

Alternate Ways of Assessing Performance - A New Look at the Results from the 1992 Albertville Olympic Games

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1. Introduction

The world of sport or sport as a subsystem of societies cannot be longer explained in a one-dimensional way. At least it is necessary to distinguish different aspects like top-level athletics, physical education in state institutions (especially in schools), physical activity in sport clubs, sport offerings by commercial enterprises, and private or not-institutionalized sport.

One major reason, why it is necessary to distinguish different levels like these five is the fact, that unfortunately the field of sport, physical activity, or physical education is mainly judged along the dimension of top-level athletics; this is also the dimension called Olympic sports. Therefore it is very critical how performance at Olympic Games is transmitted to the public by means of mass media. This is an observation which has to be taken into account and which is a fundamental assumption for this study.

2. Purpose of the Study

Based on the fact that the usual reporting of athletic performance by way of medal ranking according to gained gold-, silver- and then bronze-medals is considered a very bad, unfair and wrong way how to do this, alternative models for assessing performance and for reporting athletic performance are developed.

The purpose of the study is to not only criticize the used model but give a constructive answer in addition. It is easy to say "not but instead of this the

following should be done". This is the perspective followed in this paper.

The purpose of the study in detail is twofold:

a) Objective assessment of athletic success: The traditional medal table ranks all nations according to medals won, starting with gold medals, etc. Objectivity can be increased progressively by calculating medal points (MP), final points (awarding points to all athletes reaching the final-place 1 to 8; FP), and medal points multiplied by the athletes involved (e.g., a gold medal in soccer counts as 11 gold medals; MPC).

b) Relativizing athletic performance by considering socio-economic variables: Especially with the recent break-up of unions of different national groups (e.g., U.S.S.R., Yugoslavia), nations with a large population, strong government support, and high industrial wealth appear to have an unfair advantage when it comes to reporting their Olympic success. To increase fairness MPCs were relativized by economic, power population, and number of competitors participating from a country. The results open new insights into Olympic success as measured by the nations' possibilities.

Thus the purpose of this study has a clear constructive direction by trying to say no to the present practice of reporting athletic success but also by saying what should be realised instead of the status-quo by offering alternate ways of assessing performance.

3. Review of Literature/Basic Assumptions

The literature dealing with this overall-topic of assessing success in top-level athletics is not very large. Examples for studies trying to deal with new and probably more fair ways how to value and report athletic success also related to Olympic Games are the following:

NOVIKOW & MAKSIMENKO (1972) investigated social and economic factors and the level of sport performance in different countries. SEPÄNEN (1972) analyzed the role of top-level athletics in the different societies of the world. In regard to success in Olympic Games COLWELL (1981) analyzed the 1976 Summer Olympic Games of Montreal and SEPÄNEN (1981) dealt with Olym-

pic Success from a cross-national perspective. In the department of sport pedagogy of the University of Kiel several studies (related to the Olympic Games 1984 and the Asian Games 1986) have been undertaken to come up with a better way to report Olympic success (HAAG & RIESINGER 1985, 1988; HAAG, STRAUSS & KANG 1987).

In this study it was tried also to develop more objective and adequate ways how to report success in Olympic Games. This is in accordance with the basic assumption (hypothesis) that there are better, more objective and adequate ways how to assess and report Olympic success by using a more objective assessment of athletic success and by relativizing athletic performance by considering socio-economic variables. Different ranking procedures will show considerable differences in the ranking places of nations participating in Olympic Games.

4. Procedure of the Study

The procedure of the study can be described in three steps:

a) Providing the necessary raw-data and calculate different forms of ranking:

Traditional medal ranking according to medal won, starting with gold medals, following silver medals, and finally bronze medals (Medal Rank - MR).

Assigning a gold medal 3 points, silver medal 2 points, and bronze medal 1 point. Building the sum of points (Medal Points = MP/MP Rank).

Counting points for place 1 (= 8 points) up to 8 (= 1 point) and build the sum (Final Points = FP/FP Rank).

Calculating for every medal the points multiplied with the number of athletes which are involved in gaining the medals (e.g. a gold medal in 4 x 10 km cross country relay counts $4 \times 3 = 12$ points (MRC, MPC, FPC, C - competitors participating in the event).

b) Providing socio-economic variables of the following nature and relativize these with the MPC figures as the data line judged best and therefore used in this study to include socio-economic vari-

ables related to the athletic performance measured in MPC.

Economic power expressed by the support of the country to the UNO (MPC/Eco).

Overall population of the respective countries (gained from the Federal office for statistics in Wiesbaden, GER)(MPC/Pop).

Number of competitors a country sends to the Olympic Games (MPC/Comp).

The results of the 1992 Albertville Winter Olympics are presented in Tables and Figures thus providing different and alternative rankings. The culmination is the calculation of a combined Z-value out of MPC/ECO, MPG/Pop, and MPC/Comp.

5. Results and Discussion

The results and their discussion is presented in light of the two given purposes. At the same time these results are discussed on the basis of the data presented in tables and figures.

a) Alternative forms to assess and report athletic success.

The countries are listed in the way of the traditional medal ranking, which is continued accordingly for places 4 to 8. The differences in total result from even placing.

Tab. 1 contains the medal distribution as well as the places 4 to 8 which gives an overview on the 8 final places. From this raw data the medal points for gold (3), silver (2) bronze (1) and the MP Rank were calculated as well as the final points for place 1-8 and the FP Rank.

Fig. 1 shows the three types of ranking (MR, MP Rank, and FP Rank) in an overview. Out of the first 20 countries it can be seen that for 13 countries the ranks differ according to the three forms of ranking (e.g. NED and KOR). Overall this is especially true for the smaller countries.

These can be seen already differences in the ranking (e.g. NED and KOR) and especially in the lower ranks, e.g. MP and FP can be regarded as a much more objective way to report on athletic success in the Olympic Games.

The results presented in Tab. 1 for MR, MP and FP are recalculated in regard to the actual number of athletes involved in every competition according to the rules. The assumption is, that a gold medal in 4 x 10 cross country relay requires a top performance of 4 people, therefore the medal or place points should be taken times four. The results of these calculations are presented in Fig. 2: MPC-Medal points (Tabulated by awarding points to each athlete who won a medal). The figure shows that the ranking according to the usual medal rank is showing differences with some countries. It also was decided, that this factor MPC is the basis for further calculations especially in regard to including socio-economic variables.

