Massey Ratings

https://penaltyblog.readthedocs.io/en/latest/ratings/massey_ratings.html (https://penaltyblog.readthedocs.io/en/latest/ratings/massey_ratings.html)

In [1]:
```
%matplotlib inline
%config InlineBackend.figure_format = 'retina'
```

In [2]:
```
import os
import warnings
warnings.filterwarnings('ignore')

import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import penaltyblog as pb
```

In [3]:
```
DATA_DIR = os.path.join(os.getcwd(), 'data/')
CHART_DIR = os.path.join(os.getcwd(), 'charts/')
```

In [4]:
```
#data_file = './data/FMF_TA_2021.csv'
data_file = './data/lmf-ac-2021-22.csv'
df = pd.read_csv(data_file, index_col=0)
df.head()
```

Out[4]:

Home \ Away	AMÉ	ATL	ASL	CAZ	GUA	JUÁ	LEÓ	MAZ	MON	NEC	PAC	PUE	QUE	SA
América	—	0–2	2–3	0–0	0–0	3–0	2–0	2–0	0–0	2–1	1–3	2–0	1–1	2–
Atlas	0–1	—	1–0	0–0	1–1	2–0	2–0	1–2	2–1	2–1	0–1	0–1	2–0	2–
Atlético San Luis	0–1	2–6	—	0–0	2–2	0–1	2–0	1–0	1–1	0–2	0–2	2–1	1–1	1–
Cruz Azul	2–1	1–0	0–1	—	0–1	1–0	0–1	0–2	1–1	1–2	1–1	1–3	2–0	1–
Guadalajara	0–0	0–1	1–2	1–1	—	2–2	0–3	3–0	1–3	2–1	1–0	2–3	1–1	1–

In [5]:
```
df.index = df.columns
rows = []
for i in df.index:
    for c in df.columns:
        if i == c: continue
        score = df.loc[i, c]
        if score == '–': continue
        ssplit = score.split('–')
        rows.append([i, c, ssplit[0], ssplit[1]])
df = pd.DataFrame(rows, columns = ['team_home', 'team_away',
                                   'fthg', 'ftag'])
df.head()
```

Out[5]:

	team_home	team_away	fthg	ftag
0	AMÉ	ATL	0	2
1	AMÉ	ASL	2	3
2	AMÉ	CAZ	0	0
3	AMÉ	GUA	0	0
4	AMÉ	JUÁ	3	0

In [6]:
```
df.home_score = df['fthg'].astype('int')
df.away_score = df['ftag'].astype('int')
```

In [7]:
```
df.dtypes
```

Out[7]:
```
team_home    object
team_away    object
fthg         object
ftag         object
dtype: object
```

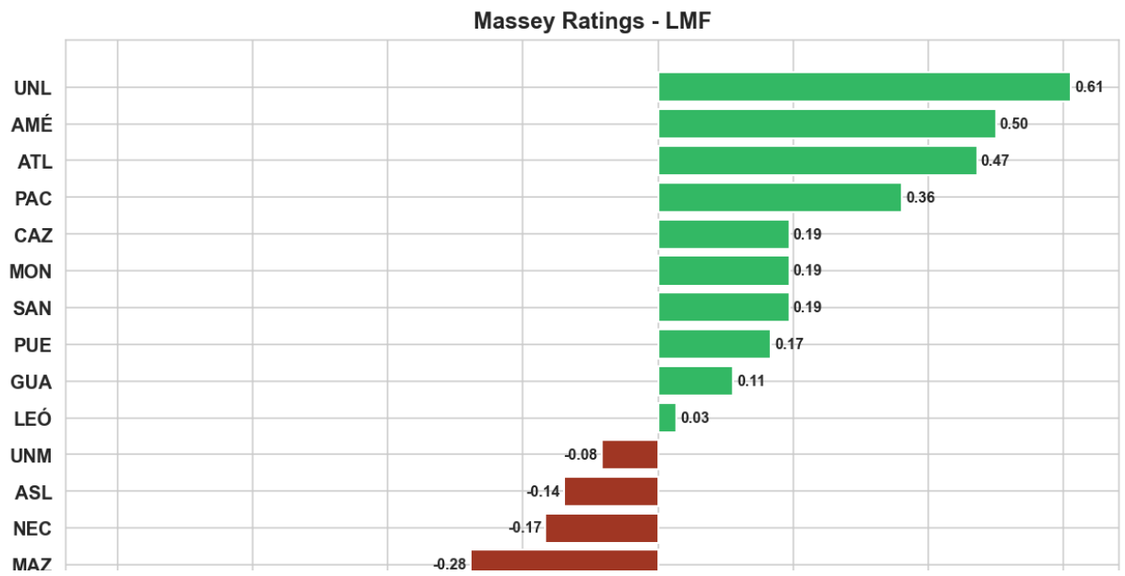
In [8]:
```
massey = pb.ratings.Massey(df["fthg"], df["ftag"],
                           df["team_home"], df["team_away"])
massey.get_ratings()
```

