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June 21, 2021

1 import modules

[292]:

```
import os
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from linearmodels.panel import PanelOLS
import statsmodels.formula.api as smf
import statsmodels.api as sm
from statsmodels.discrete.discrete_model import Probit
from sklearn.preprocessing import LabelEncoder
from statsmodels.stats.power import TTestIndPower
from scipy import optimize
```

2 global variables

[2]:

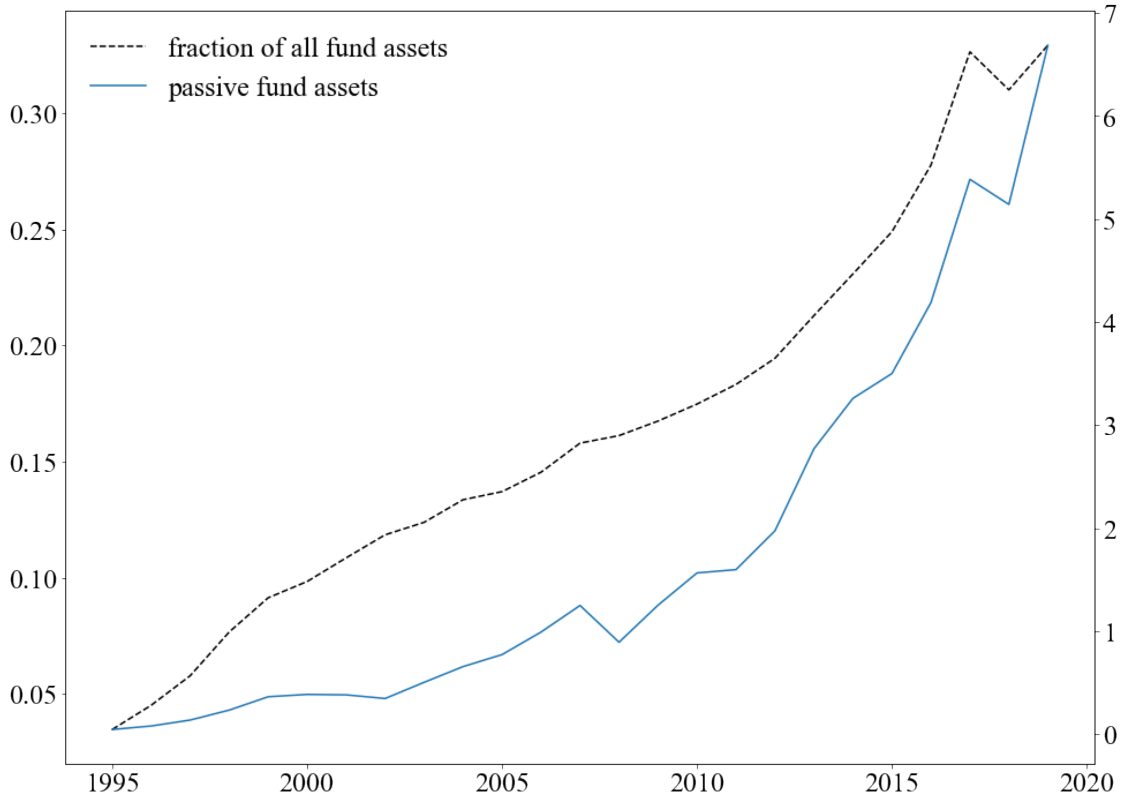
```
#
main_path = r'D:\     '
os.chdir(main_path)

#
params={
        'font.family':'serif',
        'font.serif':'Times New Roman',
        'font.style':'normal', # or italic
        'font.weight':'normal', #or 'blod'
        'font.size': 24,#or large,small
        }
plt.rcParams.update(params)
```

3 empirical study

3.1 Figure 1

[177]:

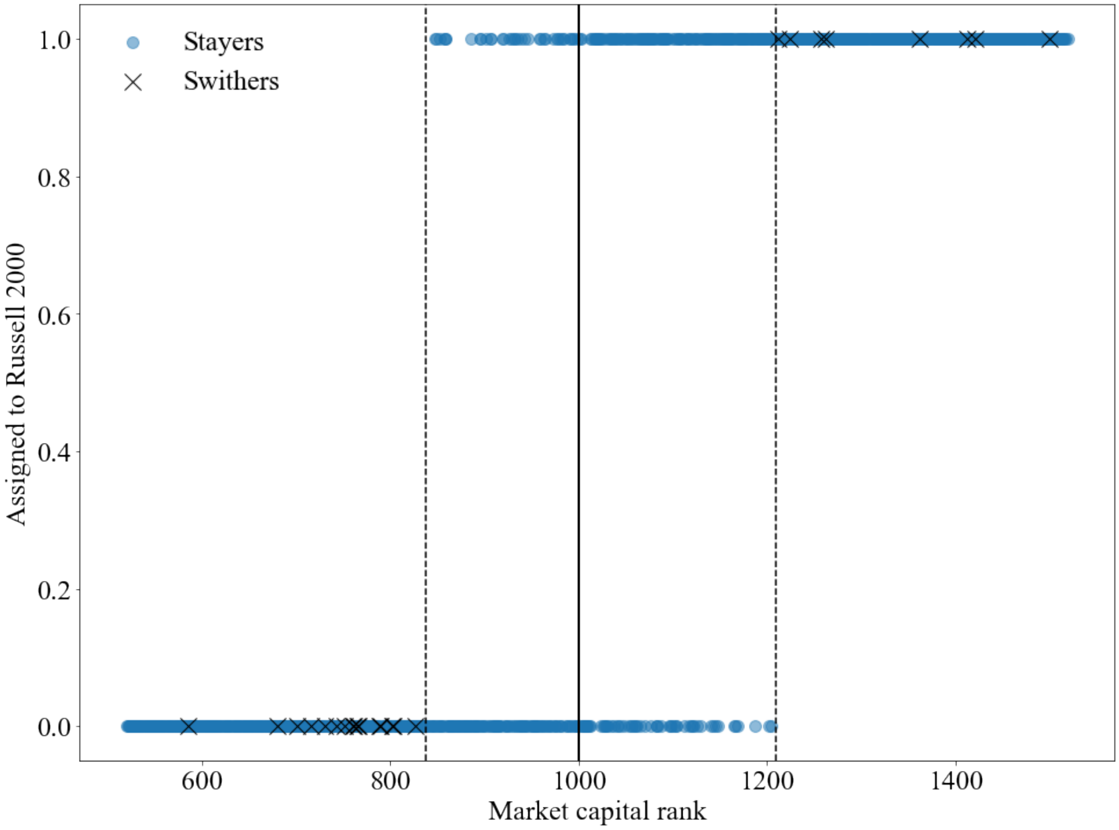
```
df = pd.read_stata('passiveaum.dta')

fig,ax = plt.subplots(figsize=(16,12))
ax2 = ax.twinx()
ax.plot(df['year'], df['frac_index'], '--', color='black', label='fraction of all fund assets')
ax2.plot(df['year'], df['aum1'], label='passive fund assets')
handles1, labels1 = ax.get_legend_handles_labels()
handles2, labels2 = ax2.get_legend_handles_labels()
plt.legend(handles1+handles2, labels1+labels2, framealpha=0)
plt.show()
fig.savefig('figure 1.png',dpi=1000, bbox_inches='tight')
```



3.2 Figure 2

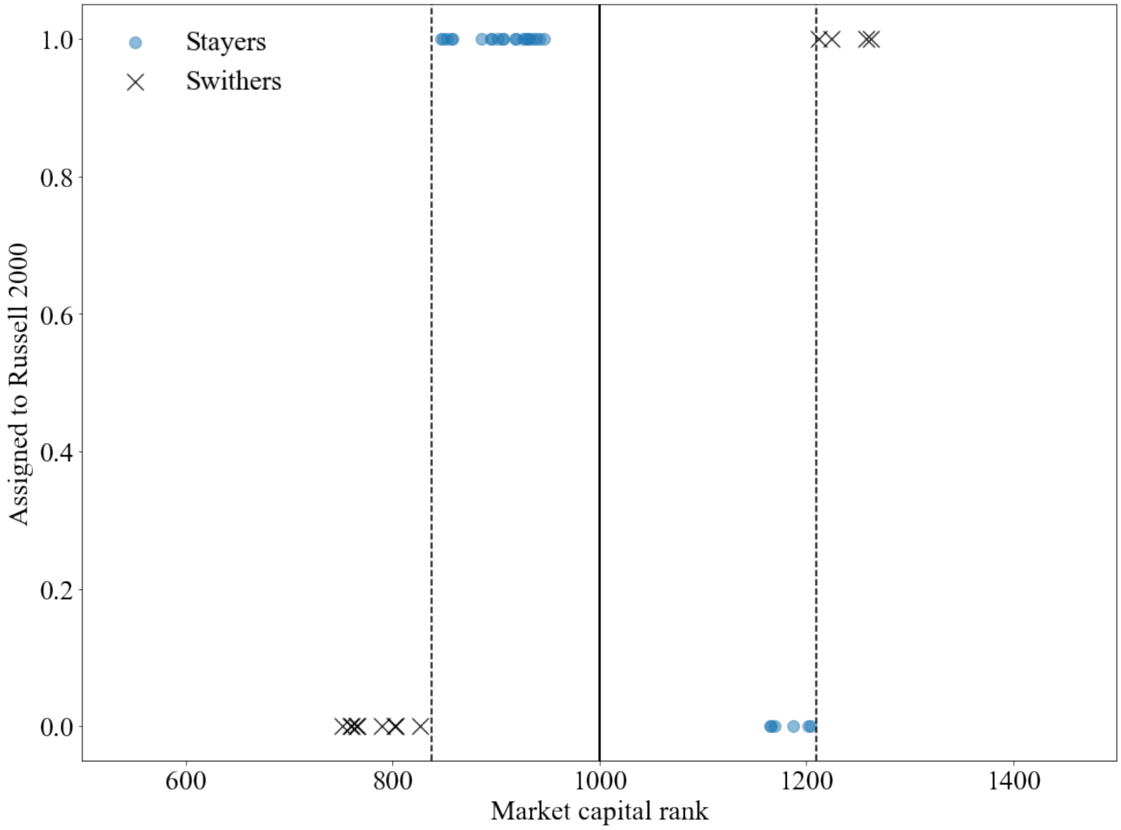
[246]:

```
# 2a
df = pd.read_stata('Russell07.dta')
fig,ax = plt.subplots(figsize=(16,12))
temp1 = df[df.switcher==0]
temp2 = df[df.switcher!=0]
ax.scatter(temp1['caprank'],temp1['R2000'], alpha=0.5, s=100, label='Stayers')
ax.scatter(temp2['caprank'],temp2['R2000'], marker='x', linewidth=1,␣
 ↪color='black', s=200, label='Swithers')
plt.axvline(838, linestyle='--', color='black')
plt.axvline(1210, linestyle='--', color='black')
plt.axvline(1000, linestyle='-', linewidth=2, color='black')
ax.set_xlabel('Market capital rank')
ax.set_ylabel('Assigned to Russell 2000')
plt.legend(framealpha=0)
plt.show()
fig.savefig('figure 2a.png',dpi=1000, bbox_inches='tight')
```