In Tab. 2 a lot of information is presented: MR (Medal Rank), MP (Medal Points) and FP (Final Points) as well as the respective ranks if C (number of athletes in the event) is considered (MRC, MPC, FPC). Clear differences can be seen in the ranking especially between MR and MP/FP for countries like GUS, USA, CAN, JAP, SWE, SWI and CSF.

Fig. 3 Compares MPS and FPC for the first 20 countries. Thus it is proven, that it makes a difference, if MPC or FPC is used especially for countries like GER, ITA, FRA, KOR, CSF, SWE and NED. By this it is also proven, that there is some justification to use place 1 to 8 in assessing athletic success.

b)Relativating athletic performance by considering socio-economic variables

Tab. 2 contains the gained raw data in regard to economic UNO rating, population and number of competitors from a country participating in the Olympic Games. These three variables have been chosen in order to introduce socio-economic variables to the assessment of athletic performance. These variables can be defined in a clear way and thus build the basis for future calculations.

If ranking is done for all 29 countries participating in the Albertville Winter Olympic Games 1992 according to the three socio-economic variables (Economic UNO Rating, Population, Competitors) differences can be clearly seen to the traditional medal ranking (MR) as it could be expected and also in between the three variables. This is presented in Fig. 4 (Economic Uno Rating), 5 (Population), and 6 (competitors).

It is interesting that with Economic Uno Rating GUS, GER, USA, JAP, and GBR are the clear

leaders, which will affect the ranking accordingly (see Eco Rank in Tab. 3).

The same is true with population for the countries GUS, USA, and China (see pop Rank in Tab. 3).

Finally the number of competitors sent by a country for the Olympic Games in Albertville also varies to a great extent. It is especially interesting that the USA with the largest number only ranks (MR) in place 7 and Poland in rank (MR) 29, the last place.

Tab. 3 is containing a lot of information, in which 20 of the participating countries are ranked according to MPC, since it was decided to use MPC for further calculations. The base-line data (Eco, Pop, Comp) are also included. For all three socio-economic variables the relation to MPC, the z-value and the rank is calculated. Finally a "z combined" is also computed in order to develop a summary ranking for the three socio-economic variables.

Three figures (Fig. 7, 8, and 9) are presenting different comparisons which can prove, that the inclusion of MPC scores and the consideration of socio-economic variables makes a large difference compared to MR as the usual medal ranking.

Fig. 7 compares MPC and MPC related to the three socio-economic factors MPC eco Rank, MPC pop Rank, and MPC camp Rank. Only in some cases there is no difference between the variables in this ranking. In most cases there is a considerable difference.

Fig. 8 presents the comparison of MPC and success related to socioeconomic factors (z-value) with again many differences.

Fig. 9 finally gives the comparison of MPC rank and MPC rank related to socio-economic factors, expressed in the combined z-value.

6. Conclusions

Starting with the power to influence meanings and opinions used by mass media it was tried to solve the discontentness with the usual medal ranking according to gold-, silver-, and bronze-medals.

Therefore models have been developed in order to reach a more realistic and fair presentation of athletic success. This is necessary since objective measures are necessary to compare the many countries in regard to their athletic success in a fair way.

First of all different forms of building rankings have been developed by

a) giving medal points (3 for gold, 2 for silver, and 1 for bronze)(MP).

b) giving final points (8 for first place, one for eight's place)(FP).

c) considering the number of athletes in a certain sports event as multiplier (MRC, MPC, FPC).

Secondly socio-economic variables have been considered like "Economic Uno Rating", "Population", and "Competitors" (from a country). Ranks have been calculated considering one of these variables. Finally a summary score was calculated in the form of a z-score from MPC eco, MPC pop, to MPC comp.

All different methods for the calculation of ranks showed considerable difference to the traditional medal ranking but also in regard to the various new methods how to build ranks.

With this type of research especially proven models for introducing a relative perception of athletic success besides the striving for absolute records have been developed. Since more and more smaller states are originating, the relative thinking is needed. The given proposals for alternative ranking models may be a contribution to meet the challenge of the "New World Order" from the perspective of sport.

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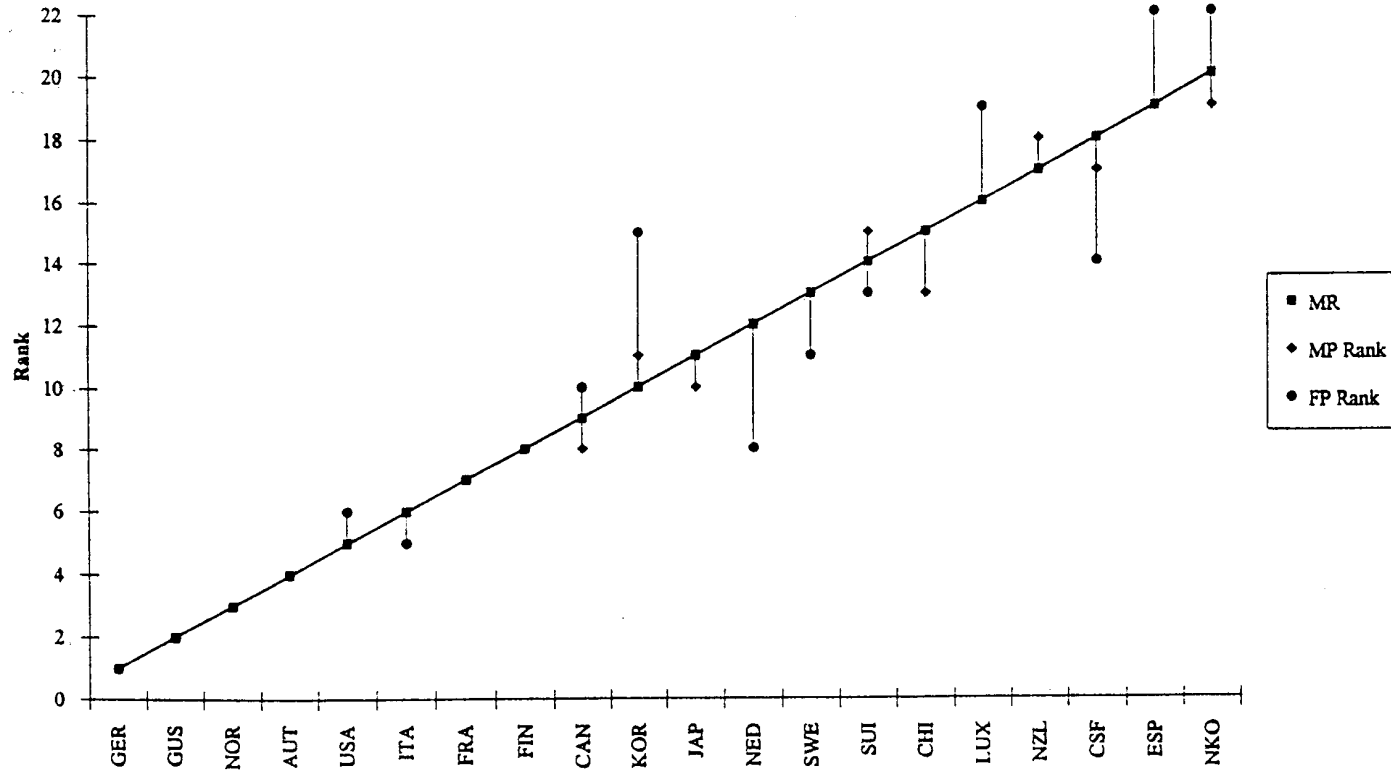
Fig. 8: Comparison of MPC and success related to socio-economic factors (z-value)