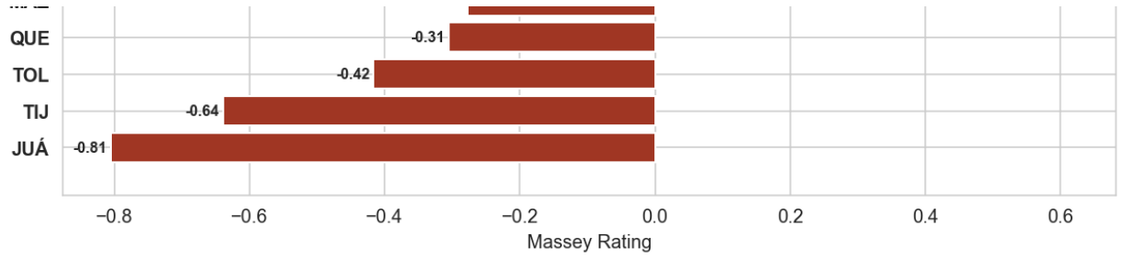
Out[8]:

	team	rating	offence	defence
0	UNL	0.611111	1.080372	-0.469261
1	AMÉ	0.5	0.712316	-0.212316
2	ATL	0.472222	0.620302	-0.14808
3	PAC	0.361111	0.845997	-0.484886
4	CAZ	0.194444	0.606413	-0.411969
5	MON	0.194444	0.575163	-0.380719
6	SAN	0.194444	0.825163	-0.630719
7	PUE	0.166667	0.60815	-0.441483
8	GUA	0.111111	0.517872	-0.406761
9	LEÓ	0.027778	0.49183	-0.464052
10	UNM	-0.083333	0.655025	-0.738358
11	ASL	-0.138889	0.595997	-0.734886
12	NEC	-0.166667	0.503983	-0.67065
13	MAZ	-0.277778	0.542177	-0.819955
14	QUE	-0.305556	0.262663	-0.568219
15	TOL	-0.416667	0.707108	-1.123775
16	TIJ	-0.638889	0.314747	-0.953636
17	JUÁ	-0.805556	0.137663	-0.943219

In [12]:
```
```

```
import matplotlib.pyplot as plt
import numpy as np
import seaborn as sns
import pandas as pd

%config InlineBackend.figure_format='retina'
plt.rcParams["figure.figsize"] = [10, 7]
sns.set_style("whitegrid")

massey = pb.ratings.Massey(df["fthg"], df["ftag"], df["team_home"],
                           df["team_away"])
ratings = pd.DataFrame(massey.get_ratings())
ratings["colours"] = np.where(ratings["rating"] > 0, "#33b864",
                              "#a03623")
fig, ax = plt.subplots()
y_pos = np.arange(len(ratings))
performance = ratings["rating"]
ax.barh(y_pos, performance, align="center", color=ratings["colours"])
ax.set_yticks(y_pos)
ax.set_yticklabels(ratings["team"], fontweight="bold")
ax.invert_yaxis()
ax.set_xlabel("Massey Rating")
ax.set_title("Massey Ratings - LMF", fontweight="bold")

rects = ax.patches
for rect in rects:
    x_value = rect.get_width()
    y_value = rect.get_y() + rect.get_height() / 2
    space = 2
    ha = "left"

    if x_value < 0:
        space *= -1
        ha = "right"

    label = "{:.2f}".format(x_value)

    # Create annotation
    plt.annotate(
        label,
        (x_value, y_value),
        xytext=(space, 0),
        textcoords="offset points",
        va="center",
        ha=ha,
        fontsize=8,
        fontweight="bold",
    )
```