[260]:

```
# 2b
df = pd.read_stata('Russell_sample_100.dta')
df = df[df.year==2007]
df = df[df.cohort==2007]
fig,ax = plt.subplots(figsize=(16,12))
temp1 = df[df.switcher==0]
temp2 = df[df.switcher!=0]
ax.scatter(temp1['caprank'],temp1['R2000'], alpha=0.5, s=100, label='Stayers')
ax.scatter(temp2['caprank'],temp2['R2000'], marker='x', linewidth=1,␣
 ↪color='black', s=200, label='Swithers')
plt.axvline(838, linestyle='--', color='black')
plt.axvline(1210, linestyle='--', color='black')
plt.axvline(1000, linestyle='-', linewidth=2, color='black')
ax.set_xlabel('Market capital rank')
ax.set_ylabel('Assigned to Russell 2000')
ax.set_xlim(500,1500)
plt.legend(framealpha=0, loc='upper left')
plt.show()
fig.savefig('figure 2b.png',dpi=1000, bbox_inches='tight')
```

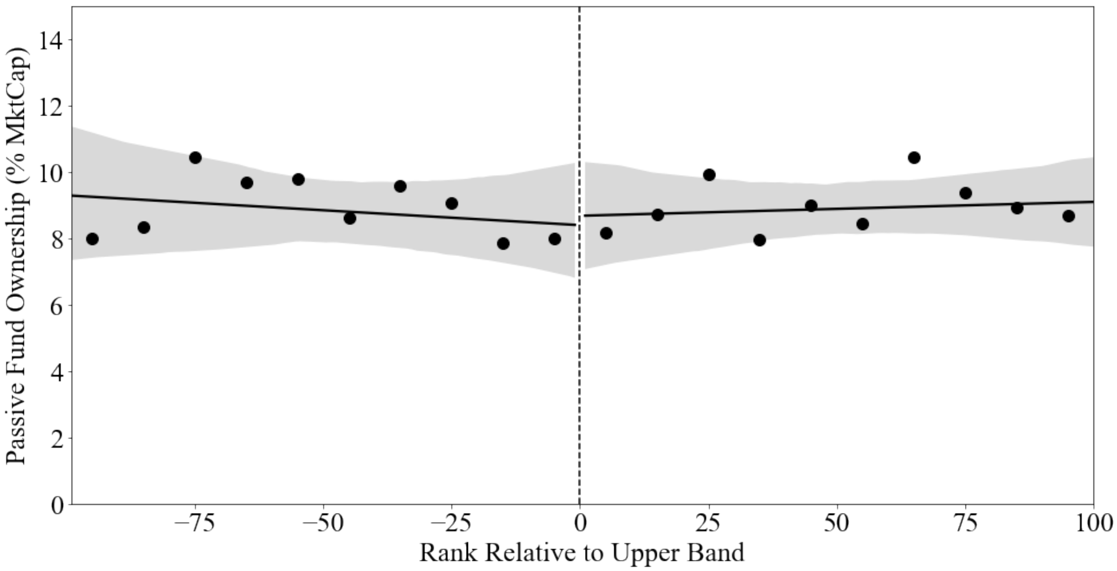


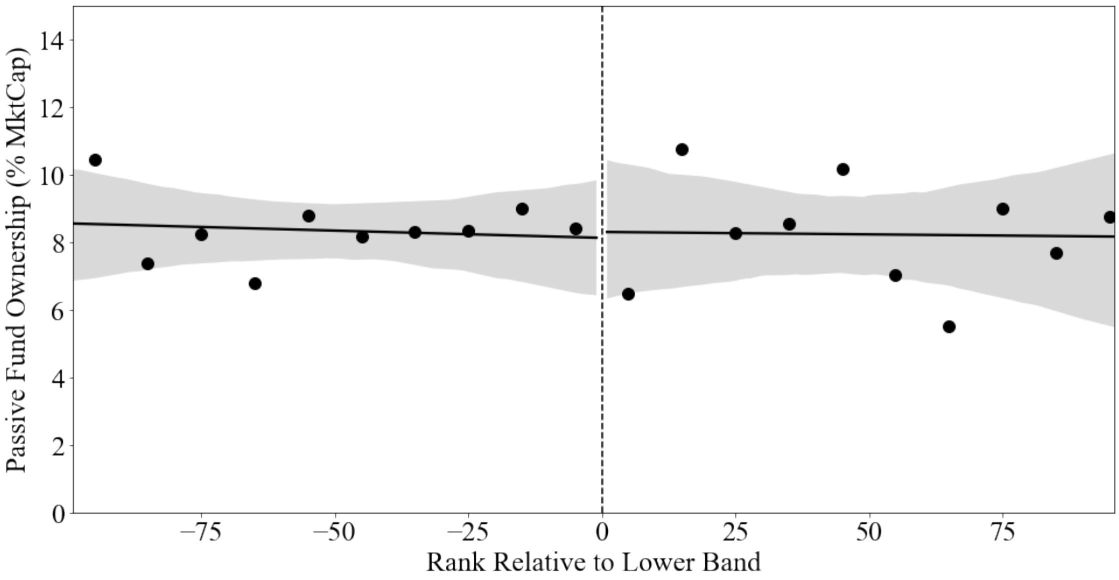
3.3 Figure 3

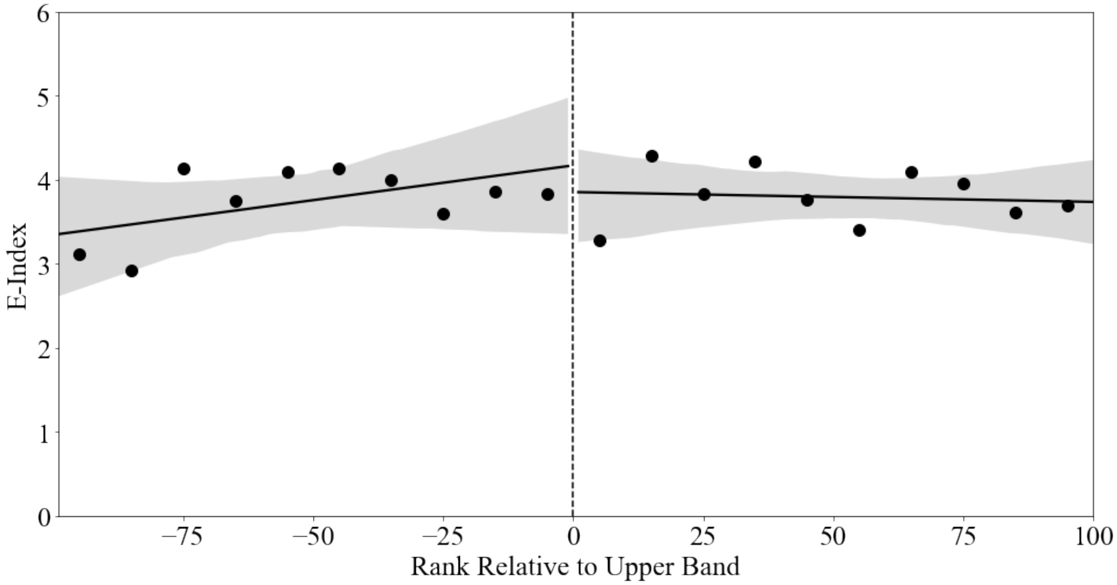
[363]:
```
df = pd.read_stata('Russell_sample_100.dta')
df = df[df.year==(df.cohort - 1)] #     1

# 3a
temp = df[df.upper==1].copy() #
temp['coarse_caprank'] = np.floor(temp.caprank_rel_to_upper / 10) * 10 + 5 #␣
 ↪
temp1 = temp[(temp.caprank_rel_to_upper<0) & (temp.caprank_rel_to_upper>=-100)]
temp2 = temp[(temp.caprank_rel_to_upper>0) & (temp.caprank_rel_to_upper<=100)]
fig,ax = plt.subplots(figsize=(16,8))
sns.regplot(x='caprank_rel_to_upper', y='MFPassive', data=temp1, ci=99,␣
 ↪marker='', color='black')