Fig. 9: Comparison of MPC rank and MPC rank related to socio-economic factors (combined z-value)-

| Nation | Gold | Silver | Bronze | 4th place | 5th place | 6th place | 7th place | 8th place | Medal Rank | Medal Points | MP Rank | Final Points | FP Rank |
|--------|------|--------|--------|-----------|-----------|-----------|-----------|-----------|------------|--------------|---------|--------------|---------|
| GER | 10 | 10 | 6 | 5 | 7 | 8 | 5 | 9 | 1 | 56 | 1 | 282 | 1 |
| GUS | 9 | 6 | 8 | 6 | 8 | 4 | 6 | 8 | 2 | 47 | 2 | 256 | 2 |
| NOR | 9 | 6 | 5 | 4 | 7 | | 6 | 8 | 3 | 44 | 3 | 212 | 3 |
| AUT | 6 | 7 | 8 | 4 | 4 | 3 | 6 | 3 | 4 | 40 | 4 | 205 | 4 |
| USA | 5 | 4 | 2 | 5 | 2 | 3 | 3 | 1 | 5 | 25 | 6 | 129 | 6 |
| ITA | 4 | 6 | 4 | 6 | 5 | 3 | 7 | 2 | 6 | 28 | 5 | 173 | 5 |
| FRA | 3 | 5 | 1 | 4 | 5 | 5 | 2 | 6 | 7 | 20 | 7 | 130 | 7 |
| FIN | 3 | 1 | 3 | 2 | 3 | 4 | 2 | 1 | 8 | 14 | 8 | 88 | 8 |
| CAN | 2 | 3 | 2 | 1 | 1 | 5 | 4 | 3 | 9 | 14 | 8 | 84 | 10 |
| KOR | 2 | 1 | 1 | | | | | | 10 | 9 | 11 | 29 | 15 |
| JAP | 1 | 2 | 4 | 3 | 3 | | 3 | | 11 | 11 | 10 | 79 | 11 |
| NED | 1 | 1 | 2 | 7 | 4 | 2 | 1 | 1 | 12 | 7 | 12 | 87 | 9 |
| SWE | 1 | | 3 | 1 | 4 | 6 | 4 | 6 | 13 | 6 | 13 | 79 | 11 |
| SUI | 1 | | 2 | 3 | 1 | 3 | 2 | 1 | 14 | 5 | 15 | 53 | 13 |
| CHI | | 3 | | | | 1 | | 2 | 15 | 6 | 13 | 26 | 16 |
| LUX | | 2 | | | | | | | 16 | 4 | 16 | 14 | 19 |
| NZL | | 1 | | 2 | | | | | 17 | 2 | 18 | 17 | 17 |
| CSF | | | 3 | 1 | 2 | 3 | 2 | 3 | 18 | 3 | 17 | 47 | 14 |
| ESP | | | 1 | | | | | | 19 | 1 | 19 | 6 | 22 |
| NKO | | | 1 | | | | | | 20 | 1 | 19 | 6 | 22 |
| BUL | | | | 2 | 1 | | | 1 | 21 | 0 | 21 | 15 | 18 |
| GBR | | | | | 1 | 2 | 1 | | 21 | 0 | 21 | 12 | 20 |
| SLO | | | | | | 1 | 1 | 1 | 21 | 0 | 21 | 6 | 22 |
| RUM | | | | 1 | | 1 | | | 21 | 0 | 21 | 8 | 21 |
| EST | | | | | | 1 | | | 21 | 0 | 21 | 3 | 25 |
| BEL | | | | | | 1 | | | 21 | 0 | 21 | 3 | 25 |
| AUS | | | | | | | 1 | | 21 | 0 | 21 | 2 | 27 |
| HUN | | | | | | | 1 | | 21 | 0 | 21 | 2 | 27 |
| POL | | | | | | | | 1 | 21 | 0 | 21 | 1 | 29 |
| Total | 57 | 58 | 56 | 57 | 58 | 56 | 57 | 57 | | | | | |

Tab. 1: Distribution of Medals and Final Places including Respective Points and Ranks