In [13]:
```
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import seaborn as sns
import pandas as pd

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massey = pb.ratings.Massey(df["fthg"], df["ftag"],
                           df["team_home"], df["team_away"])
ratings = pd.DataFrame(massey.get_ratings())
ratings["colours"] = np.where(ratings["offence"] > 0, "#33b864",
                              "#a03623")
ratings = ratings.sort_values("offence", ascending=False)
fig, ax = plt.subplots()
y_pos = np.arange(len(ratings))
performance = ratings["offence"]
ax.barh(y_pos, performance, align="center", color=ratings["colours"])
ax.set_yticks(y_pos)
ax.set_yticklabels(ratings["team"], fontweight="bold")
ax.invert_yaxis()
ax.set_xlabel("Massey Rating")
ax.set_title("Massey Offence Ratings - LMF", fontweight="bold")

rects = ax.patches

for rect in rects:
    x_value = rect.get_width()
    y_value = rect.get_y() + rect.get_height() / 2
    space = 2
    ha = "left"

    if x_value < 0:
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        ha=ha,
        fontsize=8,
        fontweight="bold",
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```

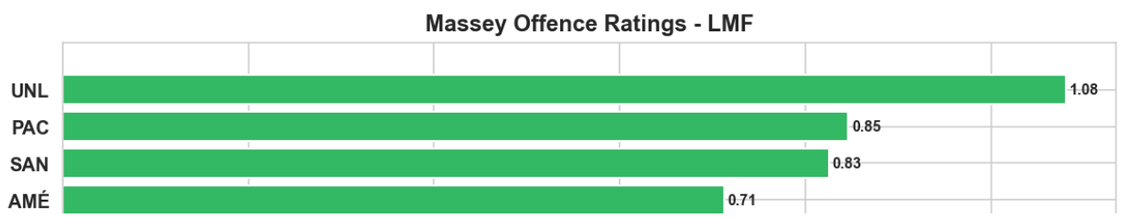

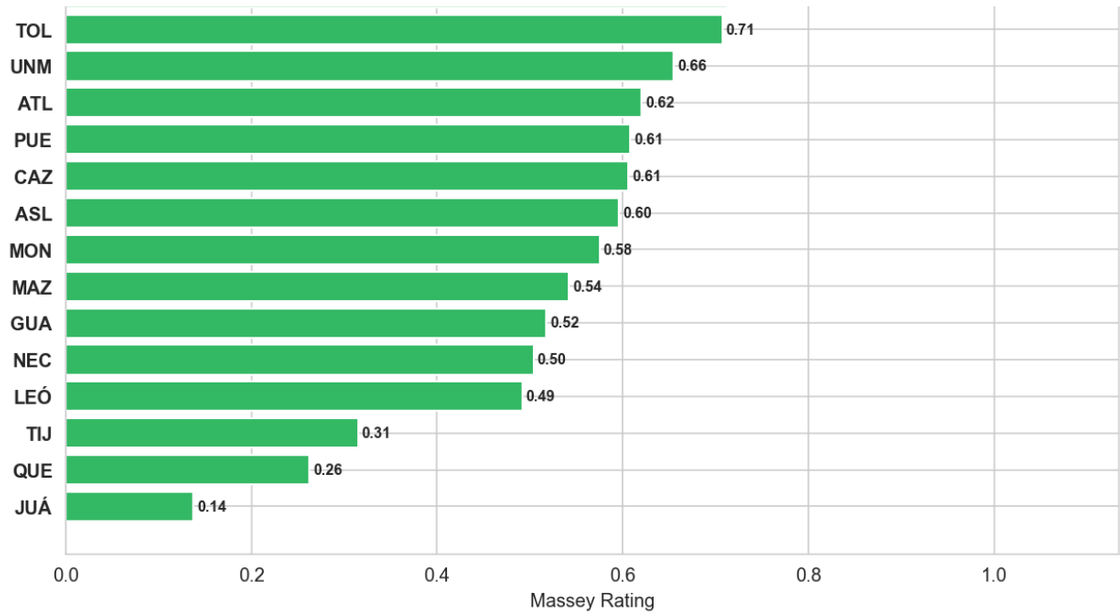
TOL
UNM
ATL
PUE
CAZ
ASL
MON
MAZ
GUA
NEC
LEÓ
TIJ
QUE
JUÁ
0.71
0.66
0.62
0.61
0.61
0.60
0.58
0.54
0.52
0.50
0.49
0.31
0.26
0.14
0.0
0.2
0.4
0.6
0.8
1.0
Massey Rating

In [14]:

```
import matplotlib.pyplot as plt
import numpy as np
import seaborn as sns
import pandas as pd