sns.regplot(x='caprank_rel_to_upper', y='MFPassive', data=temp2, ci=99,␣
 ↪marker='', color='black')
temp = temp[(temp.coarse_caprank <= 100) & (temp.coarse_caprank >= -100)] #␣
 ↪
plt.axvline(0, linestyle='--', color='black')
ax.scatter(temp.groupby('coarse_caprank').mean().index, temp.
 ↪groupby('coarse_caprank').mean()['MFPassive'], color='black', s=100)
ax.set_ylim(0,15)
ax.set_xlabel('Rank Relative to Upper Band')
ax.set_ylabel('Passive Fund Ownership (% MktCap)')
plt.show()
fig.savefig('figure 3a.png',dpi=1000, bbox_inches='tight')

# 3b
temp = df[df.upper==0].copy() #
temp['coarse_caprank'] = np.floor(temp.caprank_rel_to_lower / 10) * 10 + 5 #␣
 ↪
temp1 = temp[(temp.caprank_rel_to_lower<0) & (temp.caprank_rel_to_lower>=-100)]
temp2 = temp[(temp.caprank_rel_to_lower>0) & (temp.caprank_rel_to_lower<=100)]
fig,ax = plt.subplots(figsize=(16,8))
sns.regplot(x='caprank_rel_to_lower', y='MFPassive', data=temp1, ci=99,␣
 ↪marker='', color='black')
sns.regplot(x='caprank_rel_to_lower', y='MFPassive', data=temp2, ci=99,␣
 ↪marker='', color='black')
temp = temp[(temp.coarse_caprank <= 100) & (temp.coarse_caprank >= -100)] #␣
 ↪
plt.axvline(0, linestyle='--', color='black')
ax.scatter(temp.groupby('coarse_caprank').mean().index, temp.
 ↪groupby('coarse_caprank').mean()['MFPassive'], color='black', s=100)
ax.set_ylim(0,15)
ax.set_xlabel('Rank Relative to Lower Band')
ax.set_ylabel('Passive Fund Ownership (% MktCap)')
plt.show()
```