Fig. 1: Winter Olympic Games 1992 Albertville - Comparison of Ranking Methods



| Nation | MR | MP | FP | MRC | MPC | FPC | Econo | Pop | Comp |
|--------|----|----|----|-----|-----|-----|-------|---------|------|
| GER | 1 | 1 | 1 | 2 | 2 | 1 | 938 | 80170 | 111 |
| GUS | 2 | 2 | 2 | 1 | 1 | 2 | 1020 | 290666 | 122 |
| NOR | 3 | 3 | 3 | 3 | 3 | 3 | 54 | 4274 | 69 |
| AUT | 4 | 4 | 4 | 4 | 4 | 4 | 74 | 7881 | 57 |
| USA | 5 | 6 | 6 | 7 | 7 | 8 | 2500 | 251088 | 143 |
| ITA | 6 | 5 | 5 | 10 | 8 | 5 | 379 | 23930 | 99 |
| FRA | 7 | 7 | 7 | 8 | 8 | 8 | 637 | 57208 | 101 |
| FIN | 8 | 8 | 8 | 5 | 9 | 9 | 50 | 5029 | 59 |
| CAN | 9 | 8 | 10 | 6 | 5 | 7 | 306 | 28738 | 100 |
| KOR | 10 | 11 | 15 | 9 | 11 | 15 | 20 | 43169 | 17 |
| JAP | 11 | 10 | 11 | 11 | 10 | 11 | 1084 | 123480 | 52 |
| NED | 12 | 12 | 9 | 13 | 15 | 13 | 174 | 15129 | 14 |
| SWE | 13 | 13 | 11 | 14 | 14 | 10 | 125 | 8644 | 72 |
| SUI | 14 | 15 | 13 | 12 | 12 | 14 | 112 | 6832 | 74 |
| CHI | 15 | 13 | 16 | 15 | 16 | 18 | 79 | 1135295 | 27 |
| LUX | 16 | 16 | 19 | 16 | 17 | 20 | 5 | 390 | 1 |
| NZL | 17 | 18 | 17 | 17 | 18 | 16 | 24 | 3421 | 2 |
| CSF | 18 | 17 | 14 | 18 | 12 | 12 | 70 | 15703 | 68 |
| ESP | 19 | 19 | 22 | 19 | 19 | 23 | 203 | 39058 | 17 |
| NKO | 20 | 19 | 22 | 20 | 19 | 23 | 5 | 22193 | 17 |
| BUL | 21 | 21 | 18 | 21 | 21 | 19 | 16 | 9016 | 31 |
| GBR | 21 | 21 | 20 | 21 | 21 | 17 | 488 | 57642 | 44 |
| SLO | 21 | 21 | 22 | 21 | 21 | 23 | 10 | 1583 | 25 |
| RUM | 21 | 21 | 21 | 21 | 21 | 21 | 19 | 23381 | 24 |
| EST | 21 | 21 | 25 | 21 | 21 | 27 | 2 | 5259 | 19 |
| BEL | 21 | 21 | 25 | 21 | 21 | 27 | 118 | 9016 | 1 |
| AUS | 21 | 21 | 27 | 21 | 21 | 22 | 168 | 17087 | 16 |
| HUN | 21 | 21 | 27 | 21 | 21 | 26 | 22 | 10537 | 24 |
| POL | 21 | 21 | 29 | 21 | 21 | 29 | 64 | 38825 | 53 |

Tab. 2: Comparative presentation of MR, MP, FP and MRC, MPC, FPC
(C = number of athletes in the event)

Fig 2.: MPC - Medal Points (calculated by awarding points to each athlete who won a medal)