%config InlineBackend.figure_format='retina'
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sns.set_style("whitegrid")

massey = pb.ratings.Massey(df["fthg"], df["ftag"],
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ratings = pd.DataFrame(massey.get_ratings())
ratings["colours"] = np.where(ratings["defence"] > 0,
                              "#33b864", "#a03623")
ratings = ratings.sort_values("defence", ascending=False)
fig, ax = plt.subplots()
y_pos = np.arange(len(ratings))
performance = ratings["defence"]
ax.barh(y_pos, performance, align="center", color=ratings["colours"])
ax.set_yticks(y_pos)
ax.set_yticklabels(ratings["team"], fontweight="bold")
ax.invert_yaxis()
ax.set_xlabel("Massey Rating")
ax.set_title("Massey Defence Ratings - LMF", fontweight="bold")

rects = ax.patches

for rect in rects:
    x_value = rect.get_width()
    y_value = rect.get_y() + rect.get_height() / 2
    space = 2
    ha = "left"

    if x_value < 0:
        space *= -1
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    label = "{:.2f}".format(x_value)

    plt.annotate(
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        xytext=(space, 0),
        textcoords="offset points",
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        ha=ha,
        fontsize=8,
        fontweight="bold",
    )
```

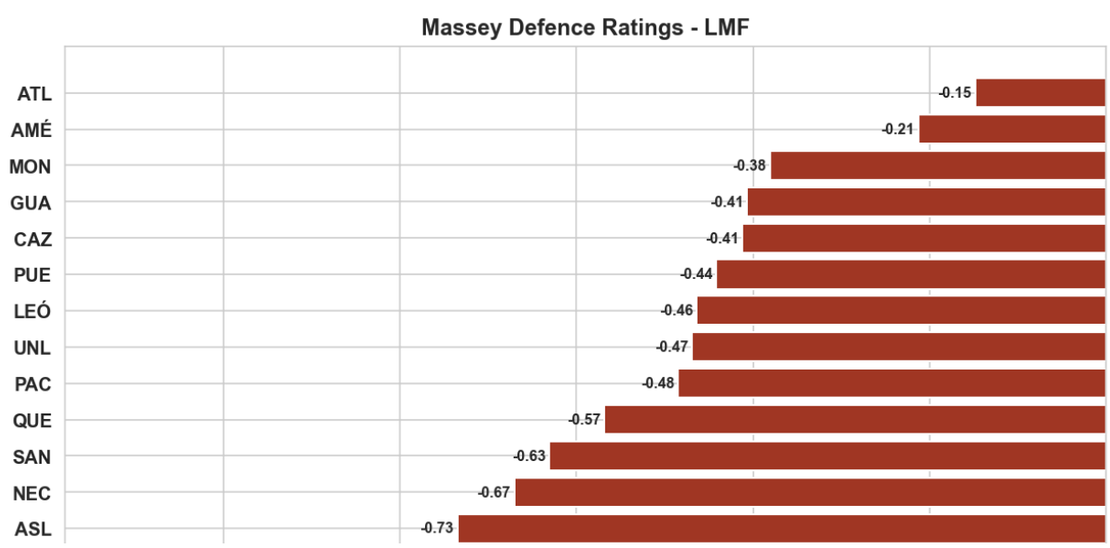

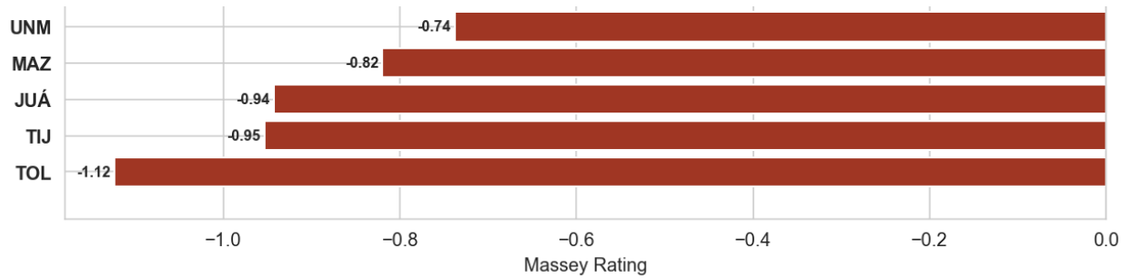
UNM
MAZ
JUÁ
TIJ
TOL
-0.74
-0.82
-0.94
-0.95
-1.12
−1.0
−0.8
−0.6
−0.4
−0.2
0.0
Massey Rating

In [ ]: