14 Analyzing the SCImago Journal Rank in 2017

In [1]:
```
import pandas as pd
import seaborn as sns
pd.options.display.max_colwidth = 200 # Default is 50
%matplotlib inline
```

In the SCImago Journal Rank's web site[1] we can get the journal rank in a format based on CSV (CSV stands for *comma separated values*, but the CSV-like files we can download from the SJR use commas as thousands separators and semi-colons as value separators), which can be directly loaded by the Pandas CSV reader function, requiring some extra parameters:

In [2]:
```
sjr2017scielo = pd.read_csv("scimagojr_2017_scielo.csv",
                            sep=";", thousands=",", index_col="Rank")
sjr2017open = pd.read_csv("scimagojr_2017_open.csv",
                          sep=";", thousands=",", index_col="Rank")
```

The first few entries:

In [3]:
```
sjr2017scielo.head().T
```

Out [3]:

Rank	1	2	3	4	5
Sourceid	21100853560	15205	21100200421	21807	22596
Title	African Journal of Disability	Memorias do Instituto Oswaldo Cruz	Journal of Soil Science and Plant Nutrition	Brazilian Journal of Infectious Diseases	Revista de Saude Publica
Type	journal	journal	journal	journal	journal
Issn	22267220, 22239170	00740276, 16788060	07189516	14138670	00348910
SJR	1463	1172	823	817	807
SJR Best Quartile	Q1	Q1	Q1	Q2	Q2
H index	4	76	24	37	65
Total Docs. (2017)	0	124	80	124	164
Total Docs. (3years)	7	438	235	401	351
Total Refs.	0	3682	2860	2919	1015
Total Cites (3years)	32	1082	521	616	570
Citable Docs. (3years)	6	425	235	315	334
Cites / Doc. (2years)	533	281	235	202	148
Ref. / Doc.	0	2969	3575	2354	619
Country	South Africa	Brazil	Chile	Brazil	Brazil
Publisher	OpenJournals Publishing AOSIS (Pty) Ltd	Fundacao Oswaldo Cruz	Sociedad Chilena de la Ciencia del Suelo	Elsevier Editora Ltda	Universidade de Sao Paulo

Continued on next page

[1] https://www.scimagojr.com/journalrank.php

Rank	1	2	3	4	5
Categories	Physical Therapy, Sports Therapy and Rehabilit...	Medicine (miscellaneous) (Q1); Microbiology (m...	Agronomy and Crop Science (Q1); Plant Science ...	Infectious Diseases (Q2); Microbiology (medica...	Medicine (miscellaneous) (Q2); Public Health, ...

They have a dedicated web page for help that includes the description of each field: https://www.scimagojr.com/help.php

In [4]:
```
sjr2017scielo.head().T
```

Out [4]:

Rank	1	2	3	4	5
Sourceid	21100853560	15205	21100200421	21807	22596
Title	African Journal of Disability	Memorias do Instituto Oswaldo Cruz	Journal of Soil Science and Plant Nutrition	Brazilian Journal of Infectious Diseases	Revista de Saude Publica
Type	journal	journal	journal	journal	journal
Issn	22267220, 22239170	00740276, 16788060	07189516	14138670	00348910
SJR	1463	1172	823	817	807
SJR Best Quartile	Q1	Q1	Q1	Q2	Q2
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Country	South Africa	Brazil	Chile	Brazil	Brazil
Publisher	OpenJournals Publishing AOSIS (Pty) Ltd	Fundacao Oswaldo Cruz	Sociedad Chilena de la Ciencia del Suelo	Elsevier Editora Ltda	Universidade de Sao Paulo
Categories	Physical Therapy, Sports Therapy and Rehabilit...	Medicine (miscellaneous) (Q1); Microbiology (m...	Agronomy and Crop Science (Q1); Plant Science ...	Infectious Diseases (Q2); Microbiology (medica...	Medicine (miscellaneous) (Q2); Public Health, ...

The SJR column have the *SCImago Journal Rank* index we're here to analyze. The same web page have a PDF explaining the mathematics that defines it[2].

[2] https://www.scimagojr.com/SCImagoJournalRank.pdf

14.1 Do all SciELO entries have open access?

Yes! We can see this by comparing the number of distinct entries in the union of the dataframes.

In [5]:
```
pd.DataFrame([
    ("Open", "all",
     sjr2017open.shape[0]
    ),
    ("Open", "distinct ISSNs",
     sjr2017open["Issn"].drop_duplicates().size,
    ),
    ("Open", "distinct titles",
     sjr2017open["Title"].drop_duplicates().size,
    ),
    ("Open", "distinct title-ISSN pairs",
     sjr2017open[["Title", "Issn"]].drop_duplicates().shape[0],
    ),
    ("SciELO", "all",
     sjr2017scielo.shape[0],
    ),
    ("SciELO", "distinct ISSNs",
     sjr2017scielo["Issn"].drop_duplicates().size,
    ),
    ("SciELO", "distinct titles",
     sjr2017scielo["Title"].drop_duplicates().size,
    ),
    ("SciELO", "distinct title-ISSN pairs",
     sjr2017scielo[["Title", "Issn"]].drop_duplicates().shape[0],
    ),
    ("Union of Open and SciELO", "all",
     pd.concat([sjr2017open.drop_duplicates(),
                sjr2017scielo.drop_duplicates()])
       .drop_duplicates().shape[0],
    ),
    ("Union of Open and SciELO", "distinct ISSNs",
     pd.concat([sjr2017open.drop_duplicates(),
                sjr2017scielo.drop_duplicates()])["Issn"]
       .drop_duplicates().size,
    ),
    ("Union of Open and SciELO", "distinct titles",
        pd.concat([sjr2017open.drop_duplicates(),
                   sjr2017scielo.drop_duplicates()])["Title"]
          .drop_duplicates().size,
    ),
    ("Union of Open and SciELO", "distinct title-ISSN pairs",
        pd.concat([sjr2017open.drop_duplicates(),
                   sjr2017scielo.drop_duplicates()])[["Title", "Issn"]]
          .drop_duplicates().shape[0],
    ),
], columns=["source", "selection", "count"]) \
    .set_index(["source", "selection"]) \
    .unstack("source")
```

Out [5]:

NaN source selection	Open	SciELO	count Union of Open and SciELO
all	4503	628	4503
distinct ISSNs	4501	628	4501
distinct title-ISSN pairs	4503	628	4503
distinct titles	4502	628	4502

Seeing the title-ISSNs pairs, the dataframe with open access entries and the union of both dataframes have the same number of distinct entries, as expected. But we can see some ISSN duplication and title duplication in the *Open* dataframe.

14.2 Understanding the duplicates in the open access dataframe

These are the duplicated ISSNs:

In [6]:
```
sjr2017open_size_gt1 = sjr2017open.groupby("Issn").size() > 1
dupl_issns = sjr2017open_size_gt1[sjr2017open_size_gt1].index.tolist()
dupl_issns
```

Out [6]:
```
['16725123', '20365438']
```

In [7]:
```
sjr2017open[sjr2017open["Issn"].isin(dupl_issns)].T
```

Out [7]:

Rank	1154	3223	4153	4171
Sourceid	130135	21100790340	21100391400	21100786380
Title	International Journal of Ophthalmology	Oxford Medical Case Reports	International Eye Science	Perspectives on Federalism
Type	journal	journal	journal	journal
Issn	16725123	20365438	16725123	20365438
SJR	576	178	109	107
SJR Best Quartile	Q2	Q4	Q4	Q4
H index	18	4	5	1
Total Docs. (2017)	336	90	626	26
Total Docs. (3years)	619	137	1990	20
Total Refs.	9780	838	8260	1254
Total Cites (3years)	745	85	69	3
Citable Docs. (3years)	545	122	1989	20
Cites / Doc. (2years)	134	71	3	15
Ref. / Doc.	2911	931	1319	4823
Country	China	United States	China	Germany
Publisher	Press of International Journal of Ophthalmology	Oxford University Press	Press of International Journal of Ophthalmology	Walter De Gruyter
Categories	Ophthalmology (Q2)	Infectious Diseases (Q4); Microbiology (Q4); P...	Ophthalmology (Q4)	Law (Q4); Political Science and International ...

The 2036-5438 regards to *Perspectives on Federalism*, whereas *Oxford Medical Case Reports* should probably have been2053-8855. The 1672-5123 entries looks like the same, the titles are probably distinct translations of , and the entries perhaps regards to two timings of the same journal, but the different numbers for everything else makes it really hard to *normalize* anything. For now, let's simply accept these as different journals.

How about the duplicate title?