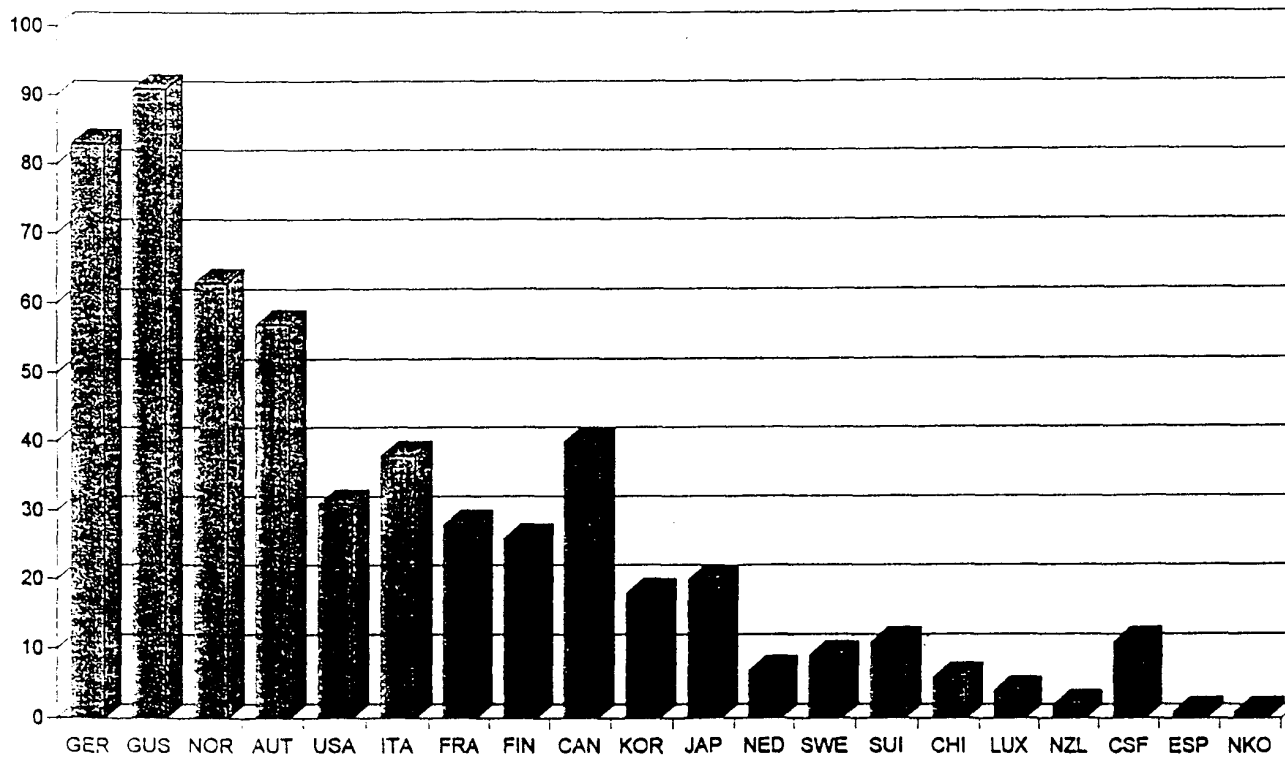


Fig. 3: Comparison of MPC and FPC for the first 20 countries

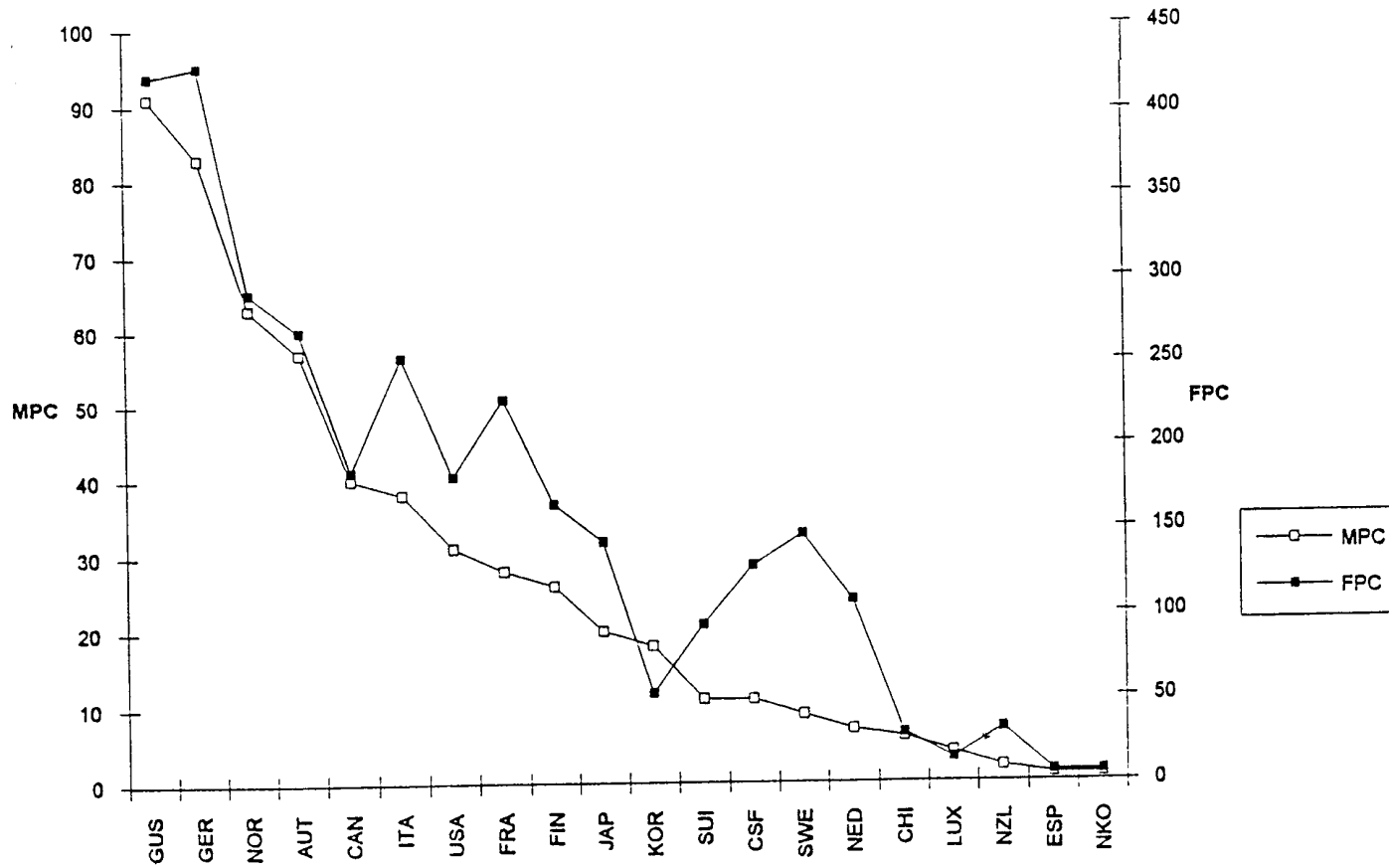


Fig. 4: Economic Uno Rating

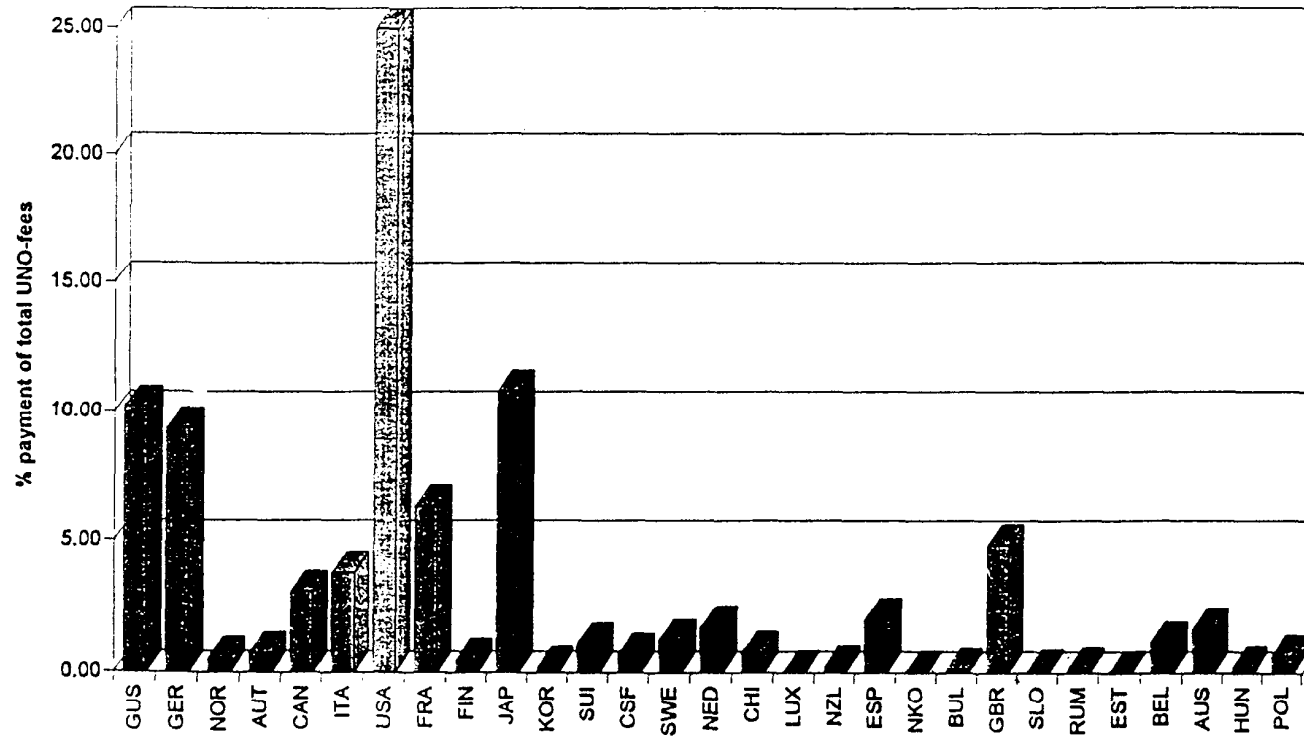


Fig. 5: Population

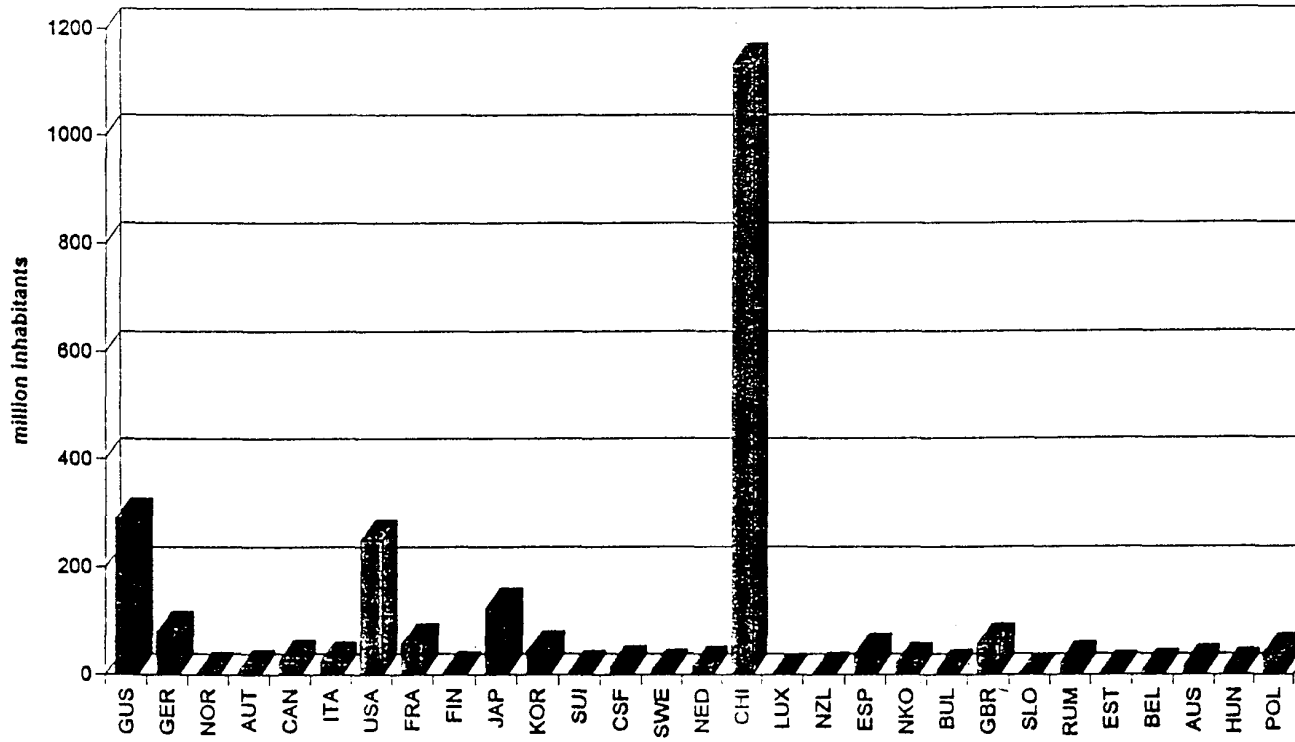
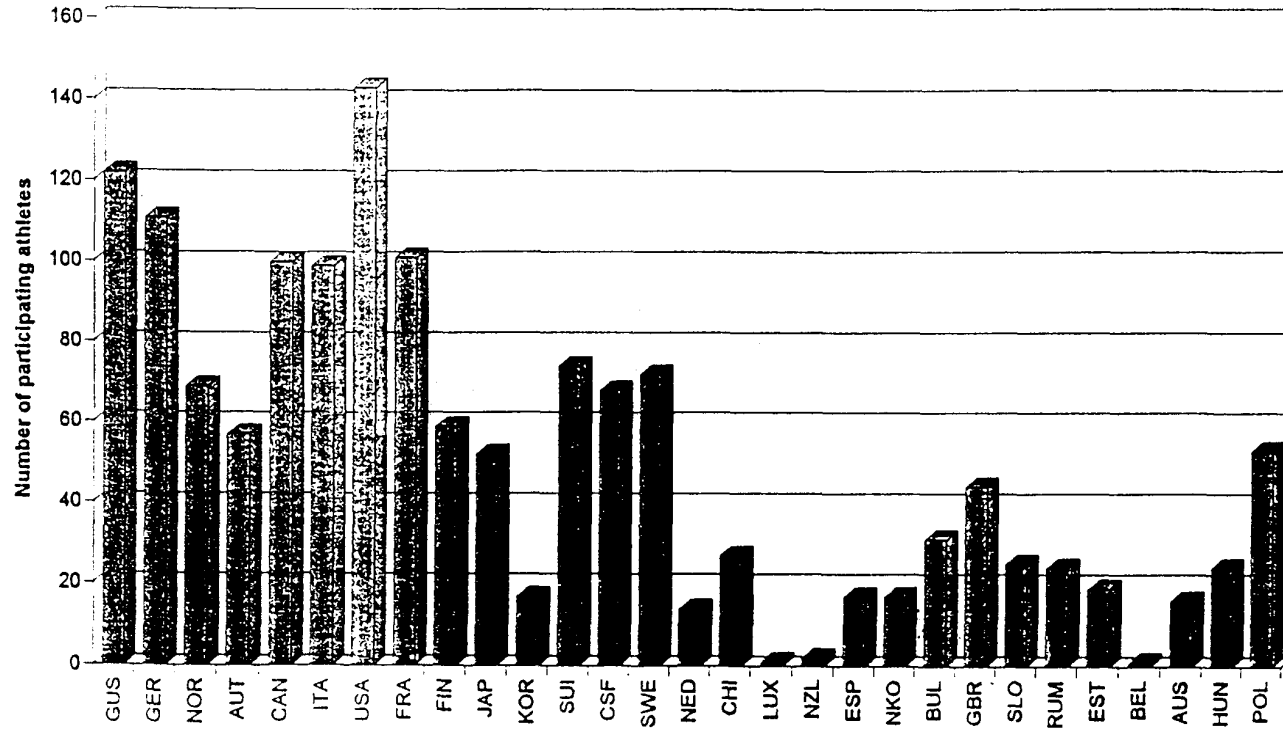


