested overall has been driven by an increase in the number of events for women. In 1950, 81% of the 88 events were contested by men and 19% were contested by women. Over time the proportion of male events as a function of total events has steadily reduced such that in 2010, 53% of events were contested by men, 44% were contested by women and 3% were contested by men and women on equal terms (mixed events).

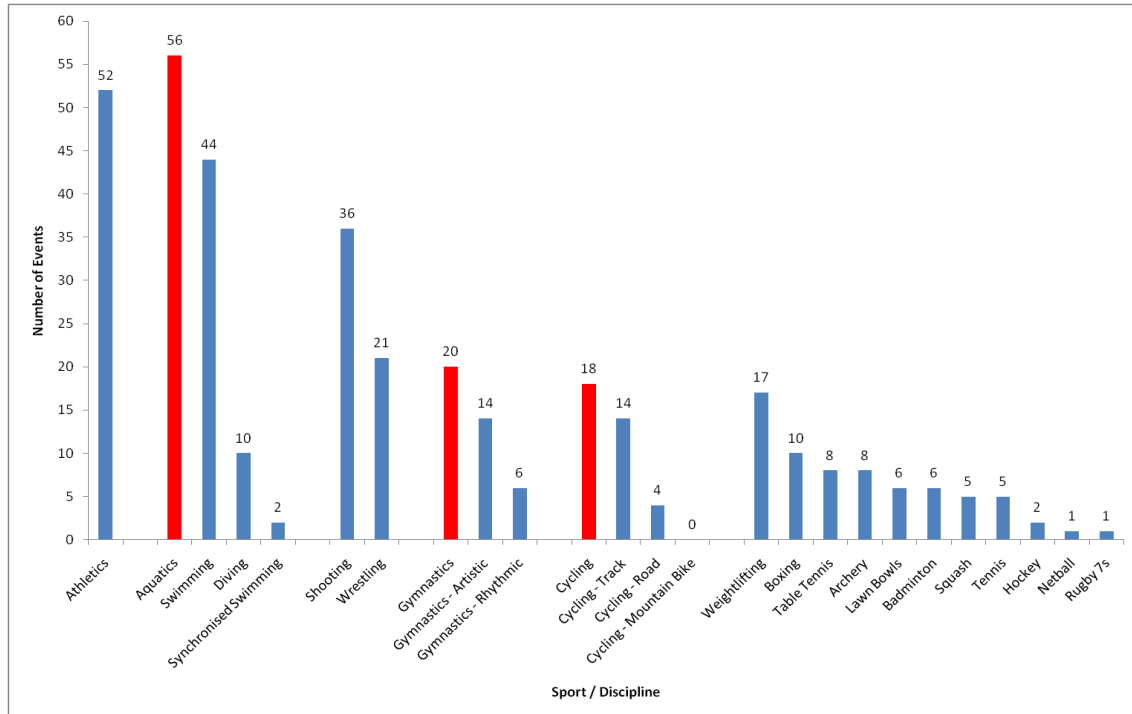
The number of events contested by women grew from 17 to 121 (612%) between 1950 and 2010 whereas during the same period the corresponding figures for men were an increase from 71 events to 144 (103%). As will be shown later in the report the most successful nations in the Commonwealth Games are those which have capitalised on the growing importance of women's sport as a key driver of overall medals' table success.

To complete the contextual analysis we examine the sports contested in Delhi 2010 and the number of events contested in each sport. It is worth noting that the events in three sports (aquatics, cycling and gymnastics) were contested in 'disciplines' as indicated below:

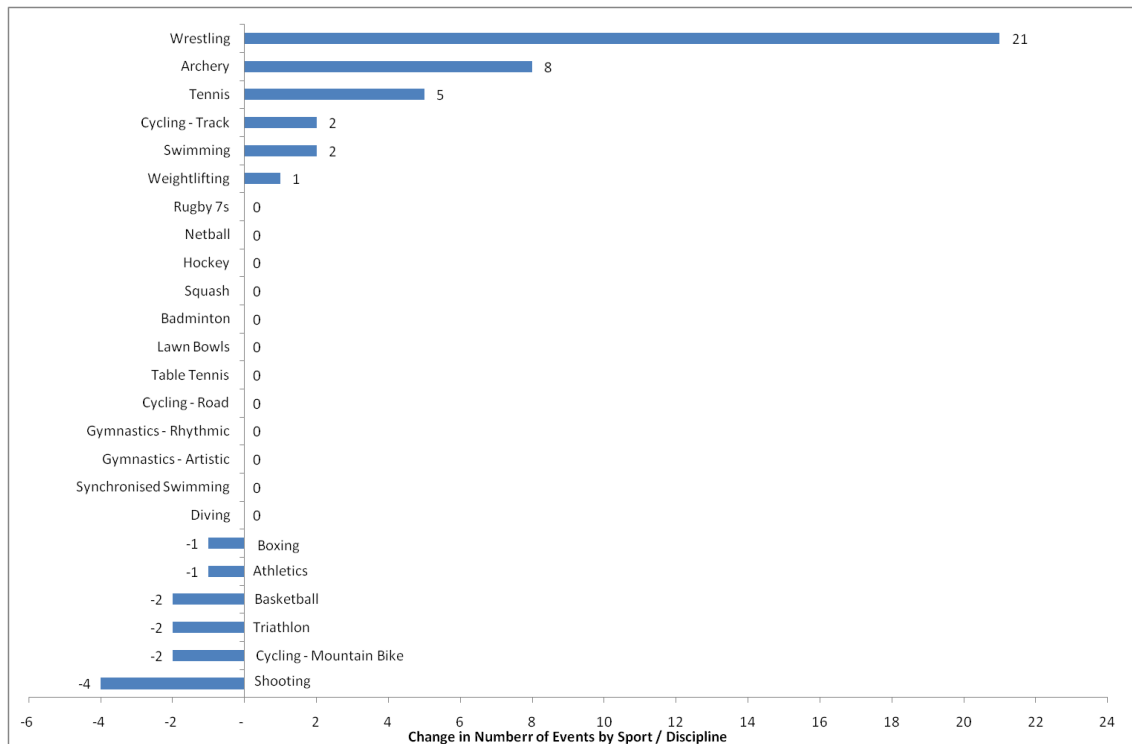
- Aquatics - swimming, diving and synchronised swimming;
- Cycling - track cycling and road cycling; and
- Gymnastics - artistic gymnastics and rhythmic gymnastics.

Graph 4.6 shows the sports and disciplines contested in 2010 along with the number of events in each sport or discipline. The red bars show the total number of medals available in sports which have sub disciplines. For example in aquatics the total of 56 events is 'explained' by: 44 events in swimming, 10 events in diving and two events in synchronised swimming.

Graph 4.6: Sports, disciplines and the number of events contested in Delhi 2010



A key point in Graph 4.6 is that the ten core sports accounted for 53% of the total events in Delhi 2010 with optional sports accounting for the remaining 47%. Integrated within the programme were fifteen events for Elite Athletes with a Disability in: athletics (6), swimming (6), weightlifting (2) and table tennis (1). Finally we examine in Graph 4.7 how the number of events contested in Delhi 2010 differs from the total events contested in Melbourne 2006.

Graph 4.7: The change in the number of events contested in 2010 v 2006

The changes in the number of events are explained by four factors. First, two sports and one discipline (basketball, -2 events; triathlon, -2 events and cycling mountain bike -2 events) were contested in Melbourne 2006 but were not in the Delhi 2010 programme. Second, three sports (archery, 8 events; tennis 5 events; and wrestling 21 events) were included in the Delhi 2010 programme and were not contested in Melbourne 2006. Third, three sports (athletics, -1 event; shooting -4 events; and boxing -1 event) were scaled down compared with Melbourne 2006. Fourth, two sports (weightlifting, 1 event; and swimming, 2 events) were scaled up in Delhi 2010 relative to Melbourne 2006.

Key points

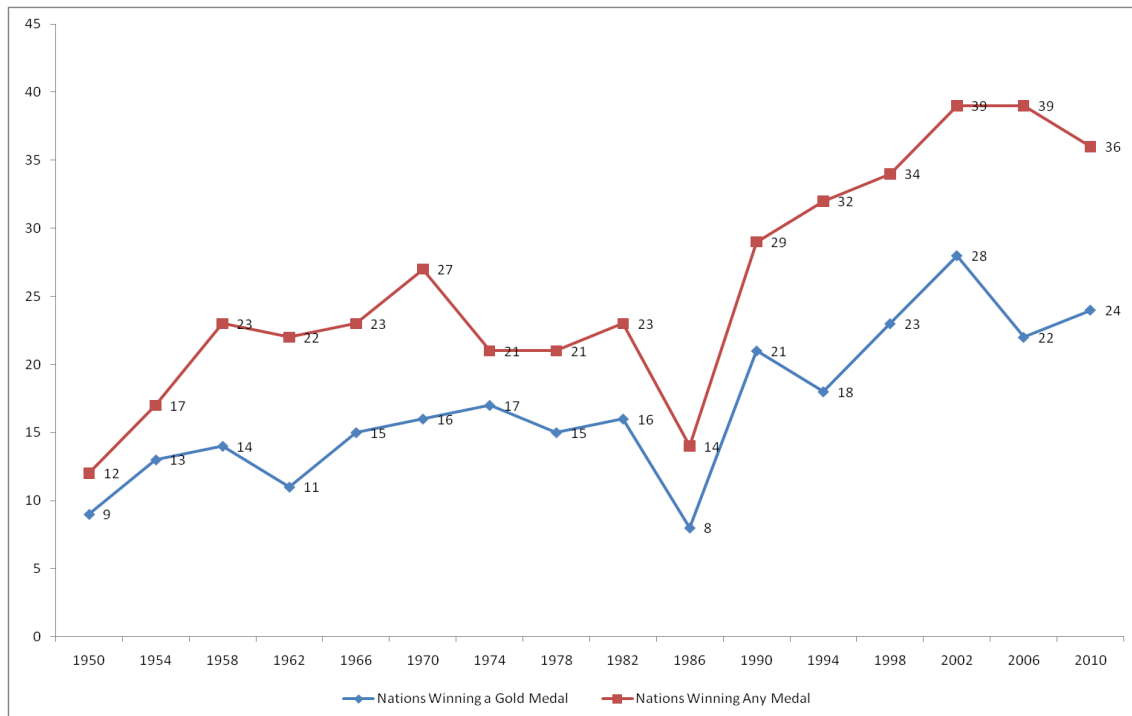
- The number of nations contesting the Commonwealth Games has increased from 12 in 1950 to full representation of all 71 nations in 2010.
- The number of athletes contesting the Commonwealth Games has increased from 590 in 1950 to a record breaking 4,399 in 2010.
- The number of sports has increased from 9 in 1950 to 17 in 2010. It is already confirmed that 17 sports will be contested in Glasgow 2014.
- The number of events contested has increased from 88 in 1950 to 272 in 2010.
- Ten core sports that are obliged to be staged accounted for 53% of the total events in 2010 with seven optional sports making up the remaining 47%.
- The number of events contested by women increased from 17 (19%) in 1950 to 121 (44%) in 2010.

- Changes in the optional sports selected, along with variations in the number of events contested in both core and optional sports explain the increase in total events in Delhi 2010 compared with Melbourne 2006.

4.2 Evidence of increasing competition for medals

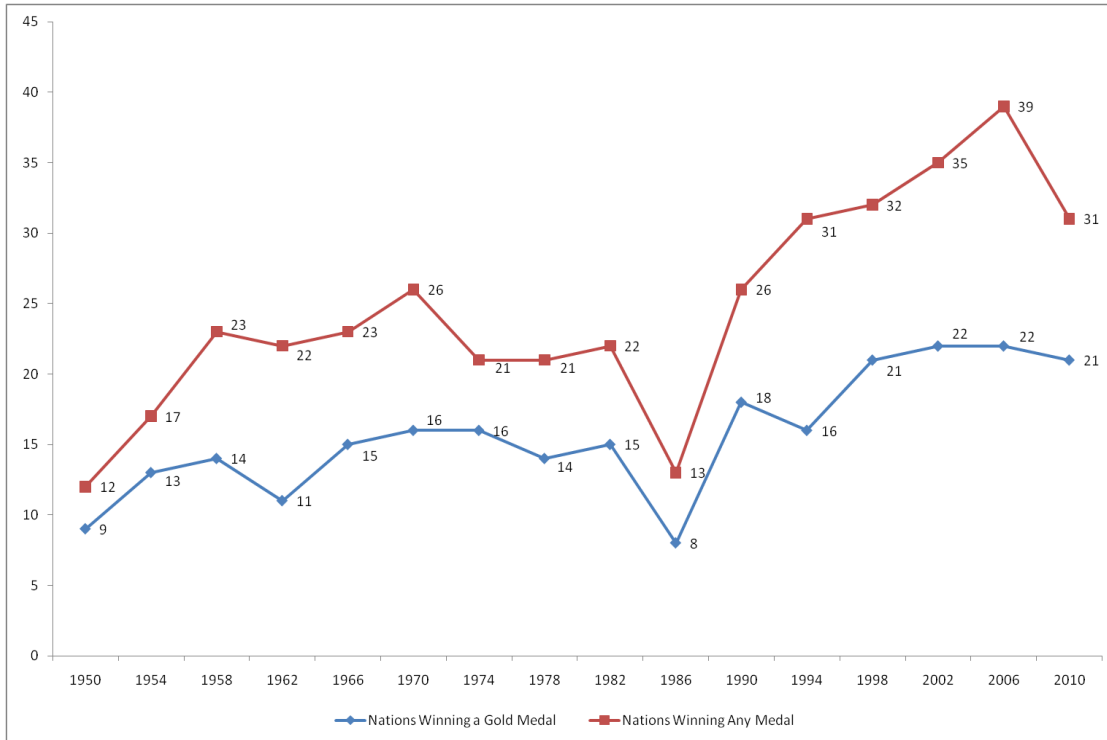
The contextual material above suggests that competition for medals may have increased over time, by virtue of more nations and more athletes taking part in the Commonwealth Games. One way of quantifying evidence of increasing competition is to analyse the number of nations that have developed medal winning capability over time. Graph 4.8 presents a time series analysis of the number of nations winning a gold medal and a medal of any colour (i.e. gold, silver or bronze).

Graph 4.8: The number of nations winning a gold medal and any medal

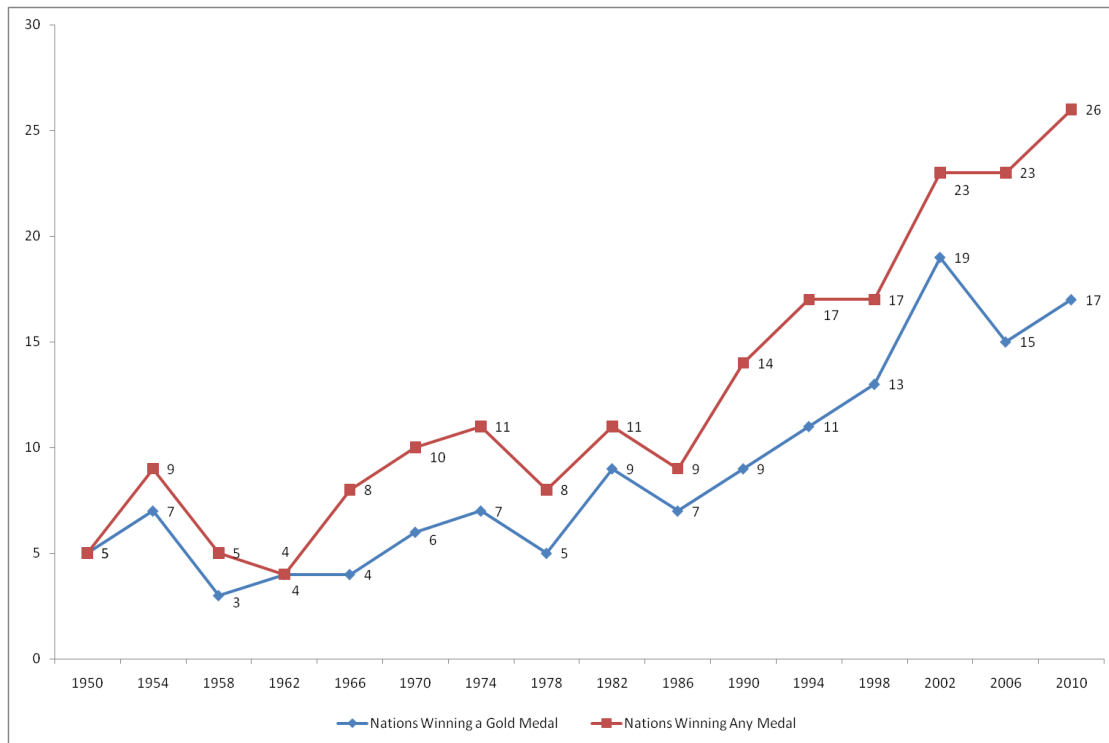


In 1950, nine nations won a gold medal and all 12 of the participating nations won a medal of any colour. In 2010, 24 of the 71 nations taking part won at least one gold medal and 36 won at least one medal of any colour. The number of nations winning a gold medal has increased to 24 in 2010 from 22 in 2006 as the dominance of the top five nations reduced from winning 74% of all gold medals to 70% during this period. The number of nations winning any medal in 2010 has fallen slightly to 36 from its all time high of 39 in 2002 and 2006. Just over half of nations taking part in Delhi 2010 (36 out of 71 or 51%) won at least one medal and this finding compares favourably with the 2008 Olympic Games in which the corresponding score was 43%.

To identify potential trends of increasing competition at a disaggregated level, we have replicated the analysis shown in Graph 4.8 by gender to see if there are any differences from the overall picture.

Graph 4.9: The number of nations winning a gold medal and any medal: men

Graph 4.9 reveals that in Delhi 2010 there was a reduction in the number of nations winning a gold medal (-1) and any medal (-8) in men's events relative to Melbourne 2006. This finding suggests that the top performing nations have become more dominant in men's events than in the past. It follows that if overall the number of nations winning a gold medal has increased and the number of nations winning a gold medal in men's events has decreased, then the number of nations winning a gold medal in women's events must have increased. Similarly, if the number of nations winning any medal has fallen by 3 overall, and in men's events this fall was 8, it also follows that the number of nations winning any medal in women's events must have increased. These points are confirmed in Graph 4.10.

Graph 4.10: The number of nations winning a gold medal and any medal: women

The number of nations winning a gold medal in women's events increased to 17 in Delhi 2010, which is the second highest score ever. The number of nations winning any medal reached a record high of 26 in Delhi and continues a consistent upward trend from 1986. Taken as a whole, the data suggests that between 2006 and 2010 there has been an increase in dominance of some nations in men's events, whereas for women's events the opposite is true. This latter point is well illustrated by the Cayman Islands winning its first ever gold in the women's 200m (athletics).

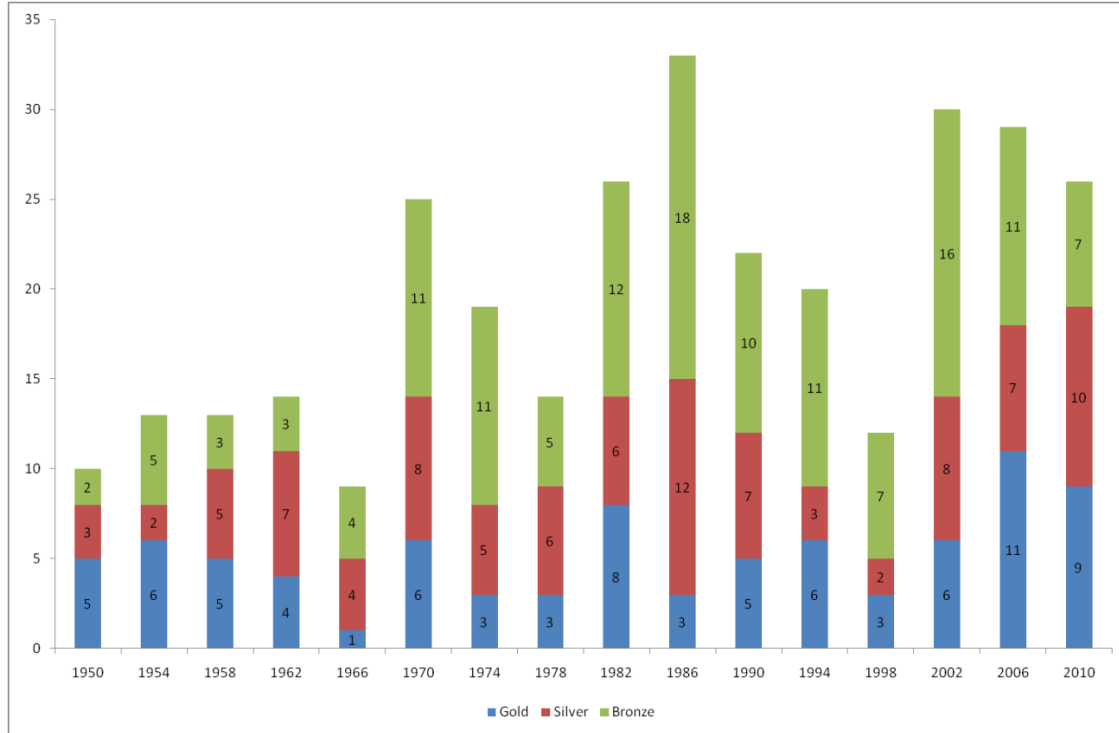
Key points

- Competition, defined by the number of nations capable of winning medals, has increased for gold medals and decreased for medals of any colour. However, there is a marked difference in the number of nations winning medals when analysed by gender.
- In men's events, the number of nations winning a gold medal in 2010 reduced by -1 and there was also a decrease in the number of nations winning a medal of any colour.
- In women's events, the number of nations winning a gold medal in 2010 increased by two and the number of nations winning a medal of any colour reached a new record high of 26.

4.3 Scotland's performance in the Commonwealth Games

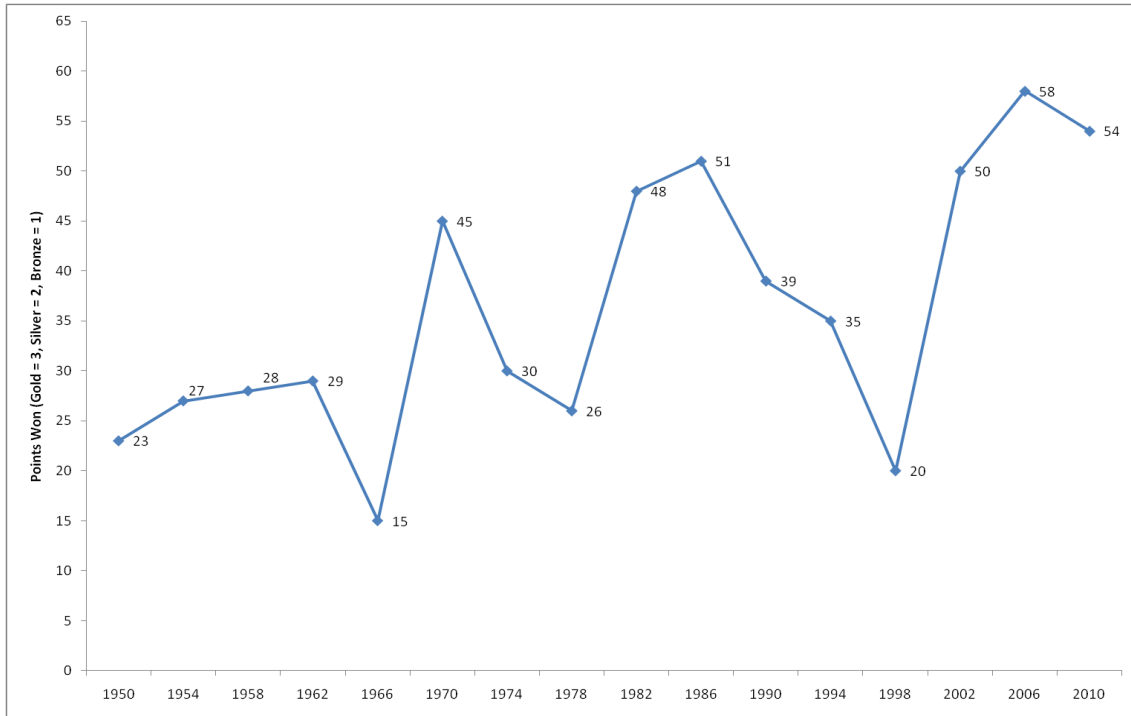
Scotland's overall performance in the Commonwealth Games between 1950 and 2010 is shown in Graph 4.11

Graph 4.11: Scotland's medal winning performance by edition



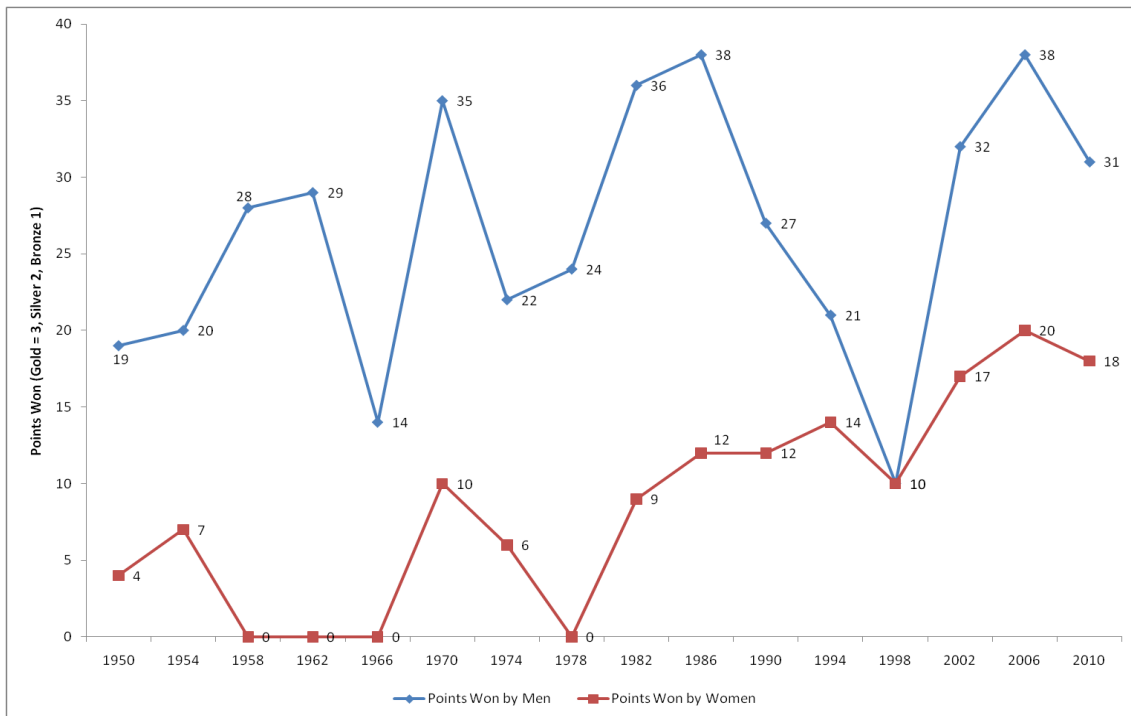
In absolute terms, Scotland is identified as having had a successful Commonwealth Games in 2010 with 9 gold medals being its second highest level of achievement to date. The total of 26 medals won was Scotland's fourth best ever. The performance of Scotland in the three editions of the Commonwealth Games since 2002 is particularly noteworthy. These are three full cycles of Sport Lottery Fund support for athletes and show that after three cycles of continual decline from the peak of 1986 to the low of 1998, Scotland has achieved a step change in its performance. This step change can be measured by the total number of medals won (between 26 and 30); and the quality of medals won (between 6 and 9 gold medals). The proportion of medals won that were gold in 2010 was 35% and is consistent with 2006 (38%) which was widely viewed as having been a particularly good Commonwealth Games for Scotland. However, it should be noted that this positive picture relates to absolute success and not relative success. As will be shown later in the report, when we factor in the increase in the number of events and medal winning opportunities available, in relative terms Scotland's recent success is not quite as impressive as Graph 4.11 suggests. Scotland's maintenance of the quality of medals won in 2010 is illustrated to good effect when the medals won are converted into a 'points' score where gold = 3, silver = 2 and bronze = 1 as shown in Graph 4.12.

Graph 4.12: Scotland's points 1950 – 2010



Graph 4.12 confirms that when medals are converted to points, 2010 was Scotland's second best performance in the Commonwealth Games. In 2010 Scotland shows three consecutive scores of 50 points or above, which is without precedent. This consistency of overall performance coincides with the availability of Lottery funding to support elite development. However, sub analysis by gender reveals some interesting differences between the performance of Scotland's male and female athletes (see Graph 4.13).

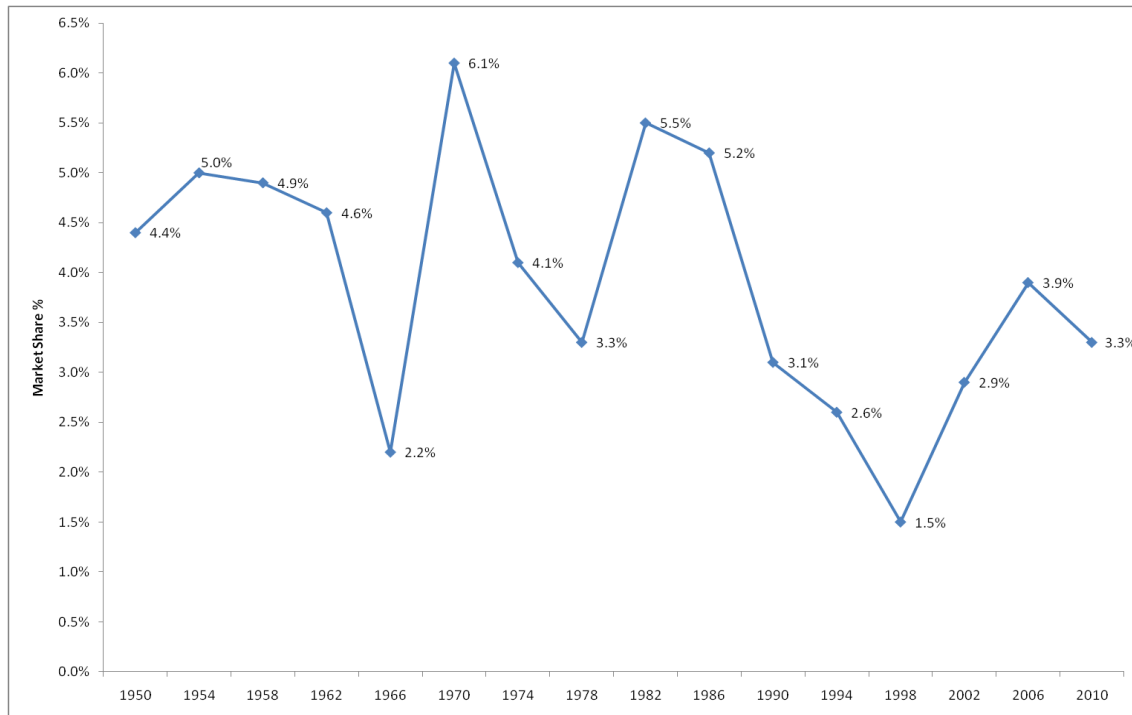
Graph 4.13: Scotland's points sub analysed by gender from 1950 - 2010



Note in Graph 4.13 that the points total shown for Scotland's men (31) and women (18) does not equal the overall total of 54 shown in Graph 4.12. This is because Graph 4.13 excludes points won in mixed events where men and women compete together (mixed doubles in tennis), or on equal terms (Queen's Full Bore Rifle). In 2010 Scotland scored 5 points in mixed events which then brings the total to 54 ($31+18+5 = 54$). This point helps to reconcile Scotland's performance between 2006 and 2010. Overall there was a loss of 4 points; men lost 7 points; women lost 2 points; and there was a gain of 5 points in mixed events.

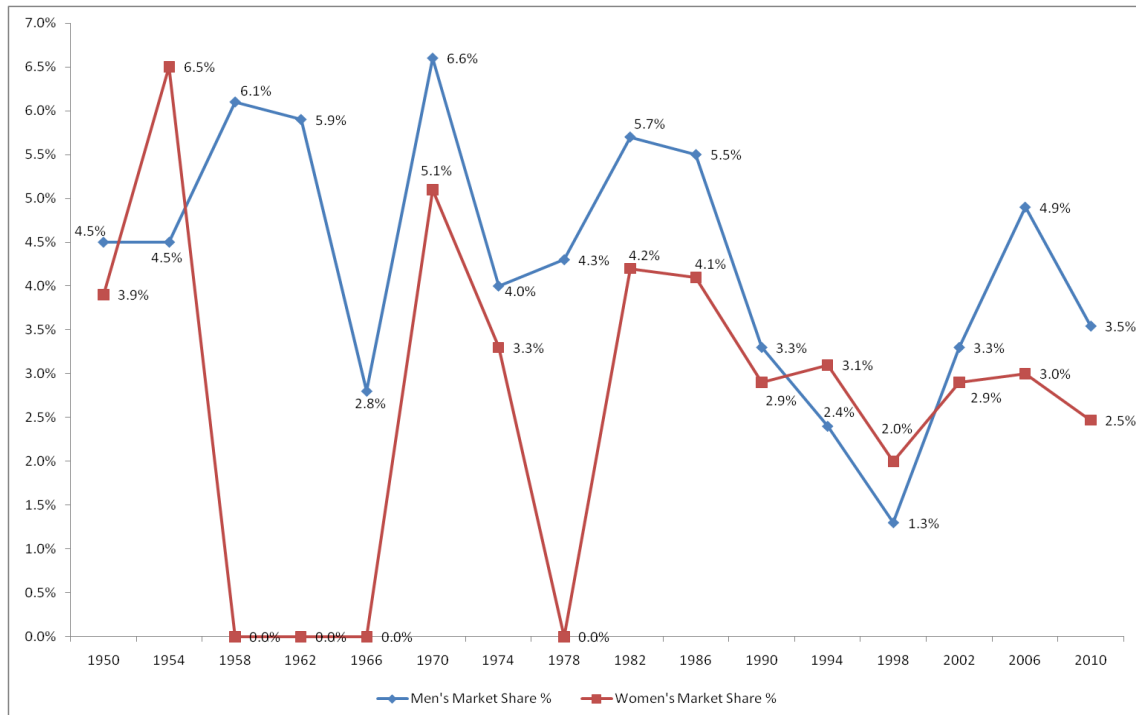
Examining points won in isolation is of limited value because the number of events has been different in 15 of the 16 editions of the Commonwealth Games since 1950. Thus it would be unwise to assume that the points won in one edition is a greater achievement than the points won in another edition without taking into account points available. The relationship between points won and points available is called 'market share' and is the only measure of performance which enables time series comparisons to be made on a like for like basis. Scotland's market share for the period 1950 to 2010 is shown in Graph 4.14.

Graph 4.14: Scotland's market share 1950 - 2010



The market share trend line shows that although 2010 was a year of consolidation for Scotland, as per the interpretation of Graph 4.11, in standardised terms 2010 was deterioration in performance relative to 2006. Furthermore, as all of the points in Graph 4.14 are comparable on a like for like basis, it can be seen that 2010 is actually Scotland's 9th best performance since 1950. Any recovery that is taking place is to levels that were attained previously without lottery funded elite athlete development programmes. The increase in nations taking part in the Commonwealth Games and the increasing number that are taking a state-sponsored strategic approach to elite sport development, has created conditions whereby medals are increasingly harder to win than in the past. It is also likely to be the case that there are diminishing returns to scale, that is, the price of success is increasing at a greater rate than any increase in medal winning capability.

At an overall level, market share masks the difference in achievement between men and women. Graph 4.15 addresses this issue by showing time series analysis of market share sub-analysed by gender and edition.

Graph 4.15: Scotland's market share by gender

Graph 4.15 illustrates market share for Scotland's male and female athletes between 1950 and 2010. The main finding is men have out performed women on 13/16 times and women have out performed men on 3/16 times (1954, 1994 and 1998). The gradient of the slope between 2006 and 2010 is steeper for men than women, which means that Scotland's slight decline between 2006 and 2010 was primarily caused by male athletes being unable to maintain their previous levels of performance. This point is perhaps best illustrated by looking at swimming. In 2006 David Carry and Gregor Tait won four gold medals between them in swimming. By contrast, in 2010 Robert Renwick was Scotland's sole male gold medallist in the pool. The loss of medals in one sport or event must be recouped elsewhere in order to stand still. Scotland's loss of medals in swimming, notably three gold medals by men is the key reason why 2010 was not quite as good a year as 2006.

Key points

- Scotland won its second highest ever total of gold medals (9) in the Delhi 2010 Commonwealth Games.
- The 26 medals won by Scotland in 2010 equate to Scotland's second highest ever 'points' total of 54.
- On a standardised basis, Scotland's market share for 2010 is 3.3%, which is lower than 2006 but nonetheless confirms strong recovery and consistency since 1998.
- Historically, male athletes representing Scotland have consistently out performed their female counterparts.

4.4 Detailed analysis of Scotland's performance in 2010 compared with 2006

In this section we analyse in detail Scotland's performance over the period 2006 to 2010. A useful starting point is to consider how the top nations and selected others performed according to four separate measures of performance namely: final position in the overall medals' table; total medals won; points value of medals; and market share percentage. Table 4.1 summarises these four measures and the direction of their change between 2006 and 2010.

Table 4.1: The top nations in 2010 using four different performance measures

Nation	Medals' Table (2010,2006)	Total Medals (2010,2006)	Points (2010,2006)	Market Share (2010,2006)
Australia	Same (1st, 1st)	Worse (177,222)	Worse (380, 458)	Worse (23.1%, 31.1%)
India	Better (2nd, 4th)	Better (101, 50)	Better (204, 111)	Better (12.4%, 7.5%)
England	Worse (3rd 2nd)	Better (142, 110)	Better (275, 222)	Better (16.7%, 15.0%)
Canada	Worse (4th, 3rd)	Worse (75, 86)	Worse (144, 167)	Worse (8.7%, 11.3%)
South Africa	Same (5th, 5th)	Worse (33, 38)	Worse (68, 75)	Worse (4.1%, 5.1%)
Kenya	Better (6th,10th)	Better (32, 18)	Better (67, 35)	Better (4.1%, 2.4%)
Malaysia	Better (7th, 8th)	Better (35, 29)	Better (69, 55)	Better (4.2%, 3.7%)
Singapore	Better (8th, 11th)	Better (31, 18)	Better (64, 34)	Better (3.9% 2.3%)
Nigeria	Better (9th, 12th)	Better (35,17)	Better (67, 31)	Better (4.1%, 2.1%)
Scotland	Worse (10th, 6th,)	Worse (26, 29)	Worse (54, 58)	Worse (3.3%, 3.9%)
New Zealand	Worse (11th 9th)	Better (36, 31)	Better (70, 55)	Better (4.3% 3.7%)
Northern Ireland	Better (13th, 25th)	Better (10, 2)	Better (19, 4)	Better (1.2%, 0.3%)
Wales	Worse (15th, 13th)	Same (19, 19)	Same (30, 30)	Worse (1.8% 2.0%)

Table 4.1 illustrates that in terms of medals' table ranking there were some notable changes in Delhi 2010 compared with Melbourne 2006. Although Australia topped the table again, its dominance was significantly reduced without the benefit of home advantage. India enjoyed its best ever Commonwealth Games achieving second place in the medals' table and improving on all measures of performance. India's success in the medals' table came at the expense of England and Canada who both slipped a place. However, England improved on all other indicators whilst for Canada, 2010 was a relatively poor Commonwealth Games with all other indicators showing deteriorating performance.

Scotland's performance, whilst seemingly good in Graph 4.11, is painted in a different light in Table 4.1. All four measures of performance reveal that in 2010 Scotland's performance was worse than in 2006. In our report on Scotland's performance in the 2006 Commonwealth Games we stated that in 2010 Scotland would find it difficult to emulate its 2006 performance because its system was over performing relative to its population and wealth (gross domestic product). This analysis has proved to be correct and as there was no step change in investment or elite sport development between 2006 and 2010 in Scotland, it is not surprising that Scotland struggled to stand still relative to 2006. As will be demonstrated later in the report, what Scotland achieved in 2010 is precisely what its population and wealth would predict.

As a development to previous reports we now examine Scotland's performance relative to the other home nations as well as broken down by gender and mixed events. Table 4.2 shows overall performance of the four home nations.

Table 4.2: The performance of the four home nations 2010 v 2006 - Overall

Nation	Medals' Table (2010,2006)	Total Medals (2010,2006)	Points (2010,2006)	Market Share (2010,2006)
England	Worse (3rd, 2nd)	Better (142, 110)	Better (276, 225)	Better (16.8%, 15.2%)
Scotland	Worse (10th, 6th)	Worse (26, 29)	Worse (54, 58)	Worse (3.3%, 3.9%)
Northern Ireland	Better (13th, 25th)	Better (10, 2)	Better (19, 4)	Better (1.2%, 0.3%)
Wales	Worse (15th, 13th)	Same (19, 19)	Same (30, 30)	Worse (1.8% 2.0%)

At an overall level, Northern Ireland is the only home nation to have improved on all four measures of performance and Scotland is the only nation whose performance is worse on all four indicators. It should be noted that Northern Ireland's improvement was from a very low base and is still below what its population and wealth would predict. England, as discussed above fell by one place in the medals' table ranking despite improvements on all other indicators. Wales is an interesting case as it won the same number of medals and achieved the same number of points, but also recorded a lower ranking and a lower market share than in 2006. Despite winning the same number of medals and points as in 2006, Wales' market share fell because there were more events and medal winning opportunities in 2010 compared with 2006. Thus Wales failed to maintain its share of an increased volume of medal winning opportunities. A similar position to Table 4.2 is revealed when the data is broken down by gender as shown in Table 4.3.

Table 4.3: The performance of the four home nations 2010 v 2006 - Men

Nation	Medals' Table (2010,2006)	Total Medals (2010,2006)	Points (2010,2006)	Market Share (2010,2006)
England	Worse (3rd, 2nd)	Better (79, 59)	Better (160,129)	Better (18.3%, 16.6%)
Scotland	Worse (9th, 5th)	Worse (15, 19)	Worse (31, 38)	Worse (3.5%, 4.9%)
Northern Ireland	Better (11th, 24th)	Better (8, 2)	Better (16, 4)	Better (1.8%, 0.5%)
Wales	Same (12th, 12th)	Worse (7, 12)	Worse (12, 19)	Worse (1.4%, 2.4%)

The main finding in Table 4.3 is the relatively poor performance of Wales' male athletes between 2006 and 2010. Wales maintained 12th place in the men's medals' table by virtue of winning two gold medals as it had done in 2006. However, in overall terms the number of medals won was five fewer which in turn caused a 44% fall in market share from 2.4% in 2006 to 1.4% in 2010. When repeating the analysis for female athletes in Table 4.4, the findings help to clarify Tables 4.2 and 4.3.

Table 4.4: The performance of the four home nations 2010 v 2006 - Women

Nation	Medals' Table (2010,2006)	Total Medals (2010,2006)	Points (2010,2006)	Market Share (2010,2006)
England	Same (3rd, 3rd)	Better (57,46)	Better (107, 84)	Better (14.7%, 12.6%)
Scotland	Worse (11th, 7th)	Worse (9, 10)	Worse (18, 20)	Worse (2.5%, 3.0%)
Northern Ireland	Better (22nd, N/A)	Better (1, 0)	Better (2, 0)	Better (0.3%, 0.0%)
Wales	Worse (18th, 13th)	Better (12, 7)	Better (18, 11)	Better (2.5%, 1.6%)

England's women athletes maintained third place in the medals' table and improved on all other indicators. Scotland's women athletes followed the nations overall trend of performing worse on all indicators, whereas for Northern Ireland there was improvement on all indicators from a zero base in 2006. Although Wales' women athletes did not win a gold medal as they did in 2006, which in turn explains their fall of five places in the medals' table; they did win five more medals in total than in 2006 which caused an increase in market share. Whilst at an overall level Wales

appears to have delivered a comparable performance in Delhi relative to Melbourne, this diagnosis masks a notable decline in the performance of male athletes and a compensating improvement in the performance of women athletes. To complete the analysis Table 4.5 shows the performance of the home nations in the seven mixed events in 2010 relative to 2006.

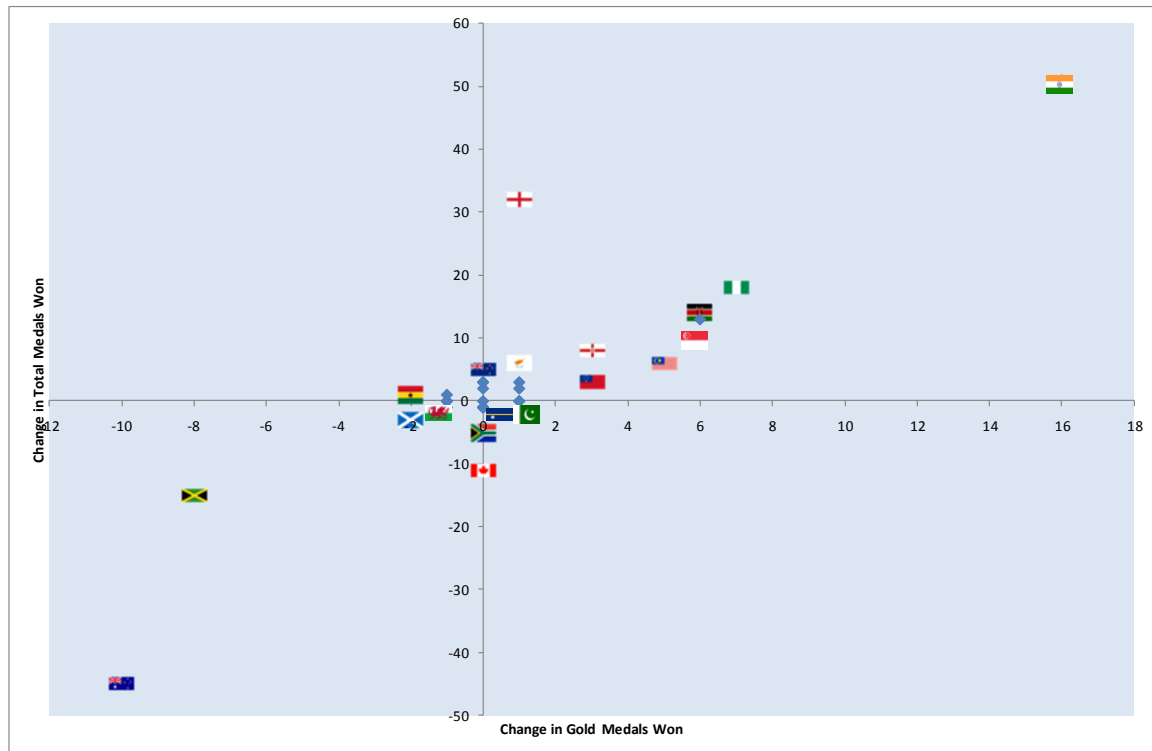
Table 4.5: The performance of the four home nations 2010 v 2006 - Mixed

Nation	Medals' Table (2010,2006)	Total Medals (2010,2006)	Points (2010,2006)	Market Share (2010,2006)
England	Worse (3rd, 1st)	Better (6, 5)	Worse (9, 12)	Worse (21.4%, 33.3%)
Scotland	Better (5th, N/A)	Better (2, 0)	Better (5, 0)	Better (11.9%, 0.0%)
Northern Ireland	Better (5th, N/A)	Better (1, 0)	Better (1,0)	Better (2.4%, 0.0%)
Wales	N/A	N/A	N/A	N/A

Table 4.5 confirms how Scotland's decline in both men's events and women's events in 2010 was compensated for by gains in mixed events. Scotland won the mixed doubles in tennis and a silver medal in an open shooting event. These gains are from a zero base in 2006, and as is the case with Northern Ireland, this is shown as improvement on all four performance measures.

An alternative way of looking for improving and deteriorating nations is to plot the change in gold medals won against the change in total medals won as shown in Graph 4.16.

Graph 4.16: Change in gold medals against change in total medals 2006-2010

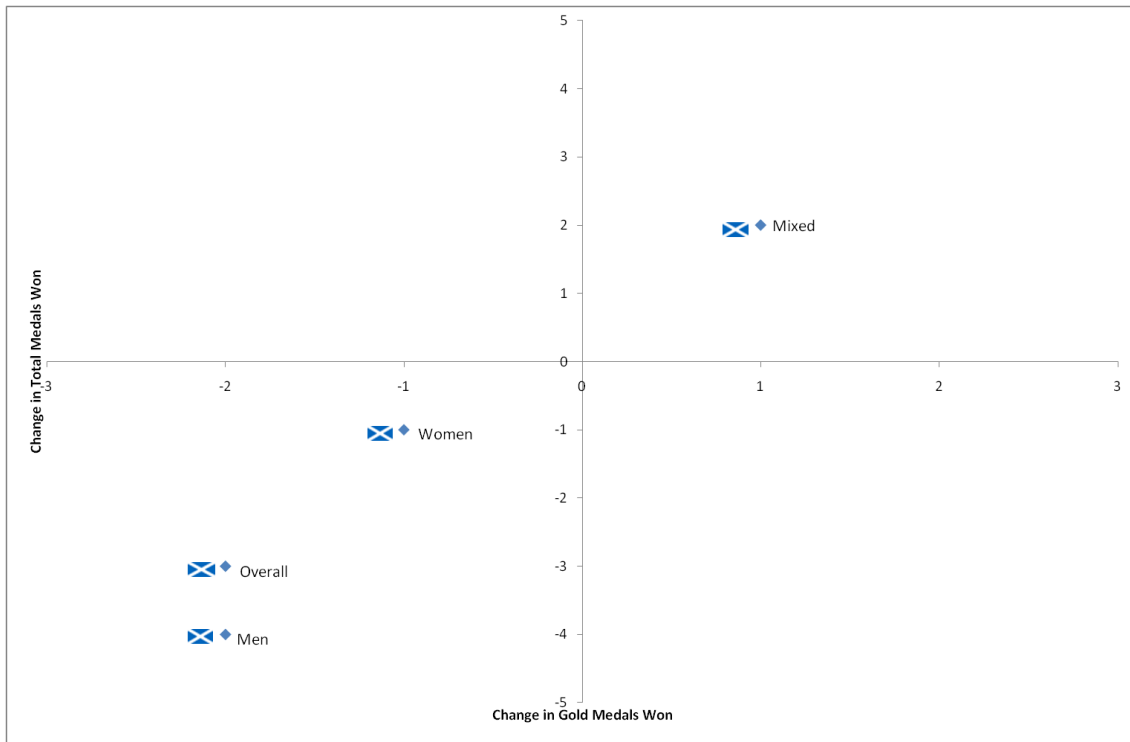


In Graph 4.16 India is identified as the most improved nation as a result of increasing its gold medals won by 17 and total medals by 52. Other improving nations are Nigeria, Kenya, Singapore and Malaysia. Northern Ireland is the most improved home nation, winning three more gold medals than it did in Melbourne 2006. England is also an improving nation with one more gold medal than 2006 and 29 more medals overall. Scotland is in the bottom left quadrant confirming the loss of two gold medals and three medals overall. Wales, whilst maintaining its total number of medals, lost one gold medal relative to 2006 and finds itself on the axis of the same quadrant as Scotland. The greatest losers of medals were Australia and Jamaica.

Australia's performance can be explained by the inevitable impact of not being the host nation. By contrast, Jamaica failed to maintain its domination of the track and field sprint events.

In the same way that the data in Graph 4.16 can be used to diagnose overall performance, it can also be used to identify relative performance by gender and by sport / discipline. In Graph 4.17 Scotland's performance in events for men, women and mixed / open categories is plotted as per Graph 4.16.

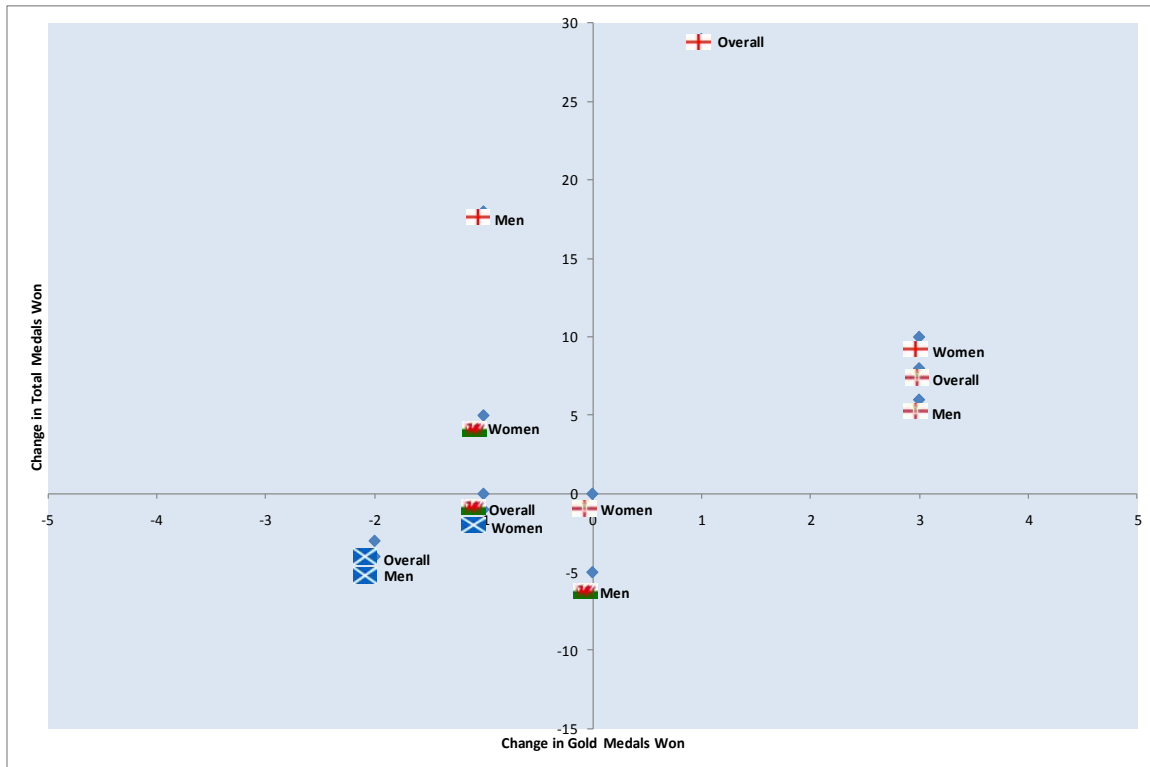
Graph 4.17: Scotland's change in gold medals won against change in total medals by gender 2006 - 2010



Graph 4.17 is a succinct visual confirmation that Scotland's overall performance in Delhi contained variations by gender. Three gold medals were lost in events for men only (-2) and women only (-1) and one gold medal was gained in mixed events to give a net loss of two gold medals (from 11 in 2006 to nine in 2010). Similarly in events for men only (-4) and women only (-1) five medals were lost and were offset by a gain of two medals in mixed events to give a net loss of three medals (from 29 in 2006 to 26 in 2010).

Replicating the analysis in Graph 4.17 for the four home nations produces the data shown in Graph 4.18.

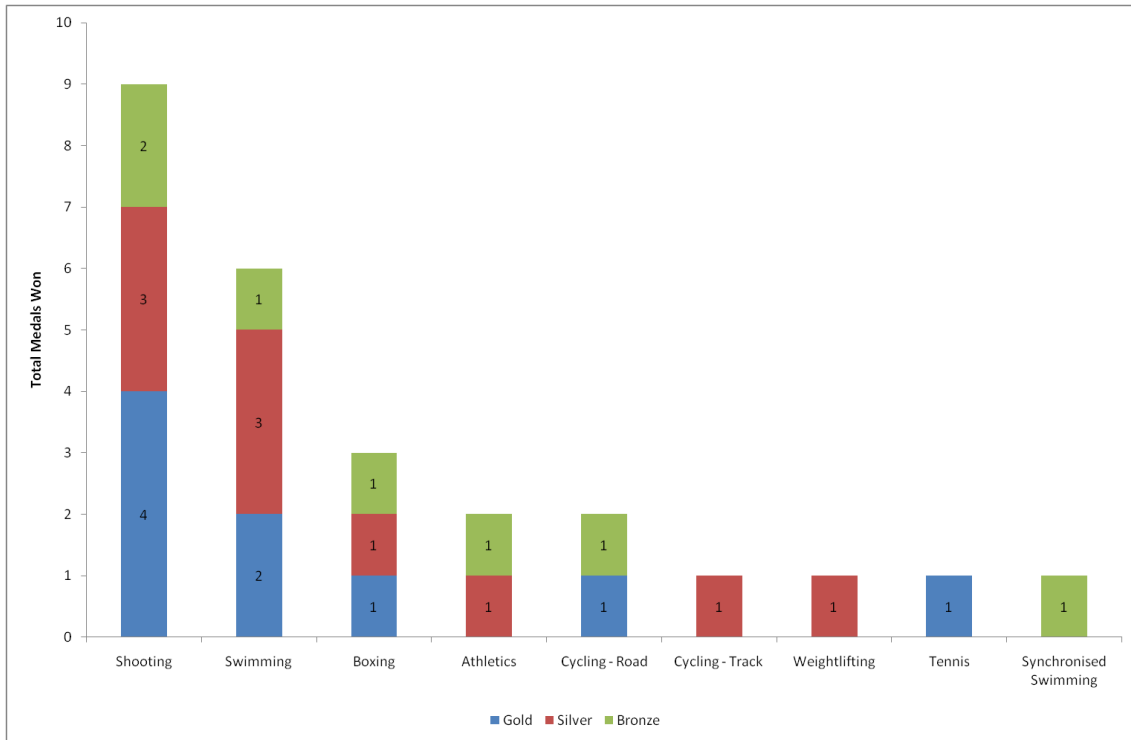
Graph 4.18: Home nations' changes in gold medals won against change in total medals by gender 2006 - 2010



Northern Ireland is identified as the most improved home nation in terms of increased gold medals won overall. These gold medals were all won by men in boxing and were from a zero base. England's women athletes were the most improved in terms of gold medals and total medals won. By contrast, England's male athletes lost one gold medal relative to 2006 but were the most improved in terms of total medals won. The success of Wales' women athletes in terms of total medals won is clearly shown as is the variation by gender for Scotland shown on its own in Graph 4.16 above.

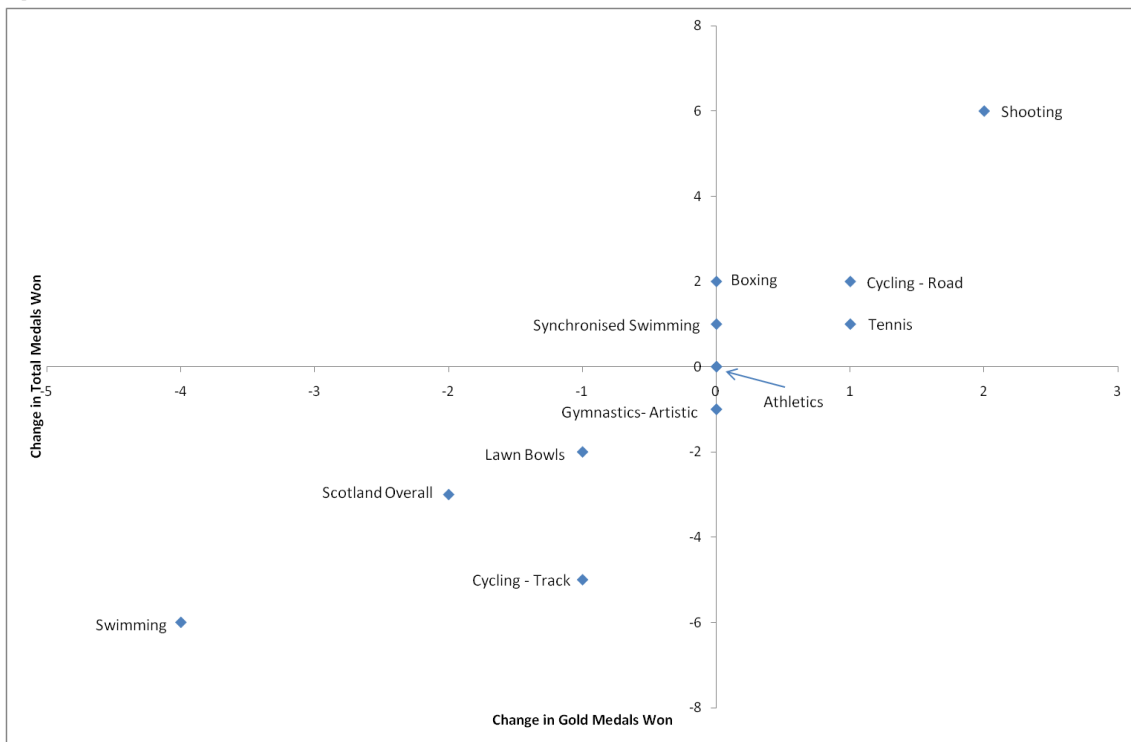
In the same way that it is possible to highlight changes in medal winning performance by gender, so too it is possible to drill down to sport-specific level. To put our sport-specific analysis into context we start with a graph showing the number of gold medals won by type of medals for each sport.

Graph 4.19 Scotland's performance in 2010 by sport



Graph 4.19 illustrates how shooting and swimming were the two sports in which Scotland won the majority (67%) of its gold medals (6/9) and the majority (58%) of its total medals (15/26). The change in medals won by sport is shown in Graph 4.20.

Graph 4.20 Scotland's change in gold medals won against change in total medals won by sport 2006 - 2010



When analysing changes in performance by sport, as shown in Graph 4.20, it can be seen that there are three clusters of performance. First, shooting, cycling (road) and tennis are all in the top right hand quadrant meaning that these were the sports in which Scotland increased both gold medals won and total medals won. In the absence of formal performance targets, being located in the top right hand quadrant should be taken as a sign of success.

Second, there are four sports which find themselves located on the y axis which means that gold medals won did not change but total medals may have done. These sports are: boxing, synchronised swimming, athletics and artistic gymnastics. Boxing and synchronised swimming increased their total medals won by two and one respectively. By contrast athletics was unchanged with the one silver and one bronze medal being equal to the one silver and one bronze won in Melbourne 2006. In Delhi 2010 Scotland's gymnasts did not win any medals and hence lost the one medal secured on the horizontal bar by Adam Cox in 2006.

Third, in the bottom right hand quadrant are the sports in which there was a loss of both gold medals and total medals. Swimming is identified as the sport with the greatest loss of medals, four fewer gold medals and six fewer medals in total. As will be shown later, two gold medals in swimming would normally be viewed as having been a very successful Games for Scotland. The six gold medals won in 2006 was the best performance by Scotland in all Commonwealth Games with the previous record being two in 1974 and 1954.

Key points

- Scotland's performance in Delhi 2010 was worse on all four measures of performance used in this research than Melbourne 2006. In some respects this is not surprising as in 2006 Scotland performed well above what its resources would otherwise predict.
- Scotland's performance sub analysed by gender reveals that both performance in events for men only and women only was worse in 2010 than 2006. Scotland's success in mixed events, notably the gold medal in the tennis mixed doubles, helped to offset the losses made elsewhere.
- At a sport-specific level Scotland performed particularly well in shooting, with a gain of two gold medals and six medals in total. By contrast, Scotland's swimmers were unable to repeat their achievements in the pool, with the loss of four gold medals and six medals overall, being the principal cause of Scotland's relative decline in 2010.

4.5 How does Scotland perform relative to how it might be expected to perform?

In section 4.4 it was shown that 2010 was a year of relative decline for Scotland from the heights of 11 gold medals and sixth place in the medals' table in 2006. However, a key question to answer is how does Scotland perform relative to how it might be expected to perform? We have tackled this question in two ways.

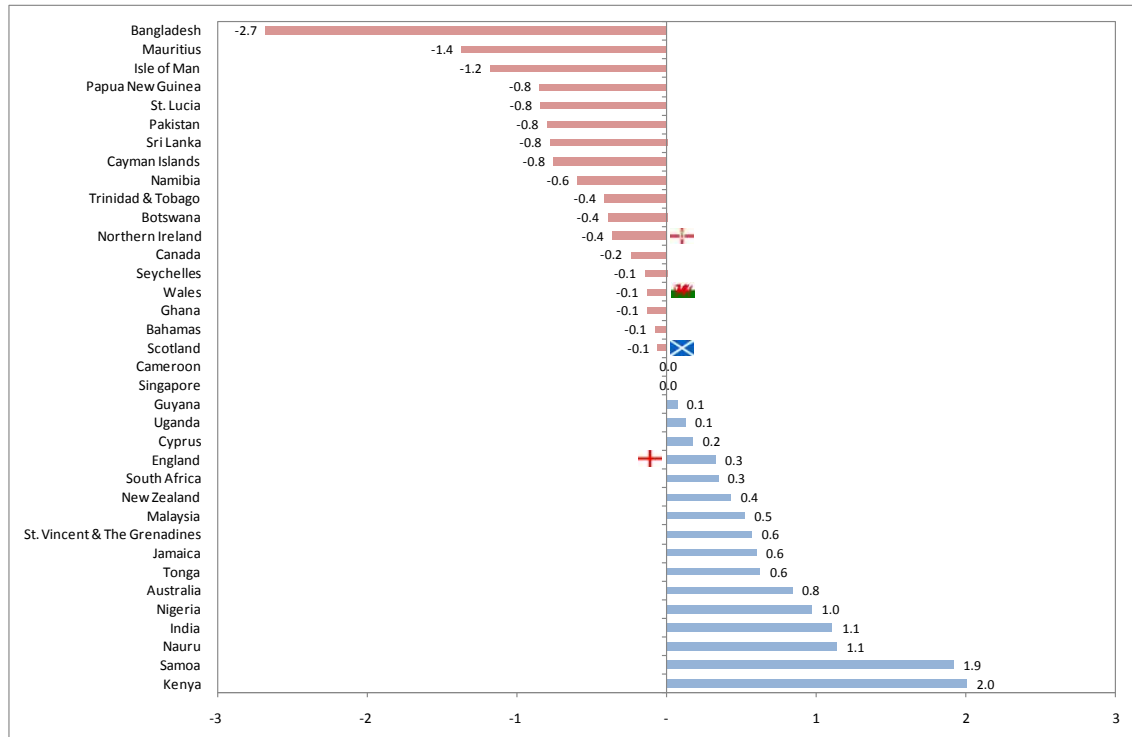
First using regression analysis on macro economic indicators such as population, Gross Domestic Product (GDP) and GDP per capita for all nations which won a medal in Delhi 2010, we have quantified the extent to which nations over or under perform relative to their economic resources.

Second, for the four home nations of England, Scotland, Wales and Northern Ireland we have computed the relationship between actual and expected market share on the basis of each nation's population. This analysis enables us to identify if any home nation is relatively more efficient than any other in terms of producing medal winning elite athletes.

In terms of the regression analysis we sourced the population and GDP data from the CIA World Fact Book where possible and where there was missing data it was found from official sources for the nations concerned. The basic finding from the regression analysis is that in 2010, 71% of

nations' success as defined by market share can be predicted by the macro economic variables used in the regression analysis. Some nations perform better than their macro economic resources might predict and others perform worse. The difference between a nation's actual score and expected score is termed its 'residual' score. The residual scores for all 36 medal winning nations in Delhi 2010 are shown in Graph 4.21.

Graph 4.21: The residual scores for medal winning nations in Delhi 2010



Scotland has a residual score of -0.1 which means that its performance in 2010 was almost perfectly in line with what would have been expected on the basis of population and wealth. Wales achieves the same score as Scotland and Northern Ireland despite its improvement from 2006 still punches below its macro-economic weight with a residual score of -0.4. England is the only home nation that achieved above expectations in 2010 with a residual score of 0.3.

Kenya had a particularly good Commonwealth Games increasing its gold medals won by 6 and total medals won by 14. This level of achievement is considerably above what its resources would predict as demonstrated by the highest residual score of 2.0. Kenya performed particularly well in athletics with 11 of its 12 gold medals won in this sport. The ability to produce greater sporting success than macro-economic resources predict, usually points to an efficient elite sport development system. By contrast, Bangladesh's return of a solitary bronze medal in shooting is seen as a poor achievement from a nation with a population of 160 million and this is why it has the lowest residual score of -2.7.

The host nation, India, performed above expectations as revealed by a positive residual score of 1.1. It could be argued that India chose sports from the list of optional sports in which it had relatively high chances of success, notably shooting and wrestling in which it won 14 and 10 gold medals respectively, or 62% of its total gold medals. If Glasgow 2014 has chosen its programme in such a way as to improve Scotland's chances of success, it would be reasonable to expect Scotland to improve in 2014 compared with 2010.

As an alternative way of examining relative performance of nations we have compiled a time series analysis of the market share achieved by the four home nations over the period 1950 to 2010 relative to their respective populations. To illustrate how the calculation has been made, Table 4.6 shows the relevant data for 2010.

Table 4.6: Index of market share achieved relative to population

2010	Population	% of Population	Market Share %	% of M/S	Market Share % to Population % Index
England	51.4m	84.3%	16.8%	72.4%	86
Scotland	5.0m	8.2%	3.3%	14.2%	174
Wales	2.9m	4.8%	1.8%	7.8%	163
N. Ireland	1.7m	2.8%	1.3%	5.6%	201
Totals	61.0m	100%	23.2%	100%	100

Market Share % to Population % Index for England = $((72.4/84.3)*100) = 86$

If the four home nations win market share in proportion to their populations, then each nation would receive an index score of 100. However, in Table 4.6 it can be seen that England under achieved in 2010. In the case of Northern Ireland the change in performance was sufficient to move from under achieving in 2006 to over achieving in 2010. Scotland and Wales both over achieved on this measure, but to a lesser extent than in 2006 reflecting their reductions in medals won. A full time series analysis of this indicator is shown in Graph 4.22.

Graph 4.22: Time series analysis of market share relative to population



In our 2006 report we made the statement shown in the indented quotation below, which ultimately proved to be a reasonable assessment of what actually happened in 2010.

A salutary note to sport administrators in Scotland is that the 2006 level of performance is unprecedented and has created the first ever case of improvement in two consecutive Commonwealth Games. Improving on 2006 will be a tough act to follow in 2010.

Key points

- In 2010 Scotland performed almost exactly in line with how its macro economic resources predicted.
- Relative to the other home nations, Scotland was the second best performing nation when linking market share to population.
- The benefits of home advantage should help Scotland to perform better in Glasgow 2014 than it did in Delhi 2010.

4.6 Analysis of the sports in which Scotland has won medals

In this section we examine Scotland's performance in the Commonwealth Games by sport to identify the most successful sports and to provide benchmarks for comparison with other nations. The 26 medals won by Scotland in 2010 increases its total medals won to 314 as shown in Table 4.7.

Swimming, athletics and boxing are historically Scotland's most successful sports, accounting for over half (51%) of total medals won between 1950 and 2010. However, no gold medals have been won in athletics since 1994 and only 6 of the 14 gold medals won in boxing have been won since 1966. These two sports are in relative decline compared with swimming in which 9 of the 15 gold medals won have been won since 2002. Shooting is also identified as a sport which is performing well in the present, as 6 of the 12 gold medals won to date have been won since 2006.

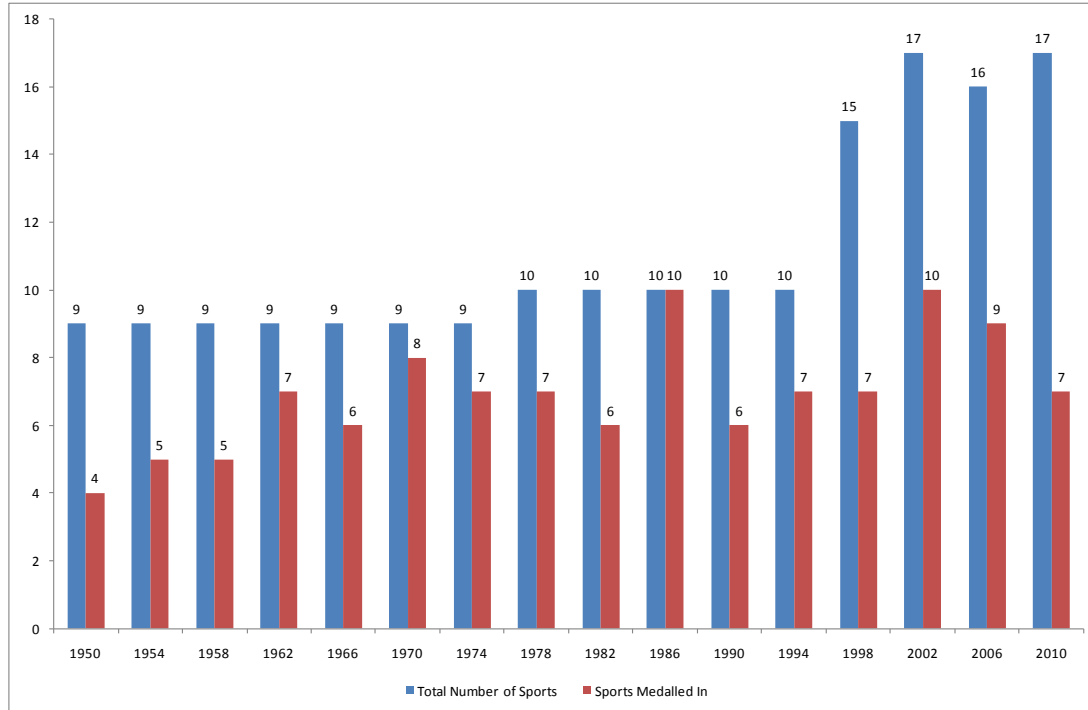
Table 4.7: Scotland's overall performance by sport 1950 - 2010

Sport	Gold	Silver	Bronze	Total	%	Cumulative
Swimming	15	20	19	54	17%	17%
Athletics	15	17	22	54	17%	34%
Boxing	14	13	24	51	16%	51%
Shooting	12	13	16	41	13%	64%
Lawn Bowls	12	7	6	25	8%	72%
Judo	2	6	10	18	6%	77%
Weightlifting	2	5	9	16	5%	83%
Wrestling	0	5	9	14	4%	87%
Cycling	3	3	7	13	4%	91%
Fencing	2	4	2	8	3%	94%
Badminton	1	1	5	7	2%	96%
Diving	3	1	1	5	2%	97%
Gymnastics	1	0	3	4	1%	99%
Squash	1	0	1	2	1%	99%
Rowing	0	0	1	1	0%	100%
Tennis	1	0	0	1	0%	100%
Total	84	95	135	314	100%	

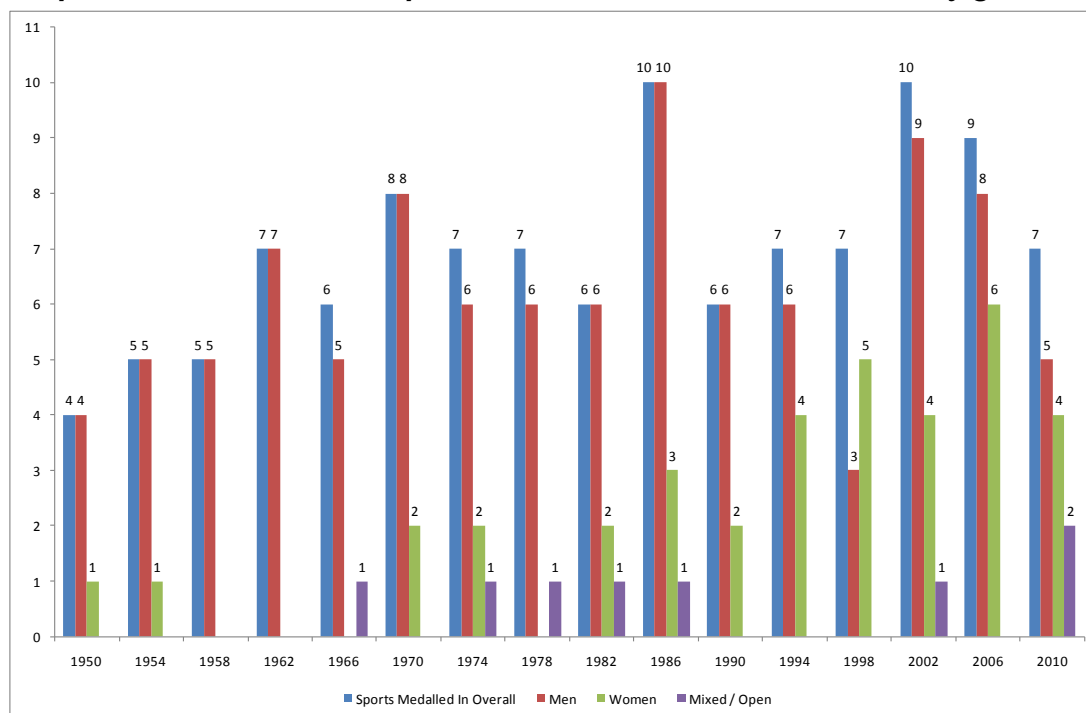
It is interesting to note that the medals listed in Table 4.7 have been won predominantly in individual sports. Whilst sports such as athletics and swimming (relays), lawn bowls (pairs and triples), shooting (pairs), cycling (team sprint) do have limited 'team' events, Scotland does not have a good track record in mainstream team sports such as hockey (men and women) and rugby 7s (men).

In addition to analysing medals won by sport, a useful indicator of a nation's all round sporting prowess is the number of sports in which it wins medals in any given edition of the Commonwealth Games. In Graph 4.23 the number of sports in which Scotland won at least one medal is plotted against the total number of sports contested at each Commonwealth Games.

Graph 4.23: The number of sports in which Scotland won a medal at each edition



As a general trend Scotland tends to win medals in most of the sports contested at each Commonwealth Games. It could be argued that the availability of Lottery funding for full four year cycles in 2002 and 2006 has increased the diversity of sports in which Scotland has won medals with scores of 10/17 and 9/16 respectively. However, Delhi 2010 represents only the third occasion since 1950 when Scotland has won a medal in fewer than half of the sports contested. Badminton, gymnastics and lawn bowls are the three sports in which Scotland won a medal in 2006 but not in 2010, whereas tennis made its debut in 2010 in which Scotland won a gold medal. This explains the fall from nine to seven sports where medals were won over the period 2006 to 2010.

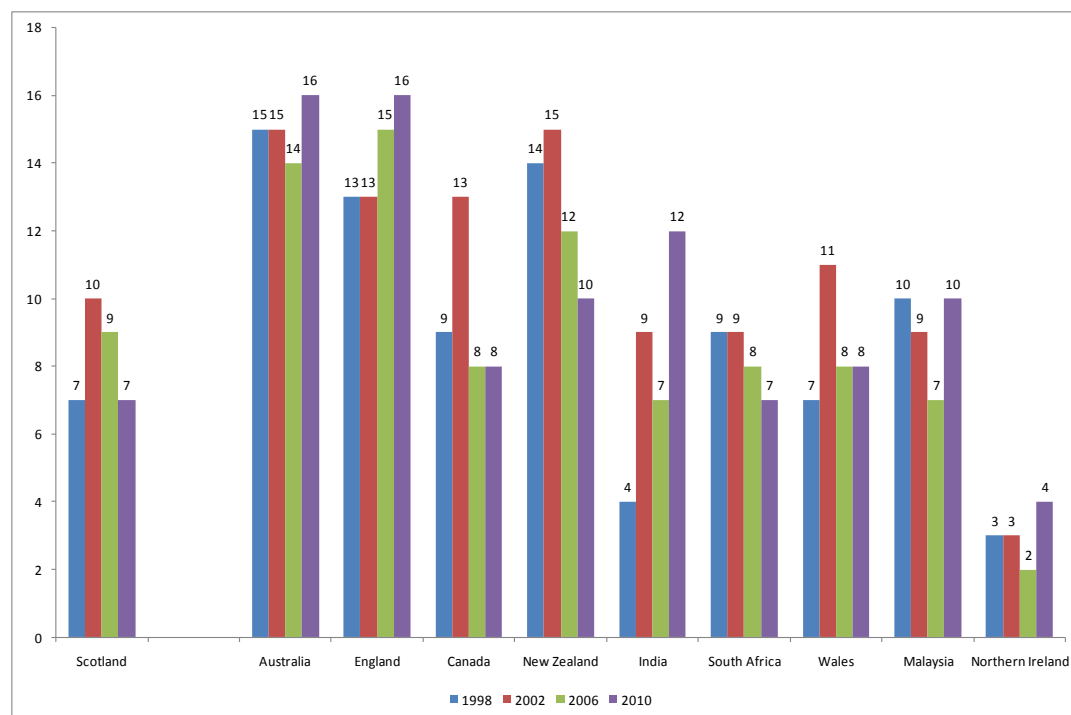
Graph 4.24: The number of sports in which Scotland won a medal by gender

More detailed analysis of the breadth of sporting prowess can be seen when analysed by gender - as shown in Graph 4.24. Scotland's male athletes tend to win medals in more sports than Scotland's women athletes. This may well be because historically there have been more sports for men than women. On the one occasion that women won medals in more sports than men (1998), it is widely accepted that Scotland had a particularly poor Commonwealth Games.

2010 was a relatively good year for Scotland's women athletes who won medals in four sports (albeit less productive than in 2006), which was only one less than for male athletes and represents the narrowest gap between the genders in the time series. If this level of performance can be maintained it bodes well for the future as Scotland will become less reliant on a minority of sports for the majority of its success.

A final way to examine the number of medals won is to make comparisons with other nations. Graph 4.25 shows the number of sports in which Scotland won a medal at the last four Commonwealth Games compared to other key comparator nations.

Graph 4.25: The number of sports in which Scotland won a medal and the comparator nations



The nations most comparable to Scotland in 2010 are South Africa, New Zealand and Wales. Despite winning medals in the same number of sports as Scotland in Delhi 2010 (seven), South Africa won three more gold medals and was ranked in fifth place in the final medals' table, whereas Scotland was ranked tenth. It is also worth noting that New Zealand won more medals (36) than Scotland (26) and won medals in more sports than Scotland (10 vs. 7) in Delhi 2010. Nonetheless, Scotland finished ahead of New Zealand in the 2010 final medals' table by virtue of winning nine gold medals compared with New Zealand's six. The key point of note here is the importance of focusing on the quality rather than quantity of medals won. Scotland's gold medal percentage was 35%; New Zealand's by contrast was 17%.

Wales' performance in 2010 is regarded as being broadly on par with 2006 and this is reflected by the fact that the number of sports in which Wales won medals remained the same between 2006 and 2010 (eight). England won medals in every sport except rugby sevens, in which it was placed fourth.

Key points

- Scotland has won 314 medals in 16 different sports over the period 1950 to 2010.
- Success in athletics and boxing has been largely historical whereas contemporary success is being driven by swimming and shooting.
- A notable weakness in Scotland's medal winning profile is its performance in mainstream team sports such as hockey and rugby 7s.
- With a few exceptions, Scotland tends to win medals in the majority of sports contested and historically men have performed better in this regard than women. The evidence from recent editions is that the gap between men and women is narrowing and Scotland's success has in part been driven by women winning medals in more sports than before.

- Comparison with South Africa and New Zealand highlights the importance of strategies which prioritise quality rather than quantity of medals won.

4.7 Benchmarking against other nations

This section of the report is concerned with benchmarking the performance of Scotland against selected comparator nations for three key variables, namely, 'market concentration', distribution of medals won by gender, and quality of medals won by type. To put Scotland and the comparator nations into an historical context, Table 4.8 shows the overall medal winning performance of the benchmark nations between 1950 and 2010.

Table 4.8: The performance of the comparator nations 1950 - 2010

	Gold	Silver	Bronze	Total	%
Australia	767	646	579	1992	25%
England	542	555	566	1663	21%
Canada	389	404	451	1244	15%
All Other Nations	355	367	477	1199	15%
New Zealand	121	178	228	527	7%
India	141	123	107	371	5%
Scotland	84	95	135	314	4%
South Africa	81	79	88	248	3%
Wales	49	70	103	222	3%
Malaysia	46	53	63	162	2%
Northern Ireland	27	28	42	97	1%
Totals	2602	2598	2839	8039	100%

Historically, Scotland has won 4% of all medals contested at the Commonwealth Games between 1950 and 2010. Of the nations ranked above Scotland, in 2010 one of these (New Zealand) was ranked below Scotland in the final medals' table. Of the nations ranked below Scotland, South Africa and Malaysia were placed higher than Scotland in 2010, although it should be noted that South Africa's all time medal tally has been affected by apartheid sporting bans.

The first benchmark is 'market concentration', which is used to describe the extent to which nations are reliant on a limited number of sports for overall medal winning success. The extent to which Scotland and the sample nations are reliant on their top three sports is shown in Table 4.9, which is based on all medals won per sport.

Table 4.9: The market concentration for Scotland and the comparator nations

	Most Successful	2nd Most Successful	3rd Most Successful	Total
Northern Ireland	43% Boxing	18% Athletics	18% Lawn Bowls	79%
India	28% Shooting	27% Weightlifting	20% Wrestling	75%
Malaysia	33% Badminton	19% Weightlifting	15% Shooting	67%
South Africa	26% Swimming	25% Athletics	10% Shooting	61%
Australia	30% Swimming	21% Athletics	9% Cycling	60%
Wales	23% Weightlifting	21% Athletics	12% Boxing	56%
England	27% Athletics	18% Swimming	9% Shooting	54%
Scotland	17% Swimming	17% Athletics	16% Boxing	51%
Canada	24% Swimming	18% Athletics	9% Gymnastics	51%
New Zealand	21% Athletics	15% Cycling	14% Swimming	50%

In Table 4.9 it can be seen that Northern Ireland is reliant on boxing (43%), athletics (18%) and lawn bowls (18%) for 79% of all medals it has won since 1954, when it first contested the Commonwealth Games. In elite sport policy terms this would be regarded as being a specialisation policy, rather than a diversity policy. Similarly, shooting (28%), weightlifting (27%), and wrestling (20%) account for the bulk (75%) of all the medals won by India during this period.

Given the degree of influence that host nations have over the programme of events for the Commonwealth Games, it is perhaps no surprise that shooting, weightlifting and wrestling all featured in the Delhi 2010 programme. It is also relatively unsurprising that India enjoyed its most successful Commonwealth Games to date in 2010, as the programme was more in line with India's traditional strengths. Around 56% of all medals won by India in 2010 were won in these three sports. It is reasonable to expect that Scotland will also have a potential advantage over other nations in Glasgow 2014. In Manchester 2002 Scotland won ten medals in judo, which features on the 2014 programme for the first time since 2002.

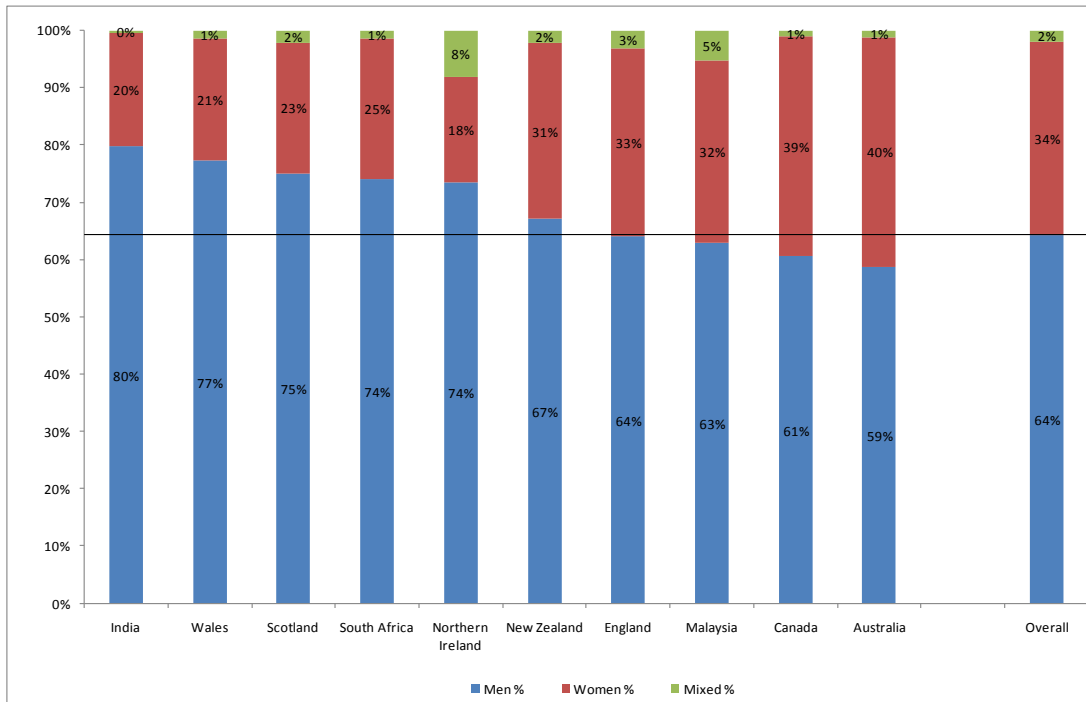
By contrast, New Zealand has the lowest market concentration for its top three sports (50%). Compared with Northern Ireland and India, New Zealand can be described as following diversity strategy. This point is reinforced by referring to Graph 4.25 in which it can be seen that New Zealand has consistently won medals in more sports than all of the benchmark nations except Australia and England.

Scotland has a three sport market concentration of 51% with swimming (17%), athletics (17%) and boxing (16%) being the main contributors to its success. Relative to the comparator nations, Scotland can be said to be following a strategy of sporting diversity rather than specialisation as it has a relatively low three sport market concentration.

Any nation which has serious aspirations to be a significant force in the final medals' table needs to develop medal winning capability in athletics and swimming. The only nation ranked above Scotland in the Commonwealth Games which has a lower reliance on athletics and swimming than Scotland is India, which has sought to differentiate itself in other sports with a high number of events, namely shooting, wrestling and weightlifting.

The second benchmark we consider is the proportion of medals won by gender. Previous research (UK Sport 2003²) has indicated that examining the overall success of a nation can mask considerable differences in performance by gender. In Melbourne 2006 Australia's increased success over 2002 was driven primarily by women athletes. In the case of Scotland we have already shown that in standardised terms (market share) men perform better than women, but in Graph 4.26 we can see the performance of the comparator nations alongside Scotland in a standardised form.

² UK Sport (2003) European sporting success: A study of the development of medal winning elites in 5 European countries, UK Sport, London.

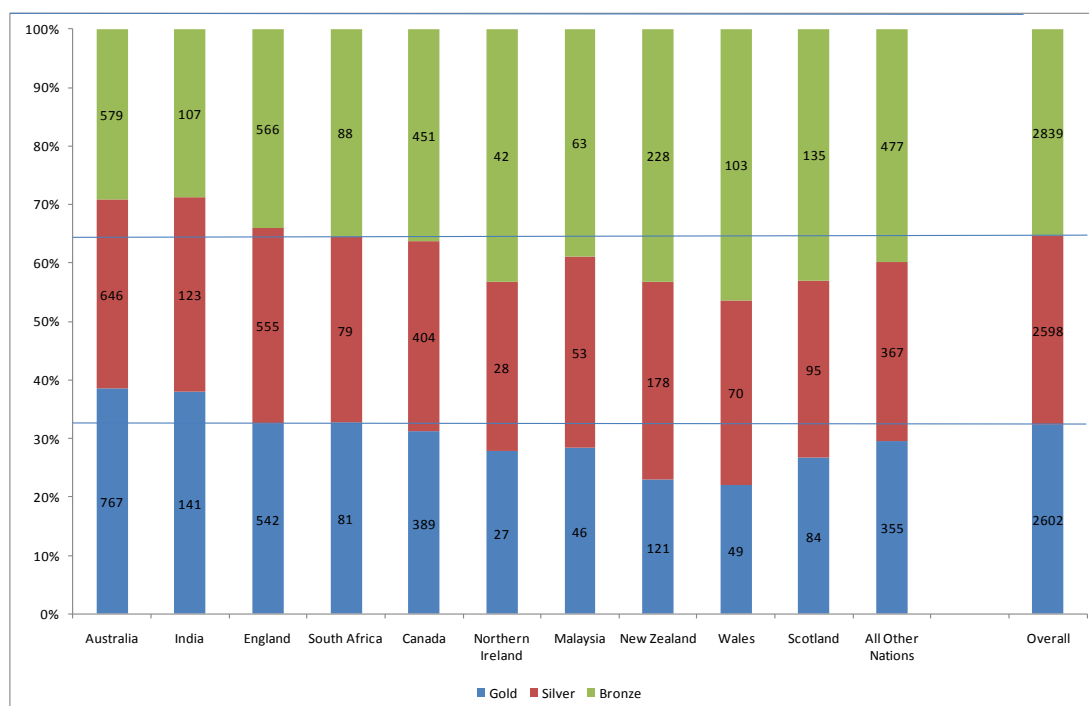
Graph 4.26: The number and proportion of medals won by gender 1950 - 2010

The reference line in Graph 4.26 is drawn at the break point between total medals contested by men and the two categories for women and mixed 1950 - 2010. During this period 64% of all medals have been contested by men, 34% by women and 2% by mixed teams. Any nation with blue above the reference line has been over reliant on men for its medals; and any nation with red below the reference line is over reliant on women / mixed categories for its success. It can therefore be seen that India (80%), Wales (77%), Scotland (75%), South Africa (74%) Northern Ireland (74%) and New Zealand (67%) have a disproportionately high percentage of their medals won by men and consequently a relatively low percentage of their medals won by women.

Historically, the most dominant nation, Australia, wins a disproportionately high percentage of its medals in women's sport. Canada and Malaysia are also disproportionately reliant on women for their success. Targeting success in women's sport is a classic sign of nations taking a strategic approach to elite sport development. England's success over time is directly in line with what might be expected proportionately.

One obvious way in which Scotland could improve its overall performance in the Commonwealth Games would be to take advantage of the increased medal winning opportunities in events for women. In Section 4.10 we take a more detailed look at the performance of Scotland's women athletes over the last three editions of the Commonwealth Games.

The third benchmark we consider is the quality of medals won by Scotland and the comparator nations. In the same way that it is possible to analyse the number and proportion of medals won by gender, so too it is possible and worthwhile, to look at the number and proportion of medals won by type. The relevant data is shown in Graph 4.27.

Graph 4.27: The number and proportion of type of medals won

Since 1950, 8,039 medals have been contested of which 32.4% have been gold, 32.3% silver and 35.3% bronze. The reason why there are more bronze medals contested than gold and silver is because of the practice of awarding two bronze medals in combat sports such as boxing and judo. The two reference lines are drawn at the points which equal the proportion of medals awarded by type between 1950 and 2010.

Australia and India both achieve a higher percentage of gold medals won relative to the percentage of gold medals awarded. Consequently they also win a lower proportion of silver and bronze medals. By contrast, Scotland, Wales, New Zealand, Malaysia, Northern Ireland and Canada all win a relatively low level of gold medals and consequently a relatively high level of silver and bronze medals.

Scotland has a below average gold medal percentage (27%) and also has one of the highest bronze medal percentages (43%) with New Zealand. Nearly one in five (24/135 or 18%) of the bronze medals won by Scotland overall have been won in boxing in which two bronze medals are awarded in each event.

Key points

- Scotland has won 4% of all medals won at the Commonwealth Games between 1950 and 2010. This statistic is in short term decline (3.1% in 2010 and 3.9% in 2006). To maintain its historical achievement Scotland would have had to have won 33 medals in 2010 (30 in 2006).
- Scotland's three sport market concentration is 51% (swimming 17%, athletics 17% and boxing 16%). Swimming and boxing are increasing their importance to Scotland's contemporary medal winning success whilst athletics is in relative decline.
- Scotland is consistently over reliant on men for its medal winning success. Longer term improvements in performance could be developed by greater emphasis on achieving success in events for women.

- In terms of the quality of medals won, Scotland wins relatively more silver and bronze (73%) medals than gold medals (27%). The proportion of gold medals won in 2010 (35%) (and 2006, 38%) counters the long term trend. This in turn suggests that Lottery funding has impacted positively on Scotland's quality of success as well as the quantity of success.

4.8 Analysis of success by sport

A list of the sports that were contested in Delhi 2010, plus Scotland's success in them is shown in Table 4.10.

Table 4.10: Scotland's performance in Delhi 2010 by sport

Sports	Medal	Gold	Silver	Bronze	Total
Archery	No				0
Athletics	Yes	0	1	1	2
Aquatics ¹	Yes	2	3	2	7
Badminton	No				0
Boxing	Yes	1	1	1	3
Cycling	Yes	1	1	1	3
Gymnastics	No				0
Hockey	No				0
Lawn Bowls	No				0
Netball	No				0
Rugby	No				0
Shooting	Yes	4	3	2	9
Squash	No				0
Table Tennis	No				0
Tennis	Yes	1	0	0	1
Weightlifting	Yes	0	1	0	1
Wrestling	No				0
Total	7/17	9	10	7	26

¹ The sport of 'Aquatics' includes the three disciplines of swimming, diving and synchronised swimming.

Table 4.10 confirms that Scotland won medals in seven sports overall. Within aquatics, Scotland won medals in two disciplines, swimming and synchronised swimming. Further investigation of the data reveals that Scotland contested all sports and their sub-disciplines in Delhi except netball. A comparative overview of Scotland's performance in each sport between 2002 and 2010 is presented in Table 4.11. The 'red' shading in Table 4.11 is used to denote sports in which Scotland did not win a medal, or where performance in a particular sport is at its lowest point between 2002 and 2010. The 'green' shading represents instances where performance in a particular sport peaked across the three editions, whereas 'amber' highlights performances between the two extremes. Sports that were not contested in at least two editions since 2002 (e.g. archery and basketball) are shown in the table but are not shaded.

Table 4.11: Scotland's performance 2002-2010 by sport and discipline

Sport / Discipline	Gold Medals			Total Medals			Market Share		
	2002	2006	2010	2002	2006	2010	2002	2006	2010
Archery	N/A	N/A	0	N/A	N/A	0	N/A	N/A	0.0%
Athletics	0	0	0	2	2	2	1.0%	0.9%	1.0%
Badminton	0	0	0	0	1	0	0.0%	2.8%	0.0%
Basketball	N/A	0	N/A	N/A	0	N/A	N/A	0.0%	N/A
Boxing	0	1	1	2	1	3	2.4%	3.9%	8.6%
Cycling	1	1	1	2	6	3	3.9%	8.3%	5.6%
Diving	DNC	0	0	DNC	0	0	DNC	0.0%	0.0%
Gymnastics	1	0	0	2	1	0	4.7%	0.8%	0.0%
Hockey	0	0	0	0	0	0	0.0%	0.0%	0.0%
Judo	1	N/A	N/A	10	N/A	N/A	15.5%	N/A	N/A
Lawn Bowls	2	1	0	2	2	0	10.7%	13.9%	0.0%
Netball	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Rugby 7s	0	0	0	0	0	0	0.0%	0.0%	0.0%
Shooting	0	2	4	3	3	9	2.1%	3.3%	9.3%
Squash	0	0	0	0	0	0	0.0%	0.0%	0.0%
Swimming	1	6	2	5	12	6	3.4%	10.2%	4.9%
Synchronized Swimming	0	DNC	0	0	DNC	1	0.0%	DNC	8.3%
Table Tennis	0	DNC	0	0	DNC	0	0.0%	DNC	0.0%
Tennis	N/A	N/A	1	N/A	n/a	1	N/A	N/A	10.0%
Triathlon	0	0	N/A	0	0	N/A	0.0%	0.0%	N/A
Weightlifting	0	0	0	1	1	1	0.4%	1.0%	2.0%
Wrestling	0	N/A	0	0	N/A	0	0.0%	N/A	0.0%
Total	6	11	9	29	29	26	2.9%	3.9%	3.3%

N/A = Event not held

DNC = Scotland did not compete

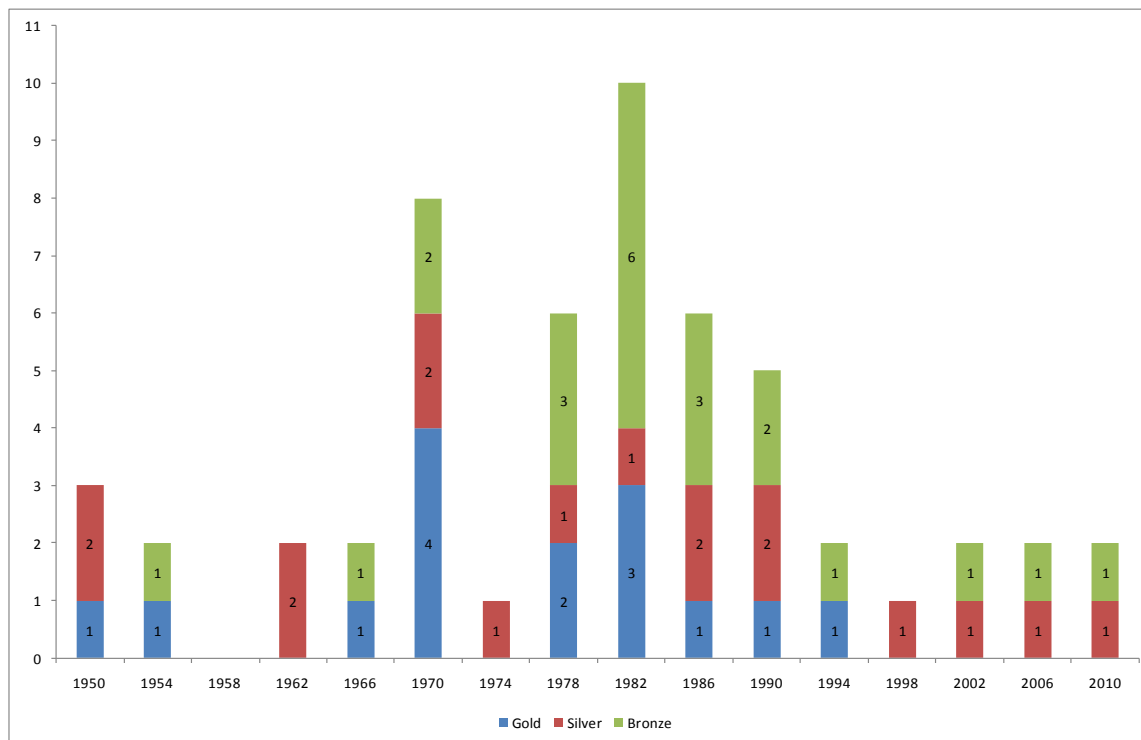
Table 4.11 illustrates that 2006 was Scotland's best overall performance across the three editions. Furthermore, Scotland performed better in 2010 relative to 2002 in terms of gold medals won (9 v 6) and market share (3.3% v 2.9%), although Scotland won three more medals in total in 2002 primarily on account of its success in judo. Performance in shooting and, to a lesser extent, boxing has progressed since 2002 on all three indicators. Conversely, gymnastics and lawn bowls are the sports where success has declined between 2002 and 2010.

We now develop our analysis of the data in Table 4.11 by taking a more detailed look at Scotland's performance in selected sports.

4.8.1 Performance in athletics

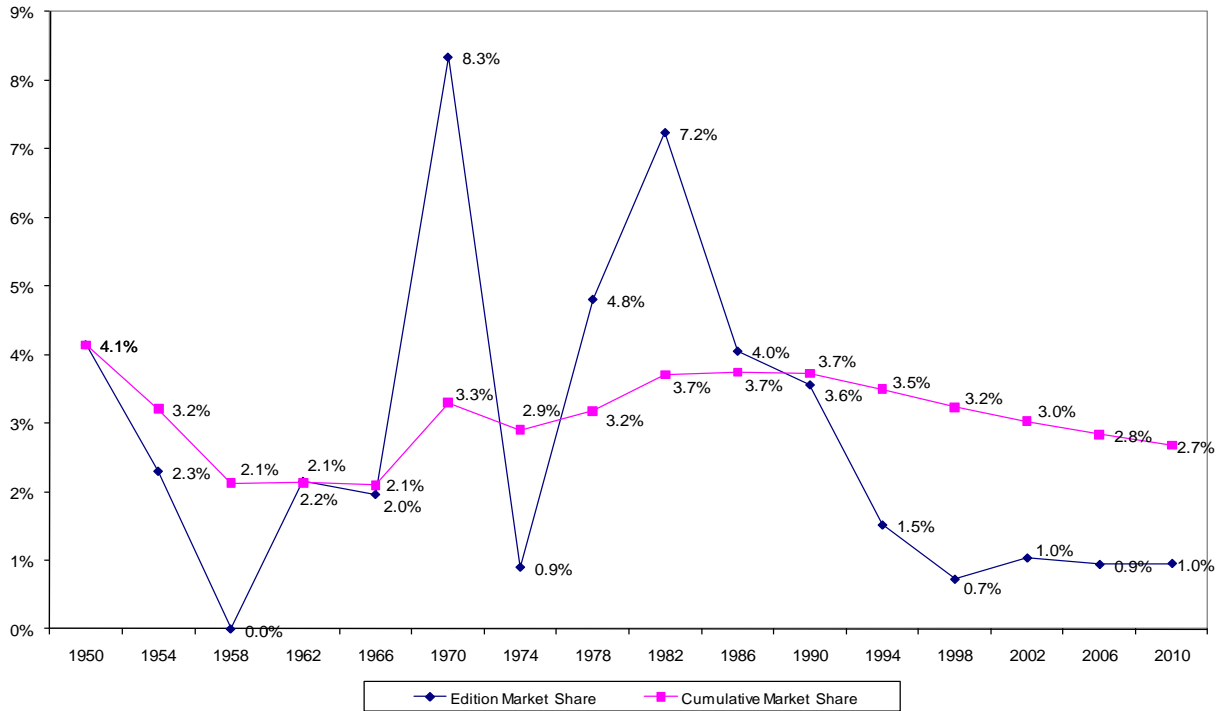
The total number and type of medals won in athletics by Scotland over the period 1950 to 2010 is shown in Graph 4.28.

Graph 4.28: Scotland's absolute achievement in athletics



Scotland's last gold medal in athletics (1994) pre-dates the availability of financial support from the Sport Lottery Fund. The three full cycles of Lottery funded athletes (2002-2010) have all yielded the same return of one silver medal and one bronze medal. This is the longest barren spell without a gold medal in Scotland's history of taking part in the Commonwealth Games. Should a Scottish athlete win a gold medal in 2014, it will be the nation's first gold medal in athletics for 20 years.

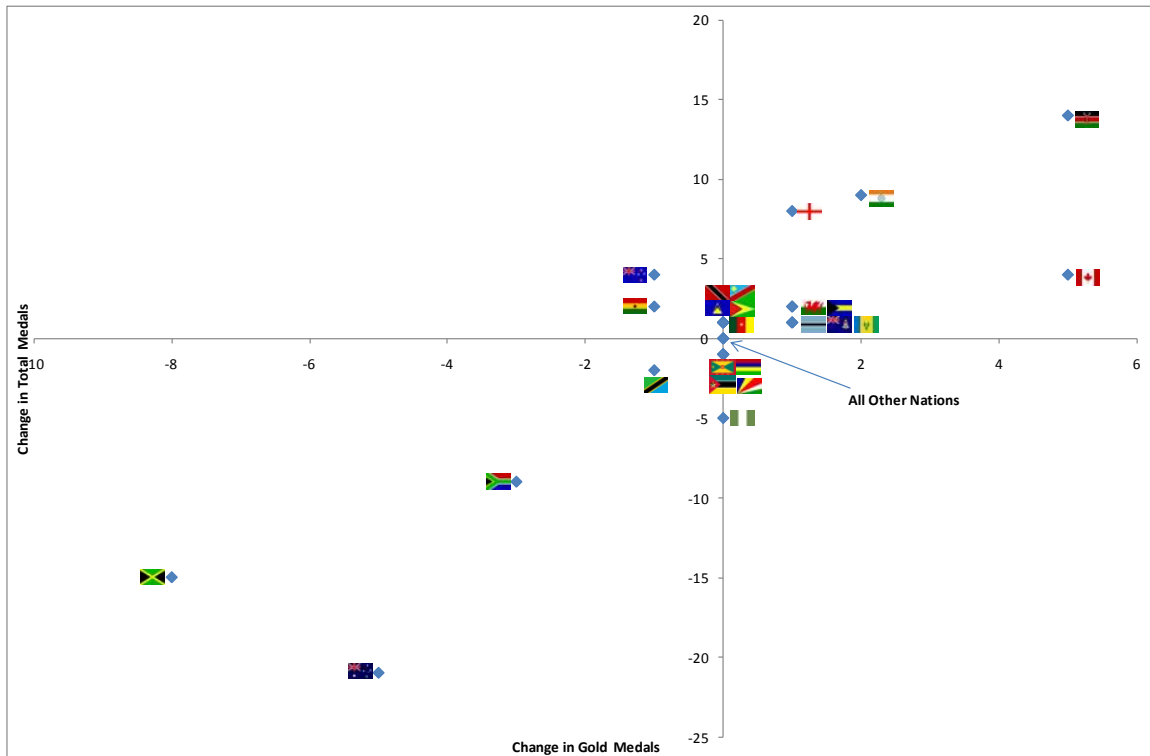
When examined on a standardised basis (market share) it would be expected that Scotland's market share in athletics would be in decline. The reasoning for this view is that the athletics programme in the Commonwealth Games has expanded to 52 events in 2010 and Scotland has failed to retain its historical share of success. In short, since 1998 Scotland has won a static share of an increasing number of medal winning opportunities. This point can be appreciated by looking at the trend lines in Graph 4.29.

Graph 4.29: Scotland's market share in athletics

Scotland's market share in athletics has suffered a marked decline since 1982 (7.2%) and in the last four editions of the Commonwealth Games it has been 1% or less. The long term (cumulative) trend line has been in decline since 1990 and at 2.7% in 2010 is at its lowest since 1966 (2.1%). The effect of not winning a gold medal in the last four editions of the Commonwealth Games has reduced Scotland's market share to 1974 levels - the last time since 1994 that Scotland did not win a gold medal in athletics.

In order to put Scotland's performance in athletics into context and to identify the nations that are improving and in decline, we have re-analysed the 2006 and 2010 medals' tables for athletics and plotted the change in gold medals won against change in total medals won as shown in Graph 4.30.

Graph 4.30: The change in gold medals won against change in total medals won for athletics

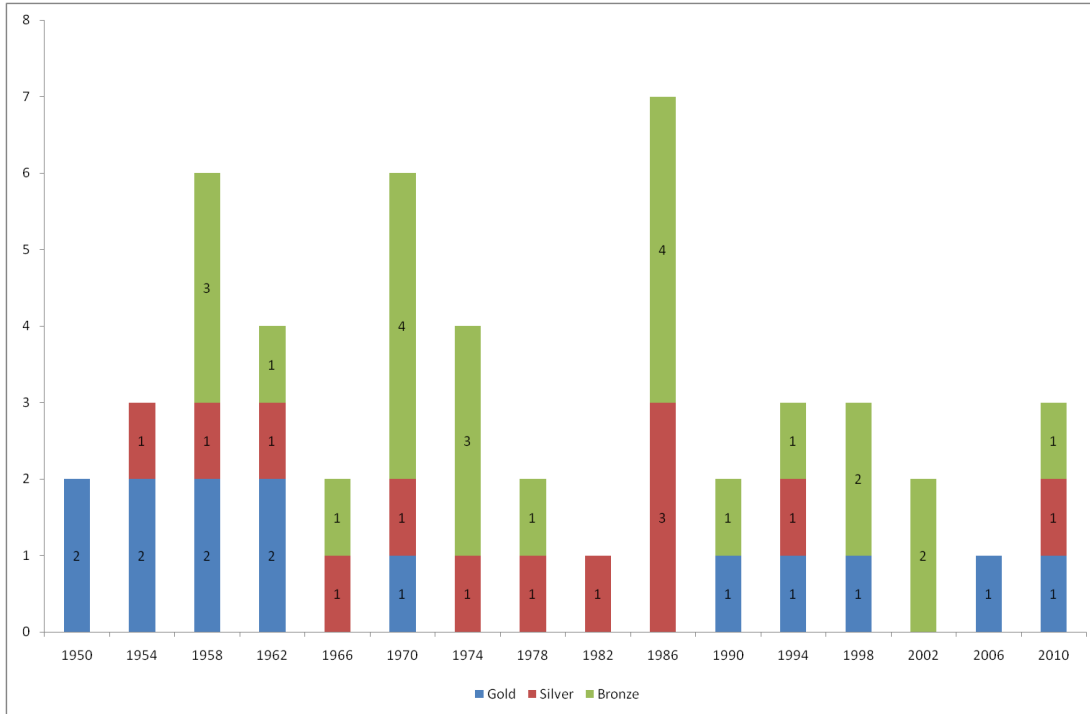


Nine nations increased their gold medals won and total medals won in athletics, most notably Kenya, which won five more gold medals and 14 more medals in total in 2010 than it did in 2006. Other improved nations include Canada, India, England, Bahamas, Wales, Botswana, St. Vincent & the Grenadines and the Cayman Islands. Nations in decline include Jamaica, Australia, South Africa, Tanzania and Ghana. By comparison, Scotland's performance in athletics remained static between 2006 and 2010 (one silver, one bronze in both editions). Scotland does not appear in Graph 4.30 in its own right and is included in 'All Other Nations'. However, it should be noted that in this instance remaining static is actually going backwards as the number of events has increased. In 2006 Scotland scored 3 medal points in athletics out of a total of 314 points awarded (0.96%), whereas in 2010, 3 medal points were won out of 319 points awarded (0.94%)

4.8.2 Performance in boxing

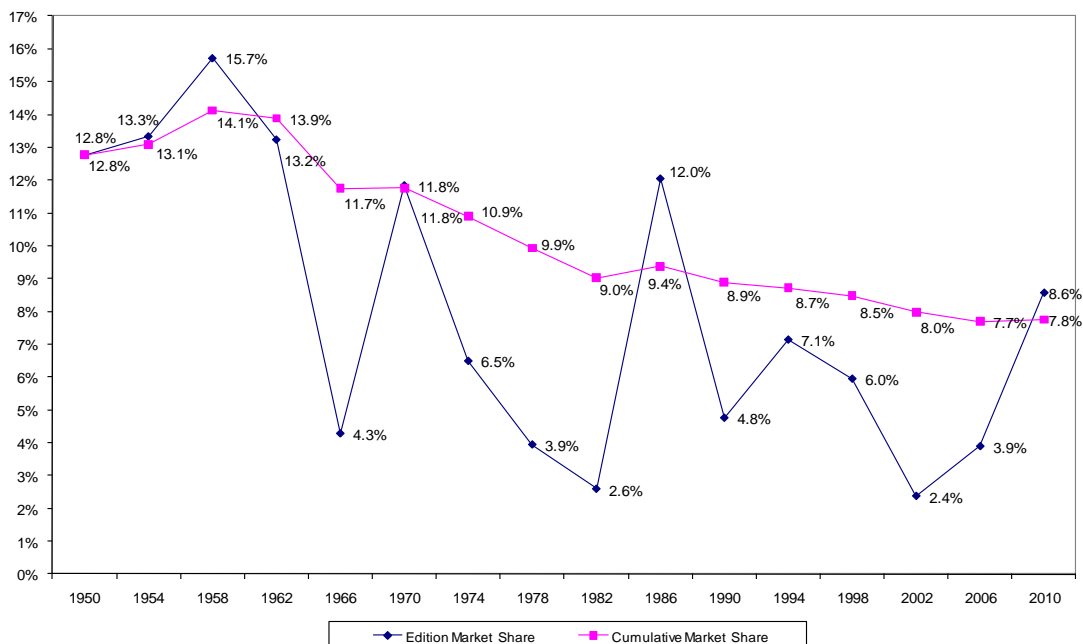
The total number and type of medals won in boxing by Scotland over the period 1950 to 2010 is shown in Graph 4.31.

Graph 4.31: Scotland's absolute achievement in boxing



Scotland's greatest achievements in boxing occurred between 1950 and 1962. After two periods of decline in 2002 and 2006, 2010 represents significant improvement. This point is well illustrated in the time series trend lines shown in Graph 4.32. Two editions of continuous growth in market share for boxing between 2002 and 2010 is only the second time Scotland has achieved this feat, with the previous occasion being 1950-1958.

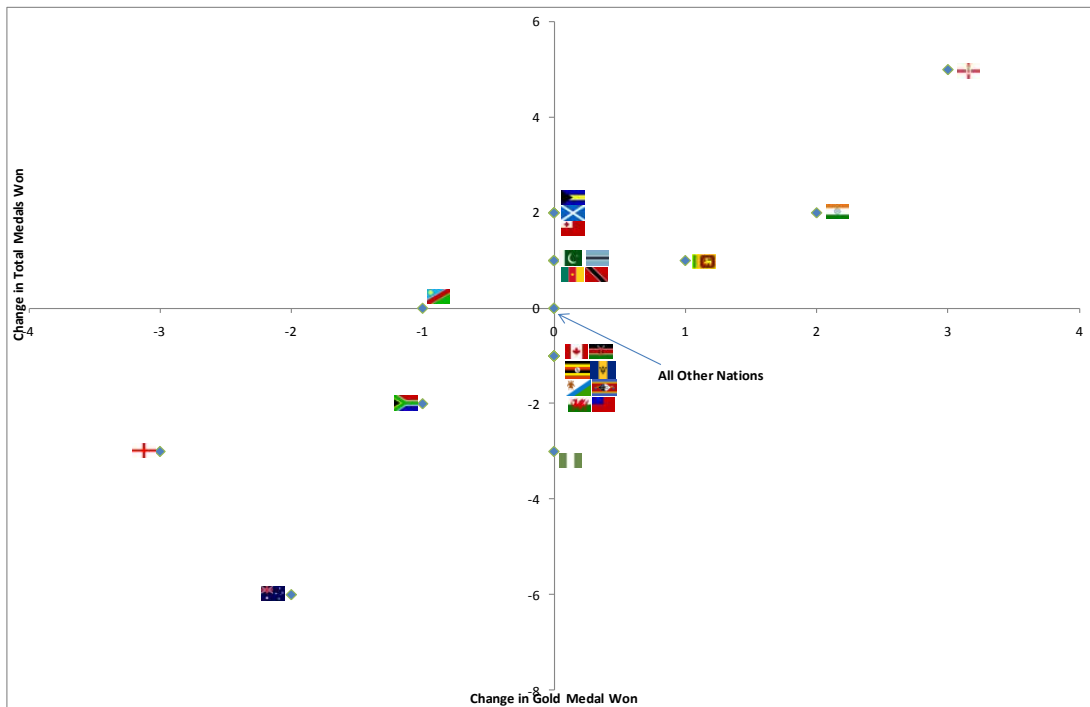
Graph 4.32: Scotland's market share in boxing



The long term trend line in boxing has been in almost continuous decline since 1970. Melbourne 2006 and Delhi 2010 represent a minor revival from the lowest point in Scotland's history (2.4% market share in 2002). The increase in market share for 2010 was driven by an improvement in the quantity of medals won but also a reduction in the number of events contested in boxing (from 11 to 10). Thus, market share increased because Scotland won an increased share of a declining market.

To contextualise Scotland's performance in boxing and to identify the nations that are improving and declining, we have re-analysed the 2006 and 2010 medals' tables for boxing and plotted the change in gold medals won against change in total medals won as shown in Graph 4.33.

Graph 4.33: The change in gold medals won against change in total medals won for boxing



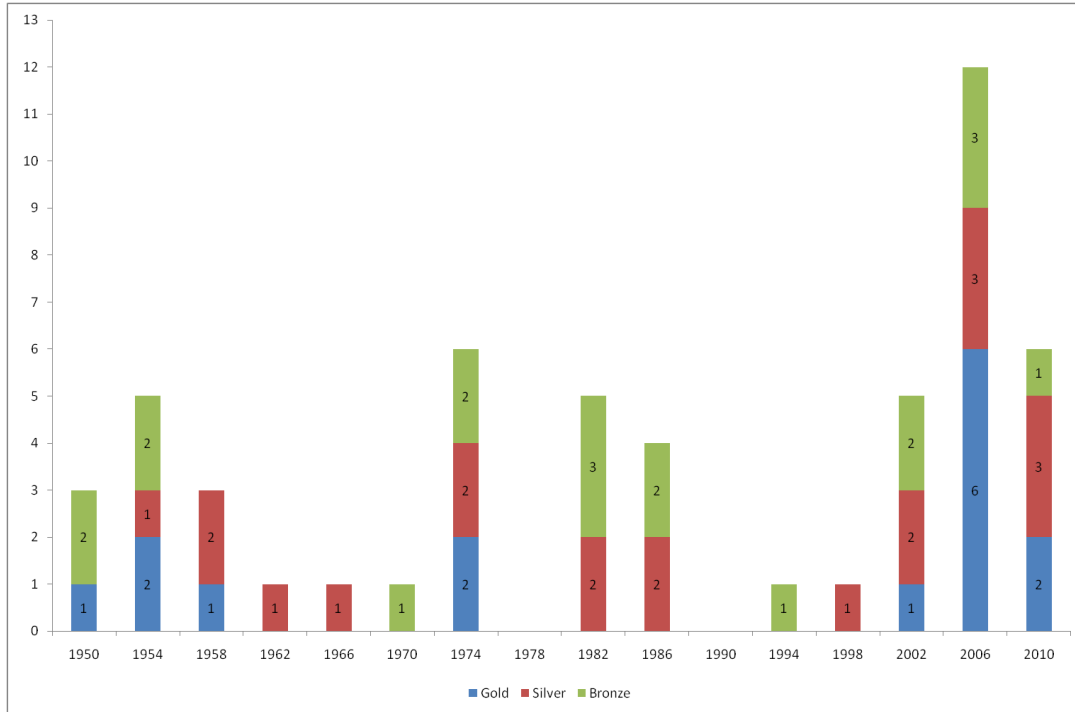
Northern Ireland was amongst three nations that increased its gold medals won and total medals won in boxing, with India and Sri Lanka being the other two. Nations in decline include England, Australia and South Africa. Scotland's performance has improved in terms of the quantity of total medals won in boxing, three in 2010 compared with one in 2006, but not in terms of quality.

Boxing is a sport in which host nations traditionally perform well. India won three gold medals in Delhi 2010 taking its all time tally of gold medals in boxing to five. In Glasgow 2014 it would be reasonable to expect Scotland to perform better in boxing than it did in 2010. In 1986 as host nation, Scotland won three silver and four bronze medals and achieved its second highest ever market share in the sport.

4.8.3 Performance in swimming

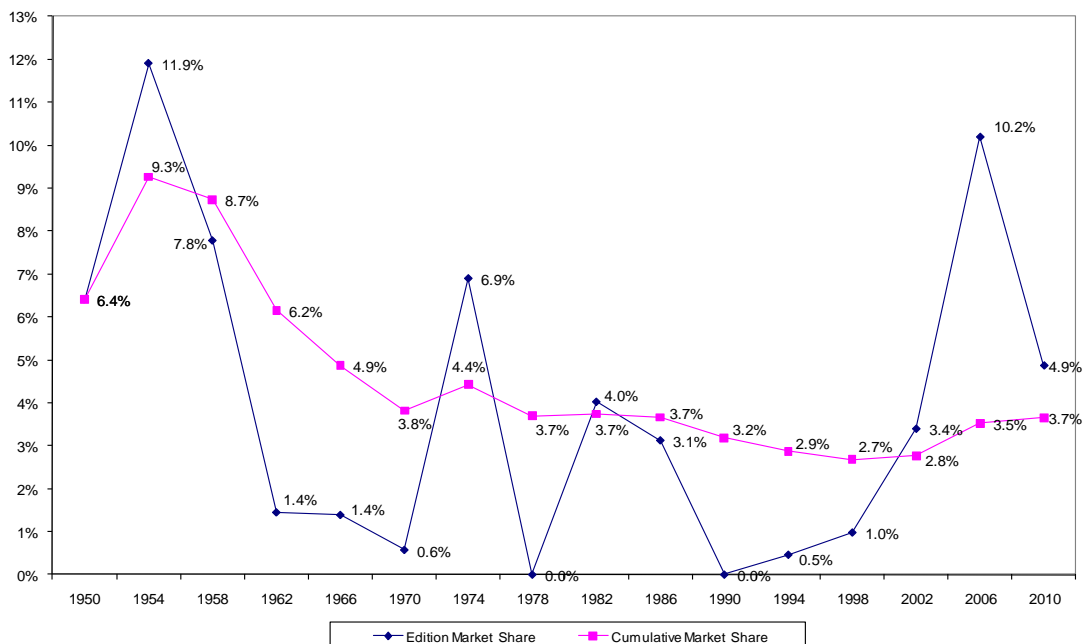
The total number and type of medals won in swimming by Scotland over the period 1950 to 2010 is shown in Graph 4.34.

Graph 4.34: Scotland's absolute achievement in swimming



Scotland's performance in swimming in 2010, was the second best ever in terms of quantity (7) and quality of medals won, but was still inferior to 2006. The swimming programme was increased in 2010 by two events and thus it would be that Scotland has declining market share by virtue of winning fewer number of medals from more events. This and Scotland's long term market share trends are shown in Graph 4.35.

Graph 4.35: Scotland's market share in swimming

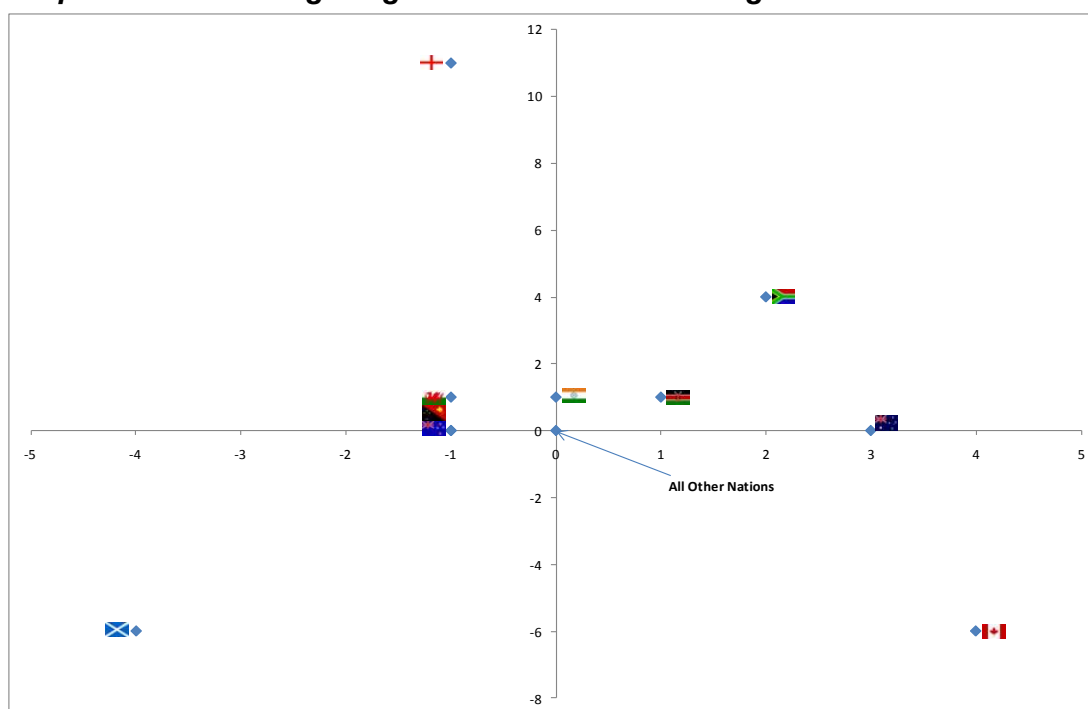


Since 1990 when Scotland failed to win any swimming medals there has been a long term increase in market share achieved by Scottish swimmers. It is rare to see examples of continuous improvement in two editions of the Commonwealth Games and this puts into perspective Scotland's relative decline in 2010 following four consecutive editions of continuous improvement at an accelerating rate.

Scotland's market share in 2010 of 4.9% is its fifth best in history and has contributed positively to an up turn in the cumulative trend line, which hit its all time low point in 1998.

Graph 4.35 indicates that Scotland has improved relative to itself over the period 1998 to 2010 and in Graph 4.36 we show how Scotland performed relative to other medal winning nations in swimming between 2006 and 2010.

Graph 4.36: The change in gold medals won vs. change in total medals won for swimming

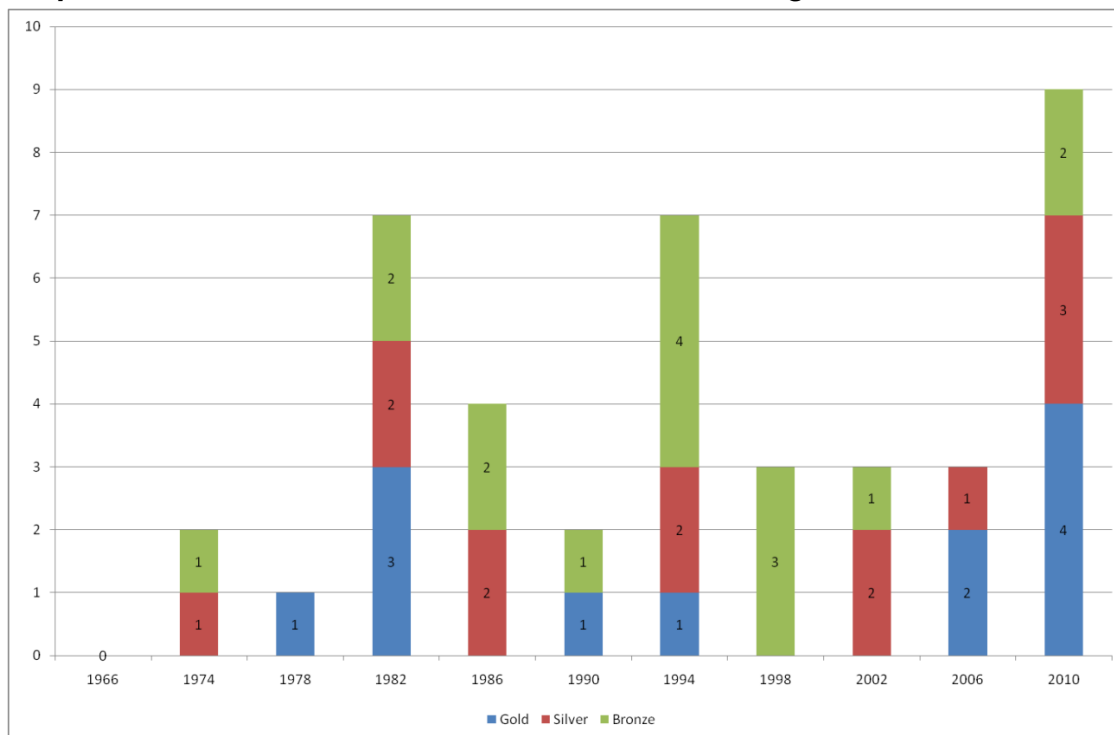


South Africa is identified as the only nation to have increased both its gold medals won and total medals won by more than one. This achievement was largely driven by Natalie du Toit who won all three swimming events for Elite Athletes with a Disability that were integrated into the swimming programme. England lost one gold medal but gained 11 medals in total. Australia and Canada both improved the quality of medals won, although Canada lost six medals in total. Scotland was the only nation to lose both gold medals (-4) and total medals (-6).

4.8.4 Performance in shooting

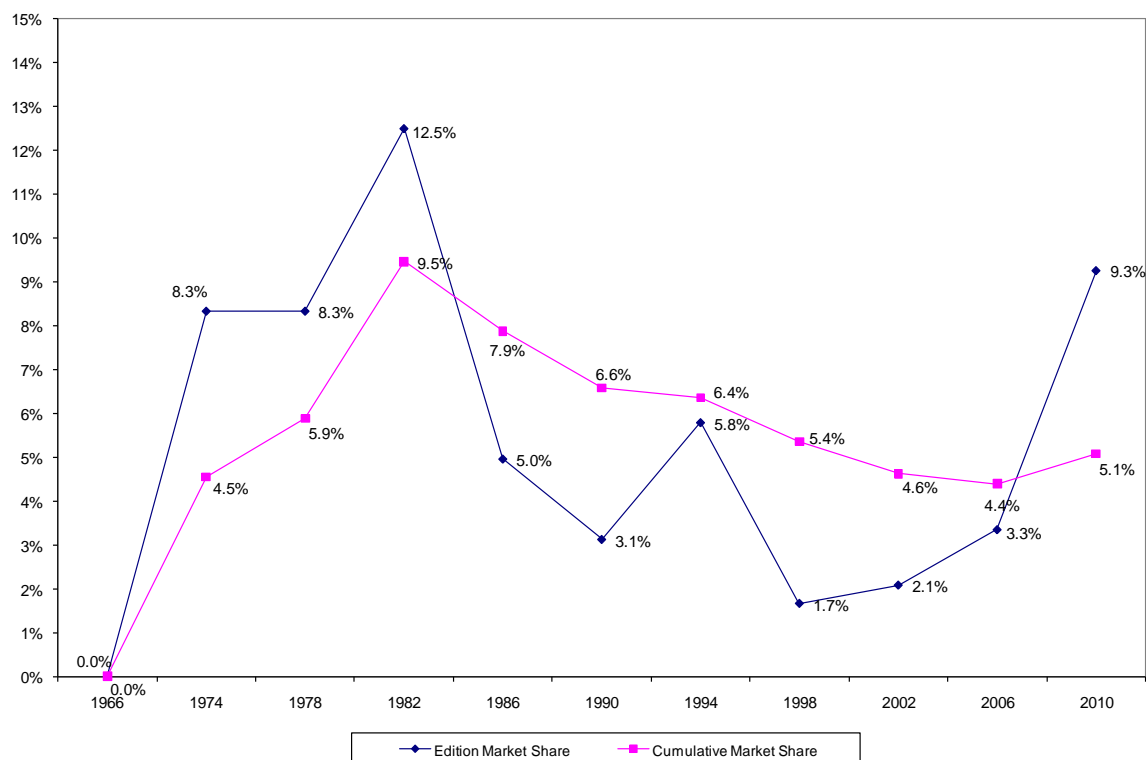
The total number and type of medals won in shooting by Scotland over the period 1966 to 2010 is shown in Graph 4.37.

Graph 4.37: Scotland's absolute achievement in shooting



In absolute terms, Scotland's performance in shooting in Delhi 2010 was its best performance ever in terms of gold medals won (4) and total medals won (9). The magnitude of Scotland's achievement in shooting can perhaps be emphasised by the fact that shooting accounted for 13% of the events in the 2010 Commonwealth Games and 35% of Scotland's 26 medals.

The shooting programme in 2010 was decreased by four events from 2006 and thus Scotland would be expected to increase its market share as a result of winning more medals from a decreased number of events. This and Scotland's long term market share trends are shown in Graph 4.38.

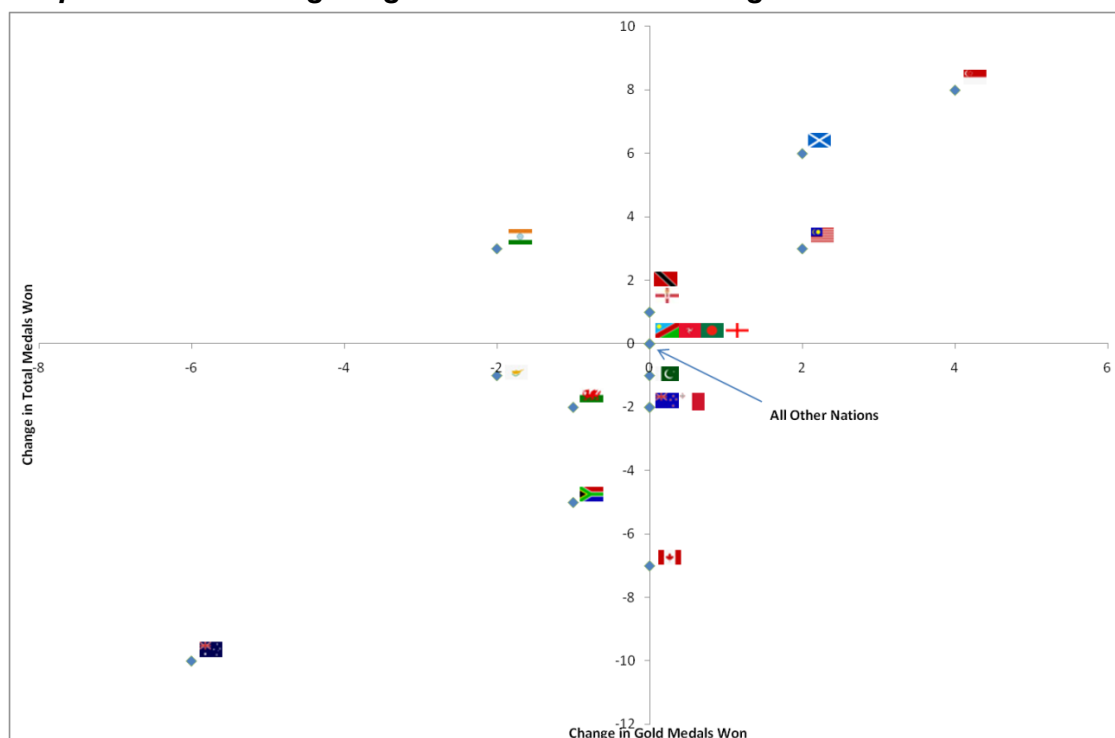
Graph 4.38: Scotland's market share in shooting

Scotland's market share in shooting shows an unusual trend line since 1998. Following the second lowest point ever (1.7% in 1998), Scotland has improved in the next three editions of the Commonwealth Games. More than two bouts of continuous improvement is unusual, but for this improvement to occur at an accelerating rate is a particularly rare finding for any nation and in any sport.

Scotland's success in 2010 has been sufficient to offset the continuous decline in the cumulative market share trend line from 1982 (9.5%) to the low point of 2006 (4.4%). This indicator now stands at 5.1% and is the first upturn since 1978.

Graph 4.39 plots the change in gold medals won against total medals won by Scotland and other nations in shooting between 2006 and 2010.

Graph 4.39: The change in gold medals won vs. change in total medals won for shooting



Scotland was the second most improved nation in shooting and was bettered only by Singapore who won four more gold medals and eight more medals in total than in 2006. In 2006 Scotland was fifth in the shooting medals' table and improved to fourth in 2010, behind India, England and Singapore.

Key Points

Athletics

- Historically athletics has been Scotland's most successful sport in the Commonwealth Games, but success in this sport is in decline with no athlete winning a gold medal for Scotland since 1994.

Boxing

- Scotland's performance in boxing is also mainly historical with the most successful period being between 1950 and 1962. However, since 2002 Scotland's boxing has been on an upward trend. It would be reasonable to expect Scotland to perform even better in boxing in 2014 than it did in 2010.

Swimming

- In swimming Scotland performed relatively well in Delhi 2010 winning two gold medals and six medals overall. What was Scotland's second best performance in swimming in absolute terms, is somewhat overshadowed by the all time best year of 2006 when Scotland's swimmers won six gold medals and 41% of the nation's total medal haul.

Shooting

- Shooting was Scotland's most successful sport in Delhi 2010 winning four gold medals and nine medals overall.
- Scotland's recent success in shooting is perhaps best illustrated by three Commonwealth Games of consecutive improvement at an accelerating rate.

4.8.5 Performance in other sports

The four sports reviewed in detail above (athletics, swimming, boxing and shooting) account for 7/9 (or 78%) of all gold medals won and 20/26 (or 77%) of total medals won by Scotland in Delhi 2010. The other two gold medals were achieved in the tennis mixed doubles event (Colin Fleming and Jocelyn Rae) and in road cycling (by David Millar in the men's individual time trial). A further two medals (a silver and a bronze) were won in cycling in the women's team sprint and in the men's road race (David Millar). In weightlifting, Peter Kirkbride improved on his sixth place in 2006 and won a silver medal for Scotland and Lauren Smith won a bronze medal in the women's solo synchronized swimming event.

Table 4.12 highlights the best positions achieved by Scotland's athletes in each of the other sports contested in Delhi 2010 in which Scotland did not win a medal. Detailed tables relating to the performances in sports in which Scotland did not win a medal for each event broken down by gender (men only, women only and mixed) are presented in Appendix A.

Table 4.12: Scotland's performance in sports in which Scotland did not win a medal

Sport	Highest Rank	Discipline / Event
Archery	5	Women's Compound Bow Team
Badminton	4	Women's Singles
Diving	6	Women's 3m Springboard
Gymnastics	4	Women's Artistic Floor
Hockey	7	Women's Hockey
Lawn Bowls	4	Men's Pairs
Netball	DNC	Women
Rugby 7s	6	Men
Squash	4	Men's Doubles
Table Tennis	9	Men's Singles / Doubles / Team
Wrestling	4	Women's Freestyle 55 kg / 67 kg / 72 kg

DNC = Scotland did not compete

Key point

- The vast majority of Scotland's gold medals won and total medals won were in shooting, swimming, boxing and cycling.

4.9 Elite Athletes with a Disability (EAD)

In Delhi 2010, a record 15 events for Elite Athletes with a Disability (EAD) were integrated within the overall programme and final medals' table following their successful introduction in Manchester 2002. The 15 events were contested in four different sports as listed in Table 4.13.

Table 4.13: EAD events contested in 2010

Sport	Event
Aquatics - Swimming	Men's 50m Freestyle (S9)
Aquatics - Swimming	Women's 50m Freestyle (S9)
Aquatics - Swimming	Men's 100m Freestyle (S8)
Aquatics - Swimming	Women's 100m Freestyle (S9)
Aquatics - Swimming	Men's 100m Freestyle (S10)
Aquatics - Swimming	Women's 100m Butterfly (S9)
Athletics	Men's 100m (T46)
Athletics	Women's 100m (T37)
Athletics	Men's 1500m Wheelchair (T54)
Athletics	Women's 1500m Wheelchair (T54)
Athletics	Men's Shot Put (F32 / 34 / 52)
Athletics	Women's Shot Put (F32-34 / 52 / 53)
Powerlifting	Men's Bench Press
Powerlifting	Women's Bench Press
Table Tennis	Women's Wheelchair (TT1-5)

¹EAD powerlifting is included in the weightlifting programme

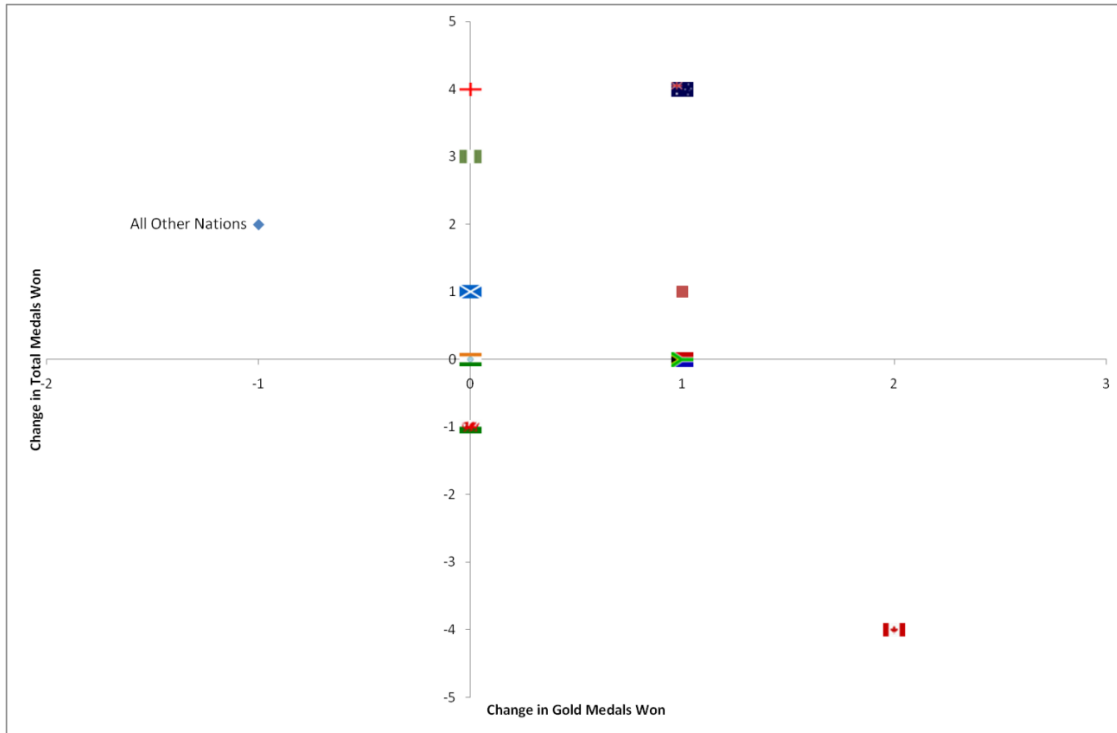
The 15 EAD events made up 5.5% of the overall programme in Delhi and exceeded the number of events in the discipline of artistic gymnastics (14). In order to analyse performance in the 15 EAD events contested in 2010, we have produced an EAD medals' table which is shown in Table 4.14.

Table 4.14: The Delhi 2010 EAD medals' table

Nation	Gold	Silver	Bronze	Total	Points	Market Share %
Australia	5	4	4	13	27	30%
Nigeria	3	3	4	10	19	21%
South Africa	3	1	0	4	11	12%
Canada	3	0	1	4	10	11%
England	1	4	3	8	14	16%
Wales	0	1	0	1	2	2%
India	0	0	1	1	1	1%
New Zealand	0	1	0	1	2	2%
Scotland	0	1	0	1	2	2%
Namibia	0	0	1	1	1	1%
Ghana	0	0	1	1	1	1%
Total	15	15	15	45	90	100%

Australia was again the dominant nation in EAD events winning five of the 15 gold medals contested and achieving a market share of 30%. South Africa (+1) and Canada (+2) both improved their gold medals won, but neither could improve total medals won with the former remaining the same and the latter losing four medals overall. The change in the balance of power in EAD events over the period 2006 to 2010 is shown in Graph 4.40.

Graph 4.40: The change in total medals won vs. change in market share for EAD events



Scotland won a silver medal in swimming (Sean Fraser) which represents an improvement on no medals won in 2006. EAD events present a recent opportunity for nations seeking to achieve success in the Commonwealth Games. This point is well illustrated by Nigeria which won three gold medals in EAD events or 20% of the gold medals available. By contrast, Nigeria's able bodied athletes won eight gold medals in 257 events (3%). Nigeria seems to have targeted powerlifting as a sport in which to achieve success as its athletes won all six of the medals available in the sport. Although South Africa won three gold medals in EAD events, this is more down to a reliance on one exceptional athlete, Natalie du Toit, rather than a strategy. Nigeria's 10 EAD medals were won by 10 different athletes, whereas for South Africa its four EAD medals were won by two athletes.

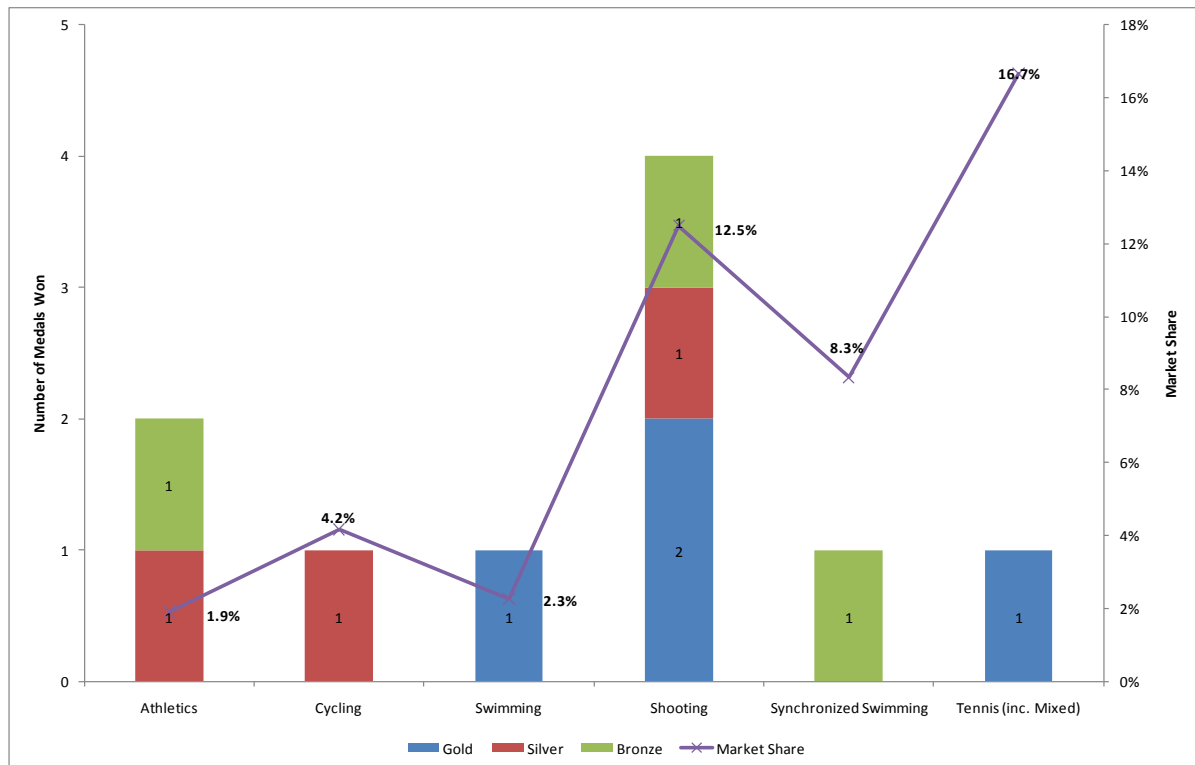
Key points

- EAD events were integrated into the Commonwealth Games for the third time in Delhi 2010. The number of events contested (15) was the highest to date and was more than the total available in some sports, for example artistic gymnastics.
- Scotland won a silver medal in the 100m Freestyle Para Sport S8 event.
- Nigeria is a good example of a nation that has targeted success in EAD events.

4.10 The progression of Scotland's women athletes 2002-2010

In this section, we examine in more detail the performance of Scottish women and their progression in 2010 from the 2006 and 2002 editions. We have already established that 2010 was a relatively good year for Scotland's women athletes, who won medals in four sports. This is almost on par with their male counterparts who medalled in five sports. In 2010, Scotland won ten medals (four gold, three silver and three bronze) in events contested by women. Graph 4.41 provides a breakdown of women's performance by sport and discipline, according to the number and type of medals won in 2010 and in standardised (market share) terms. Also included in Graph 4.41 is the gold medal won by Jocelyn Rae (alongside Colin Fleming) in the tennis mixed doubles event.

Graph 4.41: Performance of Scottish women in 2010 by sport



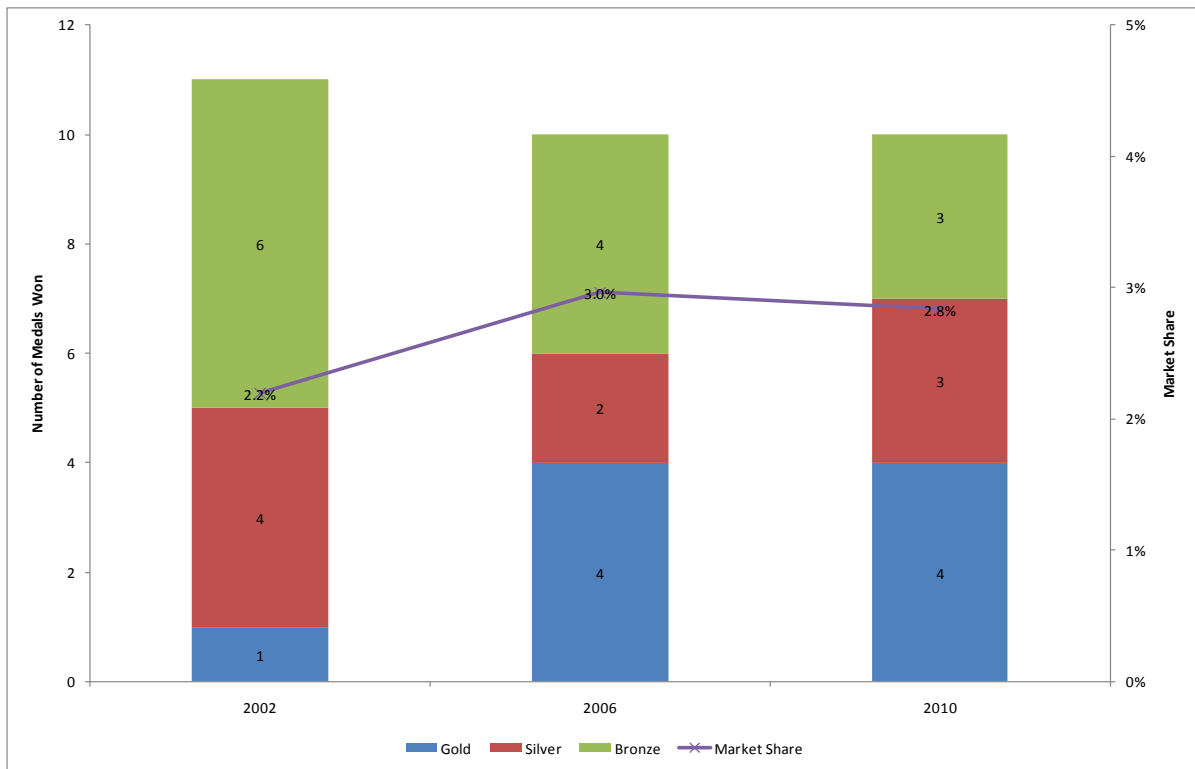
Note: Swimming and synchronised swimming are both disciplines within the sport of 'Aquatics'. The gold medal in tennis was achieved in a 'mixed' event.

Consistent with Scotland's overall performance, the sport in which women won the most number of medals and total medals in 2010 was shooting (two gold, four in total). In standardised terms, Scotland's women achieved 12.5% of the market share in shooting. Although tennis appears to have the highest market share (16.7%), this is the result of Scotland winning a gold medal in a sport with relatively few events.

Graph 4.42 illustrates how women's performance has progressed between 2002 and 2010. In 2002, Scotland's women won only one gold medal (swimming), which increased to four in both 2006 and 2010. In terms of total medals won, women's performance has remained relatively stable between the three editions (11 medals in 2002 and 10 in both 2006 and 2010). However, market share has increased from 2.2% in 2002 to almost 3% in 2010. This can be explained by the fact that Scotland's women have improved the quality of their medals won. To illustrate this point, in 2002, the proportion of gold medals won to total medals won by women was 9%, whereas in both 2006 and 2010 the corresponding statistic was 40% in both years. Note in Graph 4.42 that between 2006 and 2010 there has been a marginal decline in market share won by

Scotland's women athletes despite them winning a higher quality of medals. This is because the number of events for women in 2010 was greater than it was in 2006 (121 v 111).

Graph 4.42: Performance of Scottish women between 2002 and 2010



The data presented in Graph 4.42 above is analysed on a sport by sport basis in Table 4.15, using a traffic light system (red, amber, green). The 'red' shading in the table is used to denote sports in which Scotland's women athletes did not medal, or where performance in a particular sport is at its lowest point between 2002 and 2010. The 'green' shading represents instances where women's performance in a particular sport peaked across the three editions, whereas 'amber' highlights performances between the two extremes. Sports that were not contested by women in at least two editions (e.g. judo and tennis) are shown in the table but are not shaded.

Table 4.15: Progression of women's performance 2002-2010 by sport

Sport / Discipline	Gold Medals			Total Medals			Market Share		
	2002	2006	2010	2002	2006	2010	2002	2006	2010
Archery	N/A	N/A	0	N/A	N/A	0	N/A	N/A	0.0%
Athletics	0	0	0	1	1	2	1.4%	0.6%	1.9%
Badminton (inc. Mixed)	0	0	0	0	1	0	0.0%	4.2%	0.0%
Basketball	N/A	DNC	N/A	N/A	DNC	N/A	N/A	DNC	N/A
Cycling	0	0	0	0	0	1	0.0%	0.0%	4.2%
Diving	DNC	0	0	DNC	1	0	DNC	4.2%	0.0%
Gymnastics	0	0	0	0	0	0	0.0%	0.0%	0.0%
Hockey	0	0	0	0	0	0	0.0%	0.0%	0.0%
Judo	0	N/A	N/A	6	N/A	N/A	16.7%	N/A	N/A
Lawn Bowls	0	0	0	0	1	0	0.0%	11.1%	0.0%
Netball	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC	DNC
Shooting	0	2	2	2	2	4	3.1%	6.6%	12.5%
Squash (inc. Mixed)	0	0	0	0	0	0	0.0%	0.0%	0.0%
Swimming	1	2	1	2	4	1	2.9%	7.1%	2.3%
Synchronized Swimming	0	DNC	0	0	DNC	1	0.0%	DNC	8.3%
Table Tennis (inc. Mixed)	0	DNC	DNC	0	DNC	DNC	0.0%	DNC	DNC
Tennis (inc. Mixed)	N/A	N/A	1	N/A	n/a	1	N/A	N/A	25.0%
Triathlon	0	0	N/A	0	0	N/A	0.0%	0.0%	N/A
Weightlifting	0	0	0	0	0	0	0.0%	0.0%	0.0%
Wrestling	N/A	N/A	0	N/A	N/A	0	N/A	N/A	0.0%
Total	1	4	4	11	10	10	2.2%	3.0%	2.8%

N/A = Event not held

DNC = Scotland did not compete

As illustrated by Table 4.15, Scotland's best performance in terms of both gold medals won and market share was in 2006, even though 2002 was marginally the best year in terms of total medals because of the six medals won by women in judo. Performance in Delhi was on par with Melbourne across the three indicators, albeit market share was slightly better in 2006. Overall, it can be said that Scotland's women progressed between 2002 and 2006, and the higher level of performance has been maintained in 2010. Women have shown particularly good progression in shooting since 2002, whereas performance in swimming is in relative decline.

Key Points

- Scotland's women won four gold medals and ten medals in total in 2010 in the 'women only' and 'mixed' events.
- The number of total medals won by Scotland's women has remained relatively stable between 2002 and 2010; however the quality of medals won has improved.
- Women's performance in 2010 is comparable with 2006, but has progressed since 2002.
- Improvement in shooting in terms of both medals and market share is particularly noteworthy.

5. Concluding remarks

The information presented in this report provides a comprehensive historical review of how Scotland has performed in the Commonwealth Games. Using trend analysis it is possible to examine Scotland's performance over time so that recent achievements can be put into a wider context.

Appendix A – Scotland’s performance in sports not medalled in at Delhi 2010

Table A1: Men only events

Sport	Discipline / Event	Position	Athlete
Archery	Compound Bow Individual	17	Alistair Whittingham
	Compound Bow Individual	17	Tim Keppie
	Compound Bow Individual	17	Kyle Dods
	Compound Bow Team	9	
	Recurve Bow Individual	9	James Laing
	Recurve Bow Individual	17	Mark Forrester
	Recurve Bow Individual	17	Simon Needham
	Recurve Bow Team	9	
Badminton	Doubles	5	
	Singles	9	Kieran Merilees
Gymnastics	Artistic Floor	16	Ryan McKee
	Artistic Horizontal Bar	38	Ryan McKee
	Artistic Individual All-Around	17	Ryan McKee
	Artistic Parallel Bars	23	Ryan McKee
	Artistic Pommel Horse	33	Ryan McKee
	Artistic Rings	34	Ryan McKee
	Artistic Vault	13	Ryan McKee
Hockey	Team	9	
Lawn Bowls	Pairs	4	
	Singles	5	Paul Foster
	Triples	7	
Rugby 7s	Team	6	
Squash	Doubles	4	
	Doubles	5	
	Singles	17	Harry Leitch
	Singles	17	Alan Clyne
	Singles	17	Lyall Paterson
	Singles	33	Chris Small
Table Tennis	Doubles	9	
	Singles	9	Gavin Rungay
	Singles	17	Craig Howieson
	Singles	48	Stewart Crawford
	Team	9	
Wrestling	Freestyle 55kg	7	Craig McKenna
	Freestyle 60kg	5	Viorel Etko
	Freestyle 84 Kg	5	Sean Keogh
	Greco-Roman 84kg	7	Sean Keogh

Table A2: Women only events

Sport	Discipline / Event	Position	Athlete
Archery	Compound Bow Individual	6	Tracey McGowan
	Compound Bow Individual	9	Claudine Jennings
	Compound Bow Individual	17	Susan Maitland
	Compound Bow Team	5	
	Recurve Bow Individual	17	Lilian Downie
Badminton	Doubles	9	
	Doubles	17	
	Singles	4	Susan Hughes
	Singles	9	Kirsty Gilmour
Diving	3m Springboard	6	Grace Reid
Gymnastics	Artistic Beam	7	Victoria Simpson
	Artistic Beam	16	Jordan Lipton
	Artistic Beam	26	Amy Regan
	Artistic Floor	4	Amy Regan
	Artistic Floor	20	Victoria Simpson
	Artistic Floor	25	Jordan Lipton
	Artistic Individual All-Around	11	Victoria Simpson
	Artistic Individual All-Around	13	Jordan Lipton
	Artistic Individual All-Around	21	Amy Regan
	Artistic Team	5	Jordan Lipton
	Artistic Uneven Bars	5	Jordan Lipton
	Artistic Uneven Bars	24	Amy Regan
	Artistic Uneven Bars	27	Victoria Simpson
	Rythmic Ball	18	Victoria Clow
	Rythmic Hoop	19	Victoria Clow
	Rythmic Individual All-Around	14	Victoria Clow
	Rythmic Ribbon	18	Victoria Clow
	Rythmic Rope	18	Victoria Clow
Hockey	Women	7	
Lawn Bowls	Pairs	7	
	Singles	5	Claire Johnston
	Triples	5	
Squash	Doubles	5	
	Singles	17	Frania Gillen-Buchert
	Singles	17	Lisa Aitken
Wrestling	Freestyle 48kg	5	Fiona Robertson
	Freestyle 51kg	7	Donna Robertson
	Freestyle 55kg	4	Jayne Clason
	Freestyle 59kg	5	Kathryn Gallagher
	Freestyle 63kg	9	Tracy Connell
	Freestyle 67kg	4	Ashlea McManus
	Freestyle 72kg	4	Sarah Jones

Table A3: Mixed events

Sport	Discipline / Event	Position
Badminton	Doubles	5
	Doubles	17
	Doubles	17
	Team	5
Squash	Doubles	5
	Doubles	9