In [8]:
```
sjr2017open_title_gt1 = sjr2017open.groupby("Title").size() > 1
dupl_titles = sjr2017open_title_gt1[sjr2017open_title_gt1].index.tolist()
dupl_titles
```

Out [8]:
```
['Alea']
```

In [9]:
```
sjr2017open[sjr2017open["Title"] == "Alea"].T
```

Out [9]:

Rank	640	4448
Sourceid	21100231200	12100157116
Title	Alea	Alea
Type	journal	journal
Issn	19800436	1517106X
SJR	934	100
SJR Best Quartile	Q2	Q4
H index	10	3
Total Docs. (2017)	10	42
Total Docs. (3years)	101	98
Total Refs.	272	718
Total Cites (3years)	54	1
Citable Docs. (3years)	101	82
Cites / Doc. (2years)	44	0
Ref. / Doc.	2720	1710
Country	Brazil	Brazil
Publisher	Instituto Nacional de Matematica Pura e Aplicada	Universidade Federal do Rio de Janeiro
Categories	Statistics and Probability (Q2)	Language and Linguistics (Q4); Linguistics and...

It's just a coincidence.

14.3 Getting the open access entries that aren't in the SciELO dataframe

Since every field match (but the *Rank* index) and every SciELO entry is in the open access entries, we can just get the symmetric difference.

In [10]:
```
sjr2017openns = pd.concat([sjr2017open, sjr2017scielo], sort=False) \
                  .drop_duplicates(keep=False)
sjr2017openns.shape
```

Out [10]:
```
(3875, 17)
```

We can build a full dataset as the CSV regarding the open access entries, just including a new boolean `scielo` column.

In [11]:
```
dataset = pd.concat([
    sjr2017openns.assign(SciELO=False),
    sjr2017scielo.assign(SciELO=True),
```

```
])
```

14.4 Data from countries not in SciELO

The SCImago Journal Rank data for entries coming from SciELO regards to some few countries:

In [12]:
```
scielo_countries = sjr2017scielo["Country"].unique()
scielo_countries
```

Out [12]:
```
array(['South Africa', 'Brazil', 'Chile', 'Spain', 'Mexico',
       'United States', 'Argentina', 'Costa Rica', 'Netherlands',
       'Colombia', 'Portugal', 'Cuba', 'Peru', 'Venezuela', 'Uruguay'],
      dtype=object)
```

This open dataset have a lot of other countries we won't be able to compare.

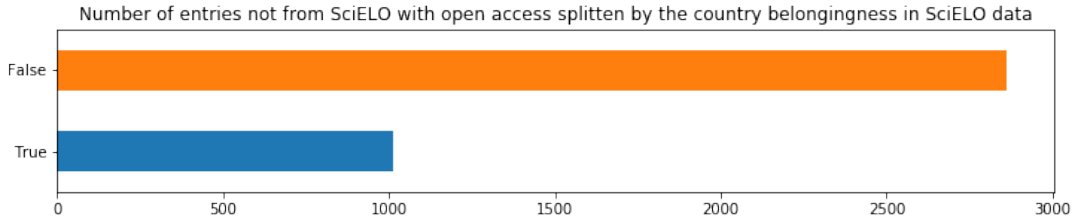
In [13]:
```
dataset["Country"].unique()
```

Out [13]:
```
array(['United States', 'Austria', 'United Kingdom', 'Germany', 'Sweden',
       'Netherlands', 'France', 'Italy', 'New Zealand', 'Switzerland',
       'Japan', 'Bulgaria', 'Canada', 'China', 'South Korea', 'Egypt',
       'Finland', 'Spain', 'Australia', 'Belgium', 'Qatar', 'India',
       'Turkey', 'Taiwan', 'Greece', 'Czech Republic', 'Hong Kong',
       'Brazil', 'Poland', 'Denmark', 'Bangladesh',
       'United Arab Emirates', 'Russian Federation', 'Hungary',
       'Singapore', 'Saudi Arabia', 'Iran', 'Ukraine', 'Slovenia',
       'Estonia', 'South Africa', 'Croatia', 'Ireland', 'Slovakia',
       'Malaysia', 'Norway', 'Philippines', 'Lithuania', 'Argentina',
       'Israel', 'Serbia', 'Oman', 'Bosnia and Herzegovina', 'Romania',
       'Ethiopia', 'Azerbaijan', 'Portugal', 'Pakistan', 'Puerto Rico',
       'Kazakhstan', 'Mexico', 'Bahrain', 'Tanzania', 'Malawi', 'Kuwait',
       'Latvia', 'Montenegro', 'Indonesia', 'Nigeria', 'Thailand',
       'Kenya', 'Chile', 'Iceland', 'Moldova', 'Venezuela', 'Macedonia',
       'Libya', 'Colombia', 'Iraq', 'Jordan', 'Belarus', 'Jamaica',
       'Nepal', 'Ghana', 'Rwanda', 'Morocco', 'Cuba', 'Sri Lanka',
       'Malta', 'Brunei Darussalam', 'Fiji', 'Ecuador', 'Costa Rica',
       'Peru', 'Uruguay'], dtype=object)
```

About one third of the open data not from SciELO are from a country that have SciELO data:

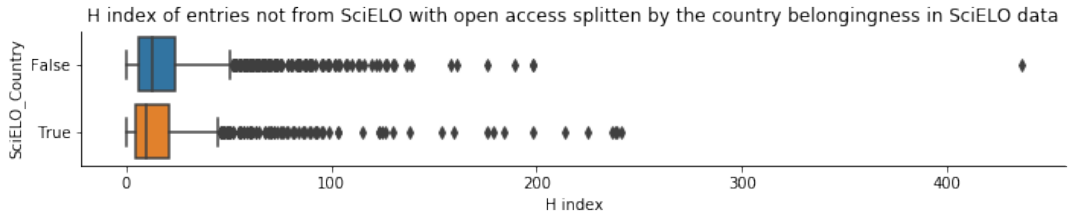
In [14]:
```
openns_cf_count = (sjr2017openns["Country"]
                       .isin(scielo_countries)
                       .value_counts()
                       .sort_index(ascending=False)
                   )
openns_cf_count.plot.barh(
    title="Number of entries not from SciELO with open access "
          "splitten by the country belongingness in SciELO data",
    figsize=(12, 2),
)
openns_cf_count
```

Out [14]:
```
True     1013
False    2862
Name: Country, dtype: int64
```

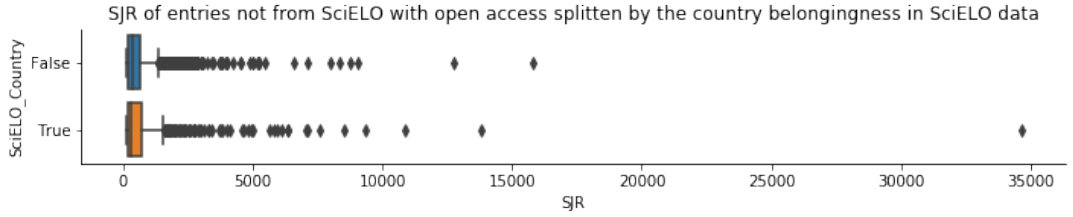


The H index and SJR aren't much different in this data split:

In [15]:
```
sns.catplot(
    kind="box",
    data=sjr2017openns.assign(
        SciELO_Country=sjr2017openns["Country"].isin(scielo_countries)
    ),
    y="SciELO_Country", orient="h", sharey=False,
    x="H index",
    aspect=5,
    height=2,
).set(title="H index of entries not from SciELO with open access "
            "splitten by the country belongingness in SciELO data",
);
```



In [16]:
```
sns.catplot(
    kind="box",
    data=sjr2017openns.assign(
        SciELO_Country=sjr2017openns["Country"].isin(scielo_countries)
    ),
    y="SciELO_Country", orient="h", sharey=False,
    x="SJR",
    aspect=5,
    height=2,
).set(title="SJR of entries not from SciELO with open access "
            "splitten by the country belongingness in SciELO data",
);
```



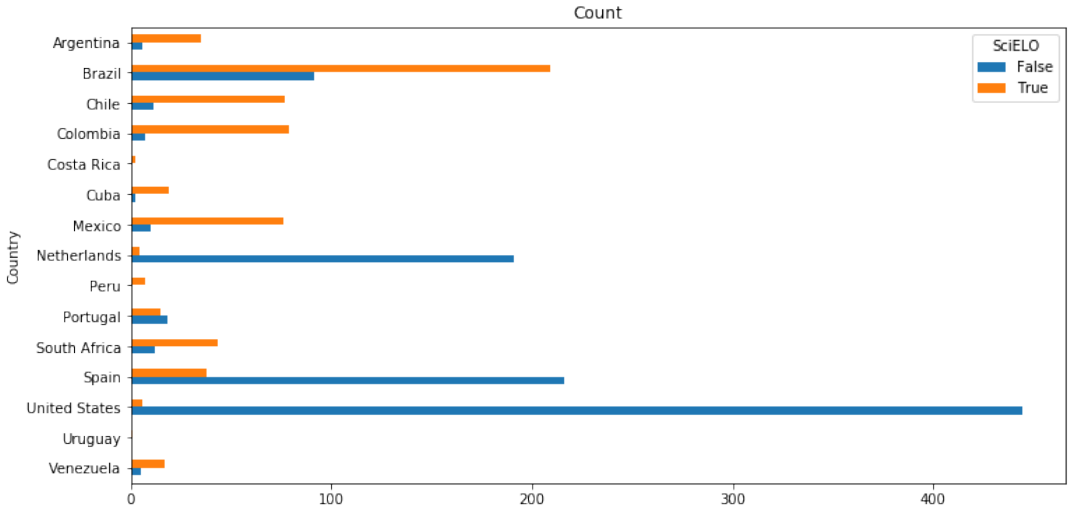
14.5 Countries that have SciELO data in SCImage Journal Rank

A proper comparison is difficult for some countries, since either almost all data is from SciELO, or almost all data isn't from it:

In [17]:
```
# "cf" stands for Country-filtered
dataset_cf = dataset[dataset["Country"].isin(scielo_countries)]
dataset_cf_count = (dataset_cf
                    .groupby(["Country", "SciELO"])
                    .size()
                    .unstack()
                    .fillna(0)
                    .astype(int)
                   )
dataset_cf_count.iloc[::-1].plot.barh(figsize=(12, 6), title="Count")
dataset_cf_count
```

Out [17]:

SciELO Country	False	True
Argentina	6	35
Brazil	91	209
Chile	11	77
Colombia	7	79
Costa Rica	0	2
Cuba	2	19
Mexico	10	76
Netherlands	191	4
Peru	0	7
Portugal	18	15
South Africa	12	43
Spain	216	38
United States	444	6
Uruguay	0	1
Venezuela	5	17

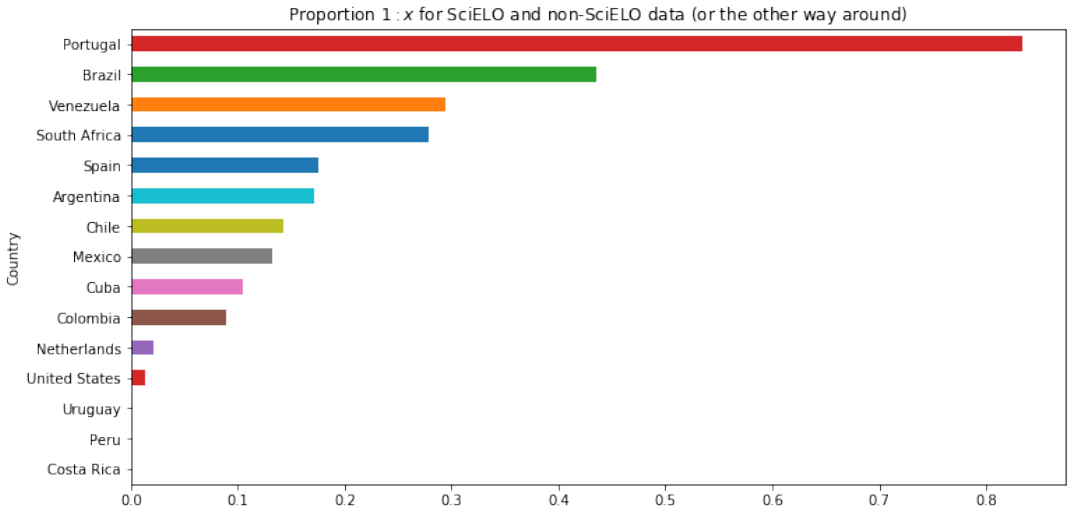


The proportion of data in quite different. We'll should analyze just the data from Portugal and Brazil. Venezuela has just 22 entries in total just 5 of them aren't from SciELO.

In [18]:
```
proportions = (
    pd.concat([dataset_cf_count[True] / dataset_cf_count[False],
               dataset_cf_count[False] / dataset_cf_count[True]],
              axis=1)
    .min(axis=1)
    .sort_values(ascending=False)
    .rename("proportion")
)
proportions.iloc[::-1].plot.barh(
    figsize=(12, 6),
    title="Proportion $1:x$ for SciELO and non-SciELO data "
          "(or the other way around)",
)
pd.DataFrame(proportions)
```

Out [18]:

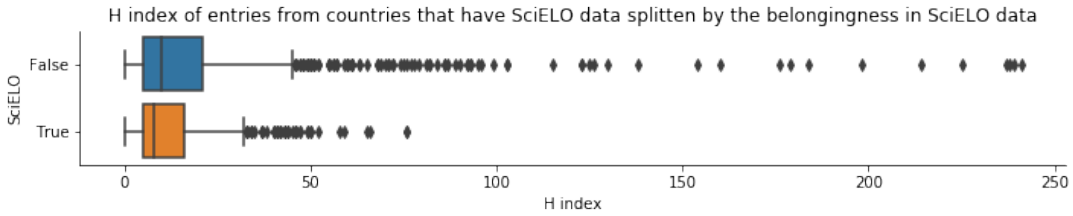
Country	proportion
Portugal	0.833333
Brazil	0.435407
Venezuela	0.294118
South Africa	0.279070
Spain	0.175926
Argentina	0.171429
Chile	0.142857
Mexico	0.131579
Cuba	0.105263
Colombia	0.088608
Netherlands	0.020942
United States	0.013514
Uruguay	0.000000
Peru	0.000000
Costa Rica	0.000000



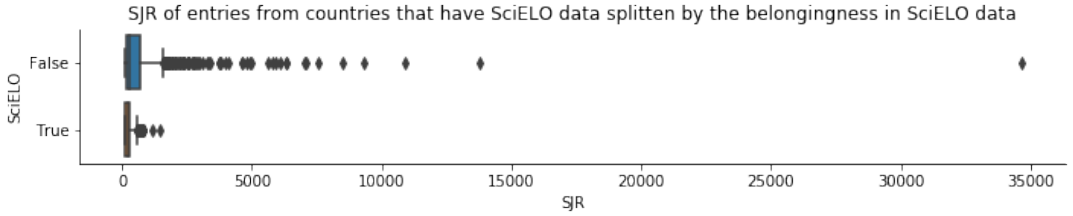
The H index and SJR for the overall data is greater in open access content not from SciELO:

In [19]:

```
sns.catplot(
    kind="box",
    data=dataset_cf,
    y="SciELO", orient="h", sharey=False,
    x="H index",
    aspect=5,
    height=2,
).set(title="H index of entries from countries that have SciELO data "
            "splitten by the belongingness in SciELO data",
);
```



In [20]:
```
sns.catplot(
    kind="box",
    data=dataset_cf,
    y="SciELO", orient="h", sharey=False,
    x="SJR",
    aspect=5,
    height=2,
).set(title="SJR of entries from countries that have SciELO data "
            "splitten by the belongingness in SciELO data",
);
```

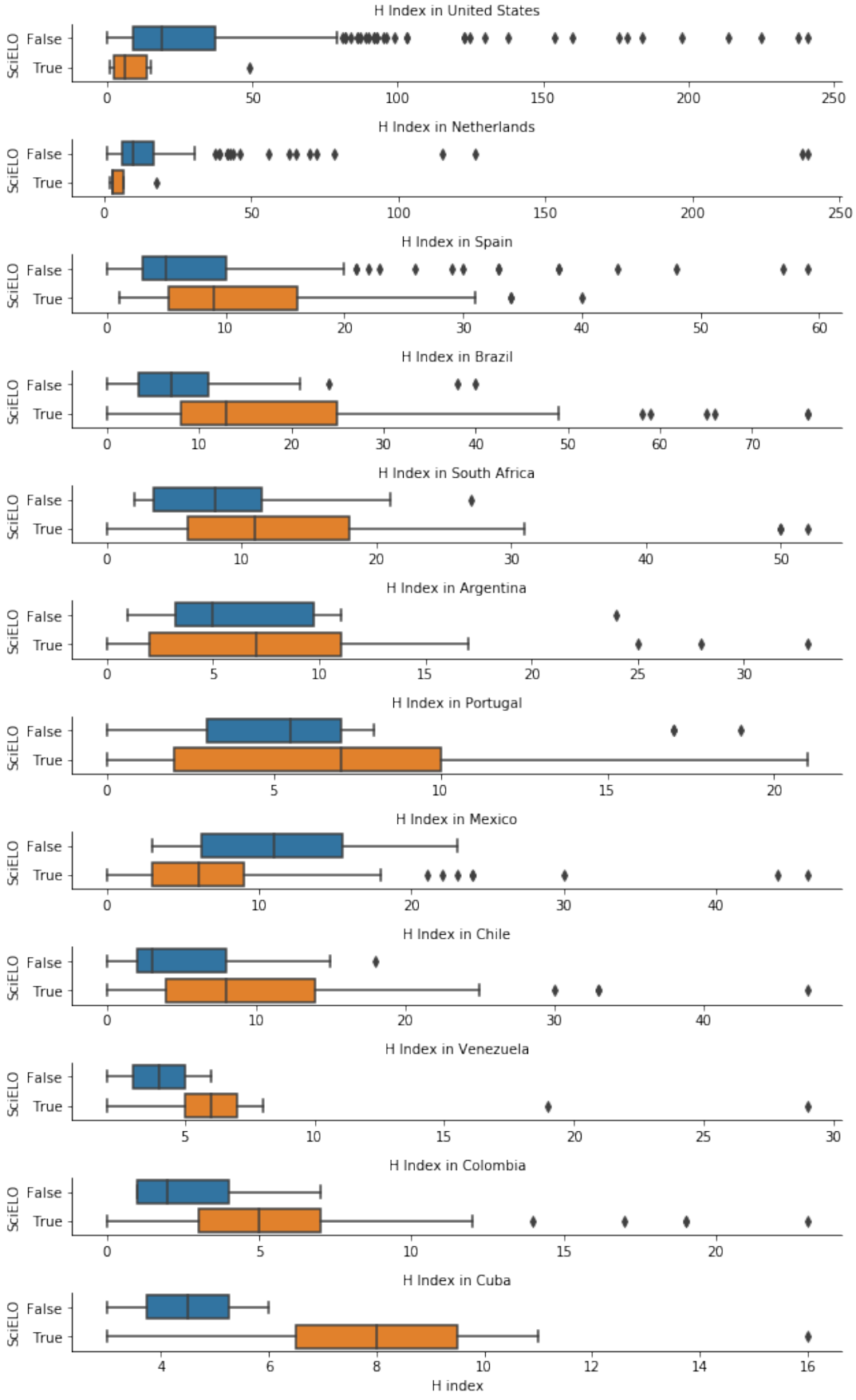


This difference can be mainly explained by the data from the United States and Netherlands, countries which have, together, only 10 entries from SciELO. Most of the data from other countries behave the other way around (but Mexico and, for SJR, Portugal):

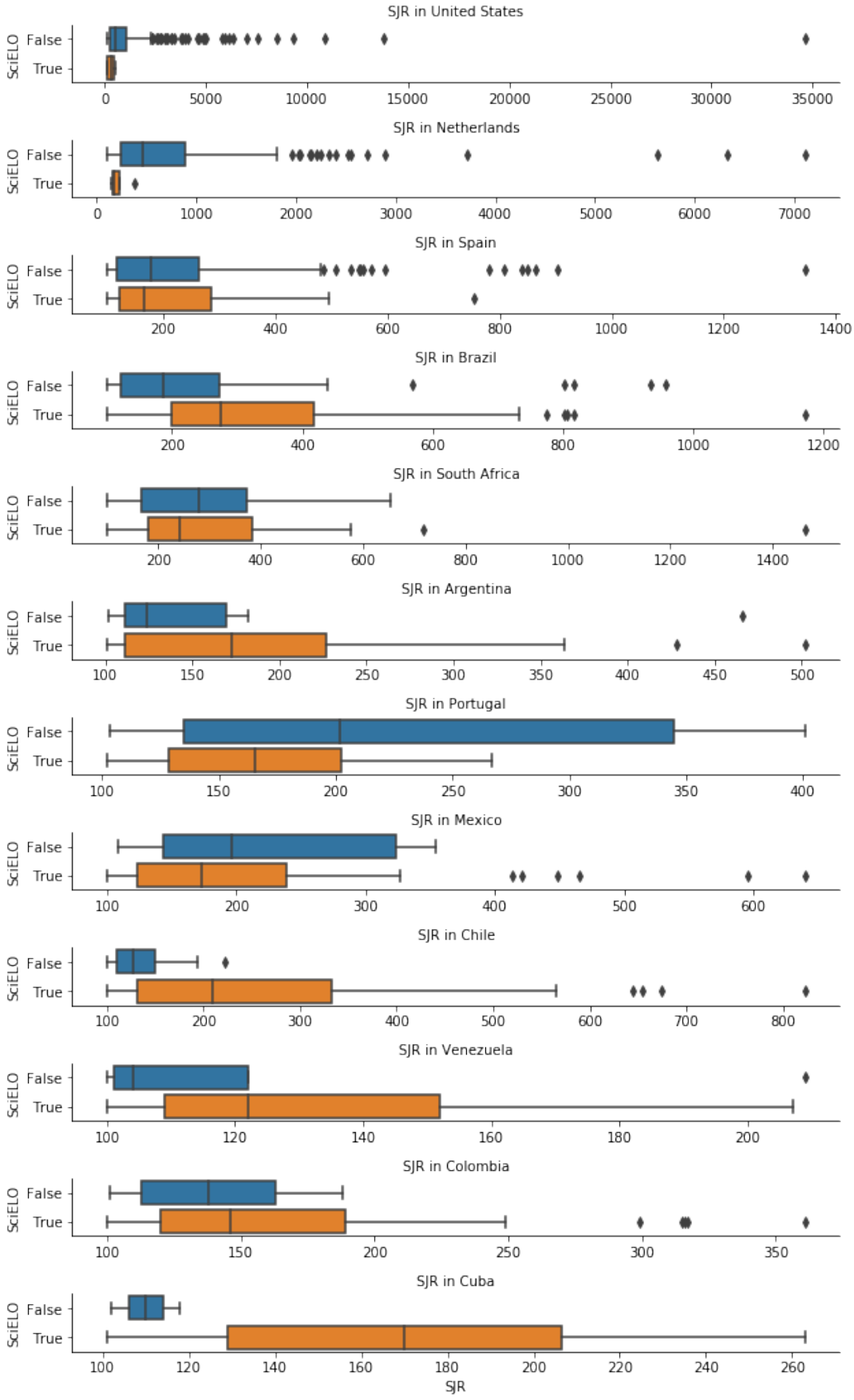
In [21]:
```
dataset_cfne = dataset_cf[~dataset_cf["Country"] # Not empty country
                          .isin(proportions[proportions == 0].index)]
```

In [22]:
```
sns.catplot(
    kind="box",
    data=dataset_cfne,
    row="Country",
    y="SciELO", orient="h", sharey=False,
    x="H index",
    aspect=7.4,
    height=1.2,
    sharex=False,
```

```
).set_titles("H Index in {row_name}") \
 .fig.tight_layout();
```



In [23]:
```
sns.catplot(
    kind="box",
    data=dataset_cfne,
    row="Country",
    y="SciELO", orient="h", sharey=False,
    x="SJR",
    aspect=7.4,
    height=1.2,
    sharex=False,
).set_titles("SJR in {row_name}") \
 .fig.tight_layout();
```


SJR in United States
SciELO
False
True
0
5000
10000
15000
20000
25000
30000
35000
SJR in Netherlands
SciELO
False
True
0
1000
2000
3000
4000
5000
6000
7000
SJR in Spain
SciELO
False
True
200
400
600
800
1000
1200
1400
SJR in Brazil
SciELO
False
True
200
400
600
800
1000
1200
SJR in South Africa
SciELO
False
True
200
400
600
800
1000
1200
1400
SJR in Argentina
SciELO
False
True
100
150
200
250
300
350
400
450
500
SJR in Portugal
SciELO
False
True
100
150
200
250
300
350
400
SJR in Mexico
SciELO
False
True
100
200
300
400
500
600
SJR in Chile
SciELO
False
True
100
200
300
400
500
600
700
800
SJR in Venezuela
SciELO
False
True
100
120
140
160
180
200
SJR in Colombia
SciELO
False
True
100
150
200
250
300
350
SJR in Cuba
SciELO
False
True
100
120
140
160
180
200
220
240
260
SJR