Fig. 6: Competitors



| Nation | Eco | Pop | Comp | MPC | MPC/Eco | Z-value | eco Rank | MPC/Pop | Z-value | pop Rank | MPC/Comp | Z-value | comp Rank | Z combined |
|--------|------|---------|------|-----|---------|---------|----------|---------|---------|----------|----------|---------|-----------|------------|
| GUS | 1020 | 290666 | 122 | 91 | 8.92 | -0.51 | 11 | 0.31 | -0.52 | 15 | 0.75 | 0.12 | 6 | -0.30 |
| GER | 936 | 80170 | 111 | 83 | 8.87 | -0.51 | 12 | 1.04 | -0.34 | 8 | 0.75 | 0.12 | 6 | -0.24 |
| NOR | 54 | 4274 | 69 | 63 | 116.67 | 2.54 | 1 | 14.74 | 3.11 | 1 | 0.91 | 0.32 | 5 | 1.99 |
| AUT | 74 | 7861 | 57 | 57 | 77.03 | 1.42 | 4 | 7.25 | 1.23 | 3 | 1.00 | 0.42 | 3 | 1.02 |
| CAN | 306 | 26736 | 100 | 40 | 13.07 | -0.39 | 8 | 1.50 | -0.22 | 7 | 0.40 | -0.28 | 10 | -0.30 |
| ITA | 379 | 23930 | 99 | 38 | 10.03 | -0.48 | 9 | 1.59 | -0.20 | 6 | 0.38 | -0.30 | 11 | -0.33 |
| USA | 2500 | 251086 | 143 | 31 | 1.24 | -0.73 | 19 | 0.12 | -0.57 | 17 | 0.22 | -0.50 | 14 | -0.60 |
| FRA | 637 | 57206 | 101 | 28 | 4.40 | -0.64 | 16 | 0.49 | -0.47 | 11 | 0.28 | -0.43 | 13 | -0.51 |
| FIN | 50 | 5029 | 59 | 26 | 52.00 | 0.71 | 5 | 5.17 | 0.70 | 4 | 0.44 | -0.24 | 9 | 0.39 |
| JAP | 1084 | 123460 | 52 | 20 | 1.85 | -0.71 | 18 | 0.16 | -0.56 | 16 | 0.38 | -0.30 | 11 | -0.52 |
| KOR | 20 | 43169 | 17 | 18 | 90.00 | 1.79 | 2 | 0.42 | -0.49 | 14 | 1.06 | 0.49 | 2 | 0.59 |
| SUI | 112 | 6832 | 74 | 11 | 9.82 | -0.48 | 10 | 1.61 | -0.19 | 5 | 0.15 | -0.58 | 17 | -0.42 |
| CSF | 70 | 15703 | 68 | 11 | 15.71 | -0.32 | 7 | 0.70 | -0.42 | 10 | 0.16 | -0.56 | 16 | -0.43 |
| SWE | 125 | 8644 | 72 | 9 | 7.20 | -0.56 | 15 | 1.04 | -0.34 | 8 | 0.13 | -0.60 | 18 | -0.50 |
| NED | 174 | 15129 | 14 | 7 | 4.02 | -0.65 | 17 | 0.46 | -0.48 | 13 | 0.50 | -0.17 | 8 | -0.43 |
| CHI | 79 | 1135295 | 27 | 6 | 7.59 | -0.55 | 14 | 0.01 | -0.60 | 20 | 0.22 | -0.49 | 14 | -0.54 |
| LUX | 5 | 390 | 1 | 4 | 80.00 | 1.50 | 3 | 10.26 | 1.98 | 2 | 4.00 | 3.92 | 1 | 2.47 |
| NZL | 24 | 3421 | 2 | 2 | 8.33 | -0.52 | 13 | 0.58 | -0.45 | 11 | 1.00 | 0.42 | 3 | -0.19 |
| ESP | 203 | 39058 | 17 | 1 | 0.49 | -0.75 | 20 | 0.03 | -0.59 | 19 | 0.08 | -0.68 | 19 | -0.67 |
| NKO | 5 | 22193 | 17 | 1 | 20.00 | -0.19 | 6 | 0.05 | -0.59 | 18 | 0.06 | -0.68 | 19 | -0.49 |

Tab. 3: Overview on calculations with the baseline data Eco, Pop, Comp using MPC and forming a z-combined score

Fig. 7: Comparison of MPC and MPC related to socioeconomic factors

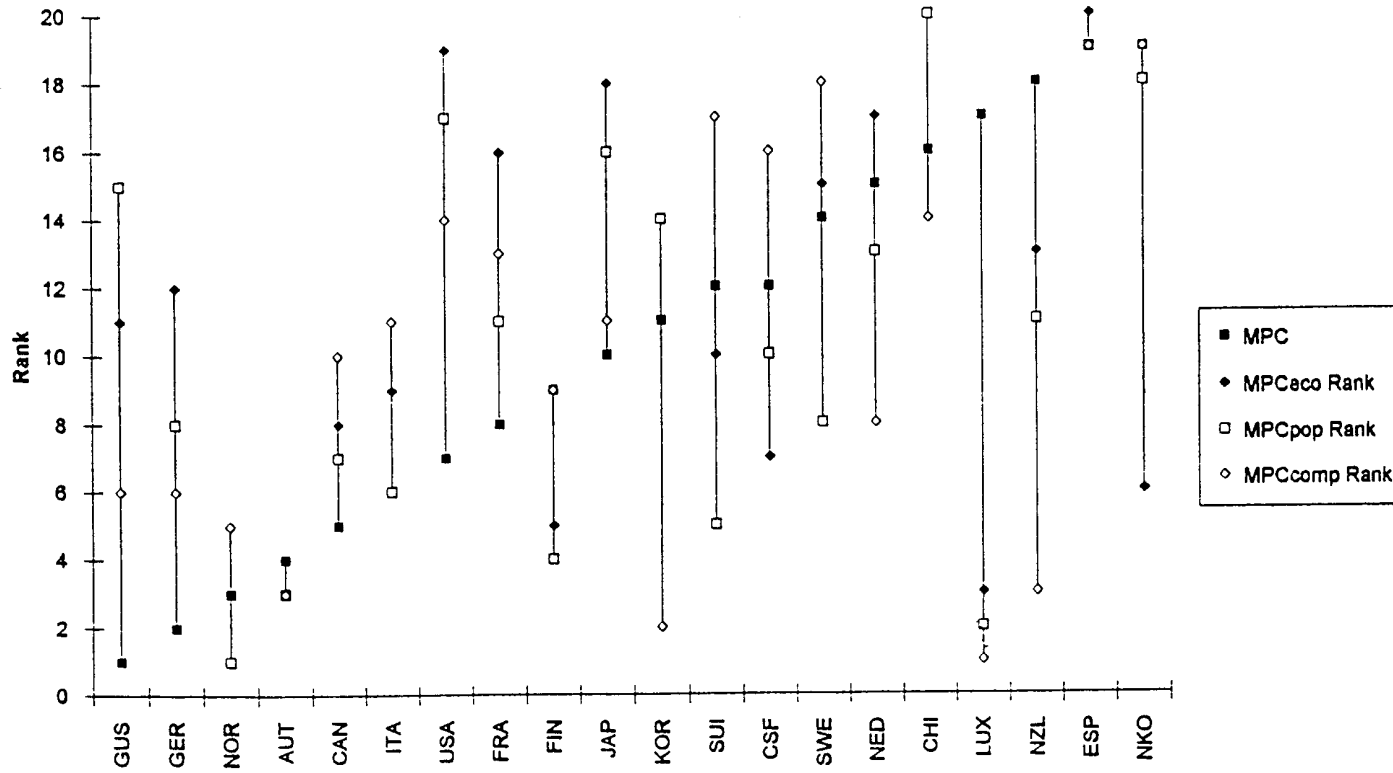


Fig. 8: Success related to socioeconomic factors (z-value)

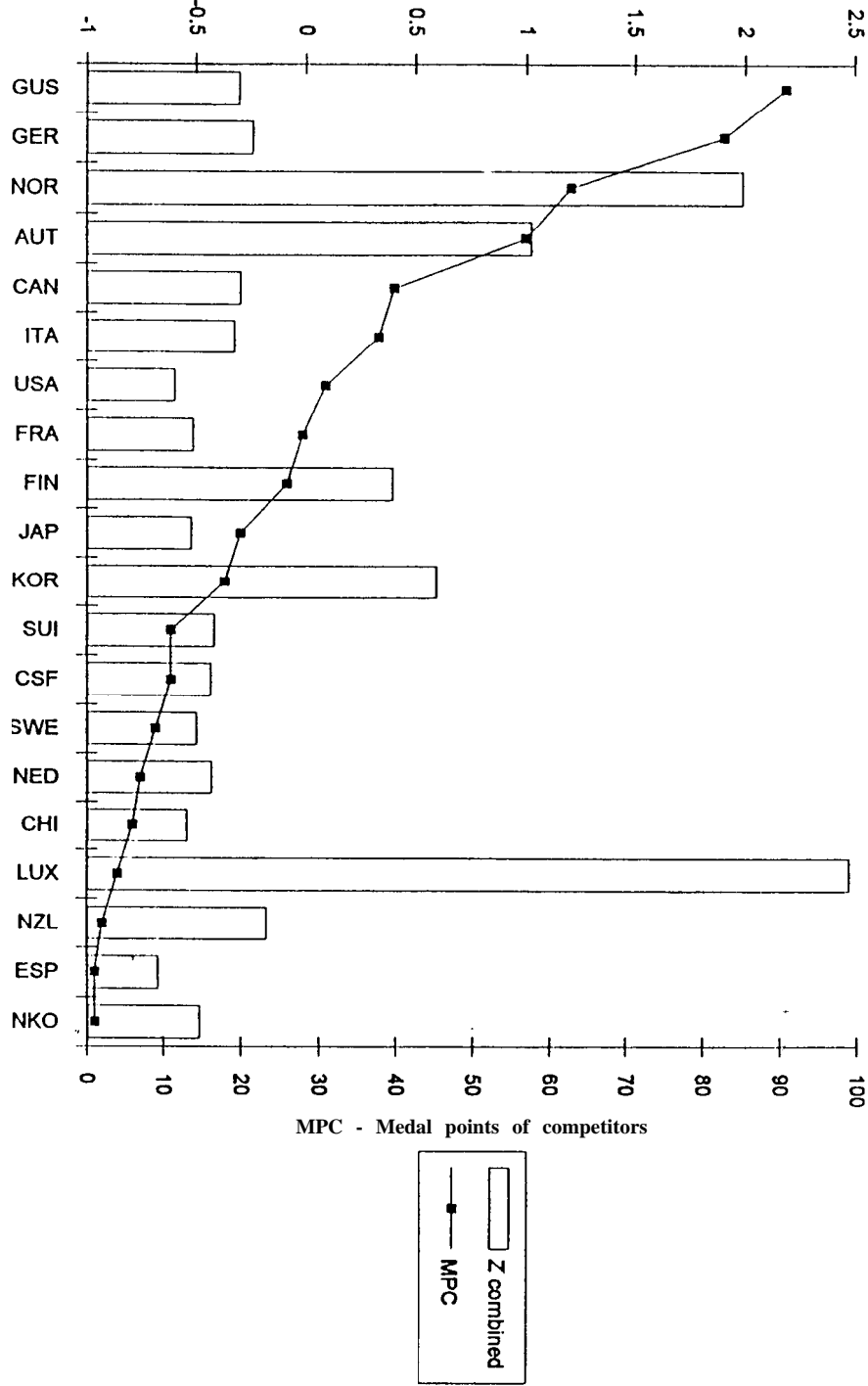


Fig. 9: Comparison of MPC rank and MPC rank related to socioeconomic factors (combined z-value)