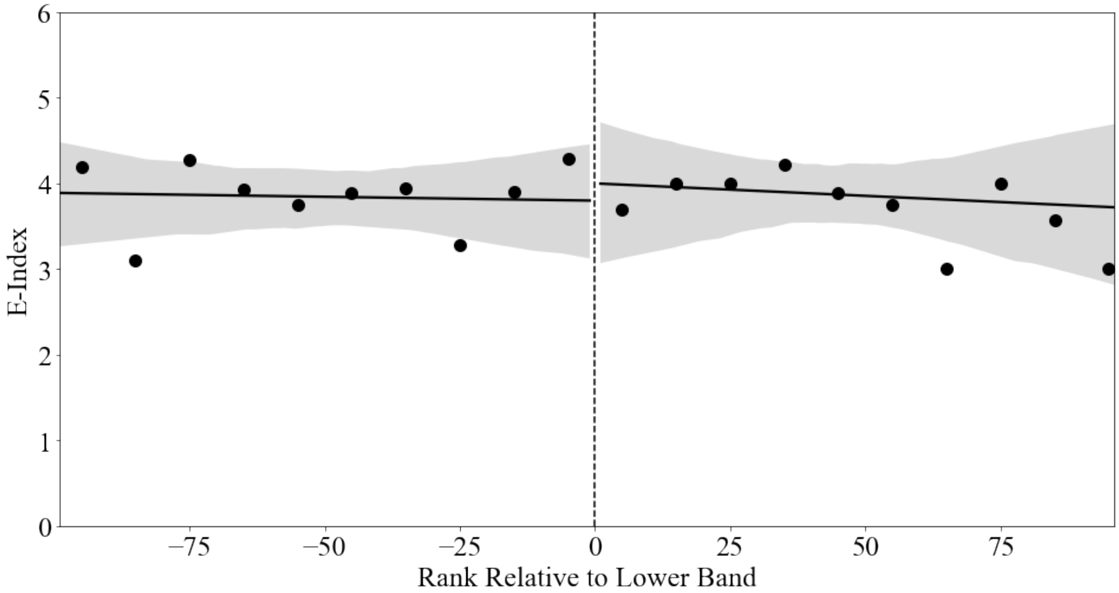
```python
fig.savefig('figure 3b.png',dpi=1000, bbox_inches='tight')

# 3c E index
temp = df[df.upper==1].copy() #
temp['coarse_caprank'] = np.floor(temp.caprank_rel_to_upper / 10) * 10 + 5 #
temp1 = temp[(temp.caprank_rel_to_upper<0) & (temp.caprank_rel_to_upper>=-100)]
temp2 = temp[(temp.caprank_rel_to_upper>0) & (temp.caprank_rel_to_upper<=100)]
fig,ax = plt.subplots(figsize=(16,8))
sns.regplot(x='caprank_rel_to_upper', y='bcf', data=temp1, ci=99, marker='', color='black')
sns.regplot(x='caprank_rel_to_upper', y='bcf', data=temp2, ci=99, marker='', color='black')
temp = temp[(temp.coarse_caprank <= 100) & (temp.coarse_caprank >= -100)] #
plt.axvline(0, linestyle='--', color='black')
ax.scatter(temp.groupby('coarse_caprank').mean().index, temp.groupby('coarse_caprank').mean()['bcf'], color='black', s=100)
ax.set_ylim(0,6)
ax.set_xlabel('Rank Relative to Upper Band')
ax.set_ylabel('E-Index')
plt.show()
fig.savefig('figure 3c.png',dpi=1000, bbox_inches='tight')

# 3d E index
temp = df[df.upper==0].copy() #
temp['coarse_caprank'] = np.floor(temp.caprank_rel_to_lower / 10) * 10 + 5 #
temp1 = temp[(temp.caprank_rel_to_lower<0) & (temp.caprank_rel_to_lower>=-100)]
temp2 = temp[(temp.caprank_rel_to_lower>0) & (temp.caprank_rel_to_lower<=100)]
fig,ax = plt.subplots(figsize=(16,8))
sns.regplot(x='caprank_rel_to_lower', y='bcf', data=temp1, ci=99, marker='', color='black')
sns.regplot(x='caprank_rel_to_lower', y='bcf', data=temp2, ci=99, marker='', color='black')
temp = temp[(temp.coarse_caprank <= 100) & (temp.coarse_caprank >= -100)] #
plt.axvline(0, linestyle='--', color='black')
ax.scatter(temp.groupby('coarse_caprank').mean().index, temp.groupby('coarse_caprank').mean()['bcf'], color='black', s=100)
ax.set_ylim(0,6)
ax.set_xlabel('Rank Relative to Lower Band')
ax.set_ylabel('E-Index')
plt.show()
fig.savefig('figure 3d.png',dpi=1000, bbox_inches='tight')
```

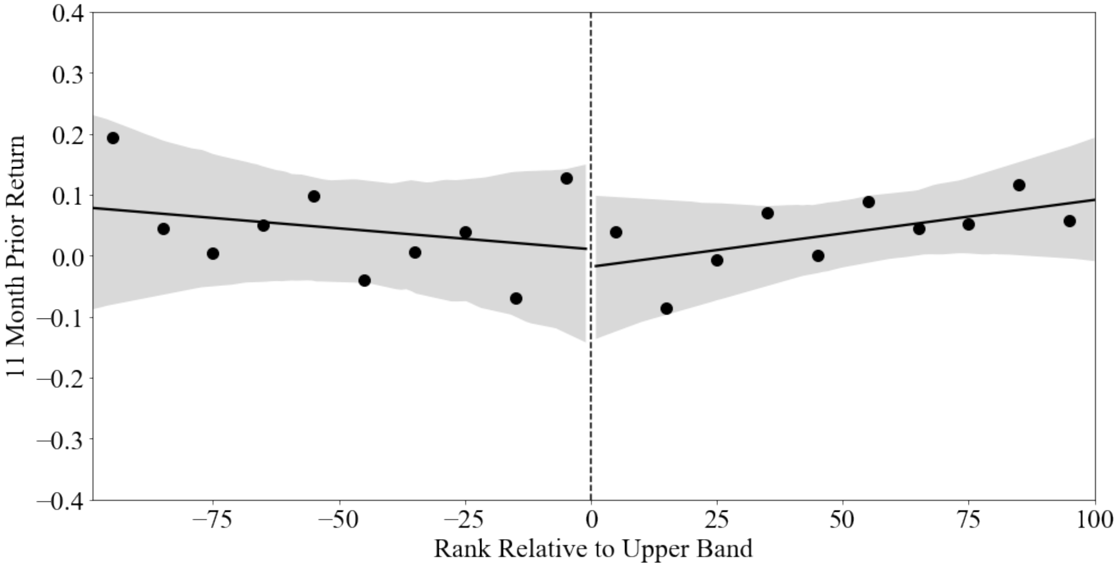
```python
# 3e 11 Month Prior Return
temp = df[df.upper==1].copy() #
temp['coarse_caprank'] = np.floor(temp.caprank_rel_to_upper / 10) * 10 + 5 #
temp1 = temp[(temp.caprank_rel_to_upper<0) & (temp.caprank_rel_to_upper>=-100)]
temp2 = temp[(temp.caprank_rel_to_upper>0) & (temp.caprank_rel_to_upper<=100)]
fig,ax = plt.subplots(figsize=(16,8))
sns.regplot(x='caprank_rel_to_upper', y='rtn_julymay', data=temp1, ci=99, marker='', color='black')
sns.regplot(x='caprank_rel_to_upper', y='rtn_julymay', data=temp2, ci=99, marker='', color='black')
temp = temp[(temp.coarse_caprank <= 100) & (temp.coarse_caprank >= -100)] #
plt.axvline(0, linestyle='--', color='black')
ax.scatter(temp.groupby('coarse_caprank').mean().index, temp.groupby('coarse_caprank').mean()['rtn_julymay'], color='black', s=100)
ax.set_ylim(-0.4,0.4)
ax.set_xlabel('Rank Relative to Upper Band')
ax.set_ylabel('11 Month Prior Return')
plt.show()
fig.savefig('figure 3e.png',dpi=1000, bbox_inches='tight')

# 3f 11 Month Prior Return
temp = df[df.upper==0].copy() #
temp['coarse_caprank'] = np.floor(temp.caprank_rel_to_lower / 10) * 10 + 5 #
temp1 = temp[(temp.caprank_rel_to_lower<0) & (temp.caprank_rel_to_lower>=-100)]
temp2 = temp[(temp.caprank_rel_to_lower>0) & (temp.caprank_rel_to_lower<=100)]
fig,ax = plt.subplots(figsize=(16,8))
sns.regplot(x='caprank_rel_to_lower', y='rtn_julymay', data=temp1, ci=99, marker='', color='black')
sns.regplot(x='caprank_rel_to_lower', y='rtn_julymay', data=temp2, ci=99, marker='', color='black')
temp = temp[(temp.coarse_caprank <= 100) & (temp.coarse_caprank >= -100)] #
plt.axvline(0, linestyle='--', color='black')
ax.scatter(temp.groupby('coarse_caprank').mean().index, temp.groupby('coarse_caprank').mean()['rtn_julymay'], color='black', s=100)
ax.set_ylim(-0.4,0.4)
ax.set_xlabel('Rank Relative to Lower Band')
ax.set_ylabel('11 Month Prior Return')
plt.show()
fig.savefig('figure 3f.png',dpi=1000, bbox_inches='tight')
```

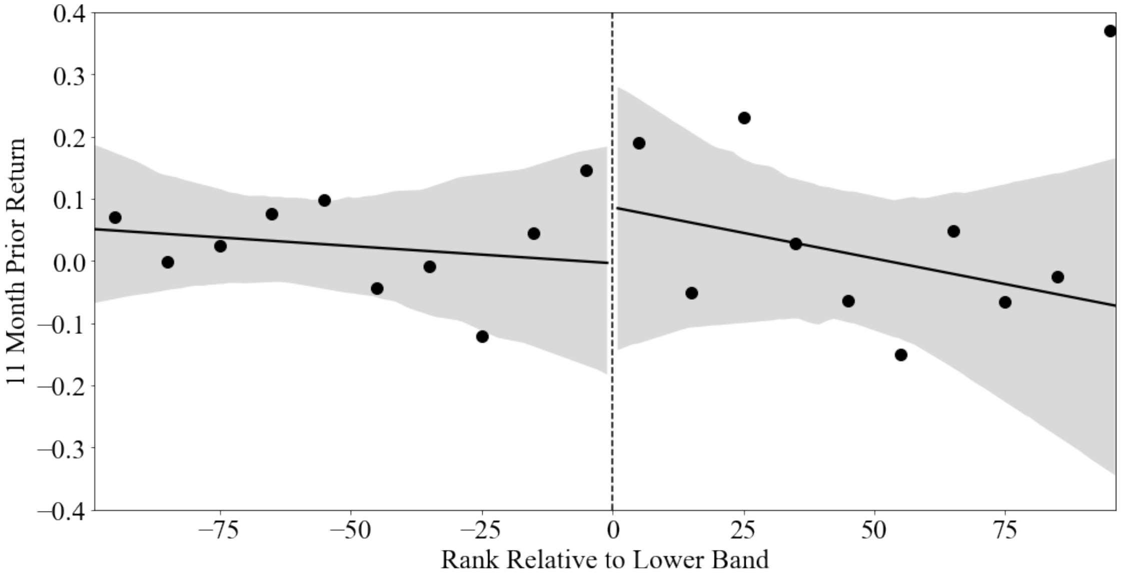

Passive Fund Ownership (% MktCap)
0
2
4
6
8
10
12
14
−75
−50
−25
0
25
50
75
100
Rank Relative to Upper Band


Passive Fund Ownership (% MktCap)
0
2
4
6
8
10
12
14
−75
−50
−25
0
25
50
75
Rank Relative to Lower Band


6
5
4
3
2
1
0
E-Index
−75
−50
−25
0
25
50
75
100
Rank Relative to Upper Band


6
5
4
3
2
1
0
E-Index
−75
−50
−25
0
25
50
75
Rank Relative to Lower Band



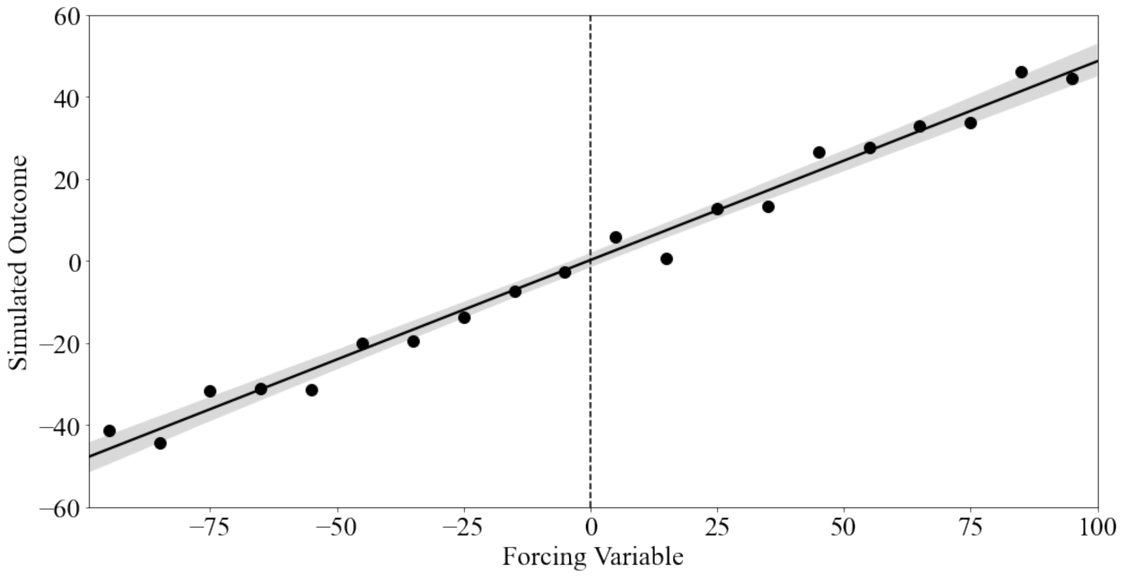


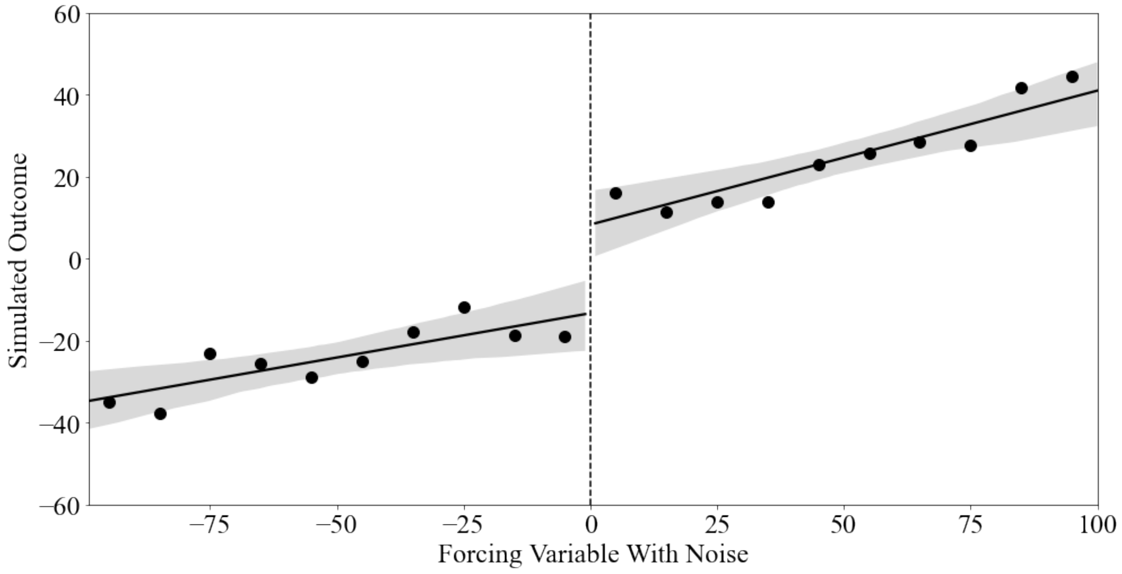
3.4 Figure 4

[371]:

```
df = pd.read_stata('simulated_data.dta')

# 4a
temp = df.copy()
temp = temp[(temp.forcing<=100) & (temp.forcing>=-100)]
temp['coarse_forcing'] = np.floor(temp.forcing / 10) * 10 + 5 #
```

```
fig,ax = plt.subplots(figsize=(16,8))
sns.regplot(x='forcing', y='outcome', data=temp, ci=99, marker='',␣
 ↪color='black')
temp = temp[(temp.coarse_forcing <= 100) & (temp.coarse_forcing >= -100)] #␣
 ↪
ax.scatter(temp.groupby('coarse_forcing').mean().index, temp.
 ↪groupby('coarse_forcing').mean()['outcome'], color='black', s=100)
plt.axvline(0, linestyle='--', color='black')
ax.set_xlabel('Forcing Variable')
ax.set_ylabel('Simulated Outcome')
ax.set_ylim(-60,60)
plt.show()
fig.savefig('figure 4a.png',dpi=1000, bbox_inches='tight')

# 4b
temp = df.copy()
temp1 = temp[(temp.forcing2<0) & (temp.forcing2>=-100)]
temp2 = temp[(temp.forcing2>0) & (temp.forcing2<=100)]
temp['coarse_forcing2'] = np.floor(temp.forcing2 / 10) * 10 + 5 #
fig,ax = plt.subplots(figsize=(16,8))
sns.regplot(x='forcing2', y='outcome', data=temp1, ci=99, marker='',␣
 ↪color='black')
sns.regplot(x='forcing2', y='outcome', data=temp2, ci=99, marker='',␣
 ↪color='black')
temp = temp[(temp.coarse_forcing2 <= 100) & (temp.coarse_forcing2 >= -100)] #␣
 ↪
ax.scatter(temp.groupby('coarse_forcing2').mean().index, temp.
 ↪groupby('coarse_forcing2').mean()['outcome'], color='black', s=100)
plt.axvline(0, linestyle='--', color='black')
ax.set_xlabel('Forcing Variable With Noise')
ax.set_ylabel('Simulated Outcome')
ax.set_ylim(-60,60)
plt.show()
fig.savefig('figure 4b.png',dpi=1000, bbox_inches='tight')
```





3.5 Figure 5

[59]:
```
df = pd.read_stata('Russell_sample_100.dta')
df['rel_year'] = df['year'] - df['cohort']
df = df.groupby(['upper', 'switcher', 'rel_year']).
 ↪agg(['mean','sem'])['passivefund_own_R2000']
df = df.reset_index()
# upper = 1
```

```
temp = df[df['upper']==1].copy()
temp['switcher'] = temp['switcher'].replace(-1,1)
temp.drop(columns=['upper'], inplace=True)
temp = temp.set_index(['rel_year','switcher']).unstack().
 ↪sort_values(by='switcher',axis=1)
temp['upper'] = 1
# upper = 0
temp1 = df[df['upper']==0].copy()
temp1['switcher'] = temp1['switcher'].replace(-1,1)
temp1.drop(columns=['upper'], inplace=True)
temp1 = temp1.set_index(['rel_year','switcher']).unstack().
 ↪sort_values(by='switcher',axis=1)
temp1['upper'] = 0

temp = temp.append(temp1).sort_values(by='upper')
temp.columns = ['mean0','sem0','mean1','sem1','upper']
temp['lb0'] = temp['mean0'] - 2 * temp['sem0']
temp['ub0'] = temp['mean0'] + 2 * temp['sem0']
temp['lb1'] = temp['mean1'] - 2 * temp['sem1']
temp['ub1'] = temp['mean1'] + 2 * temp['sem1']
temp['lower'] = temp['upper']==0
temp.loc[temp.lower==True,'lower2'] = "Lower Band (R1000 {&rarr} R2000)"
temp.loc[temp.lower==False,'lower2'] = "Lower Band (R2000 {&rarr} R1000)"
temp
```

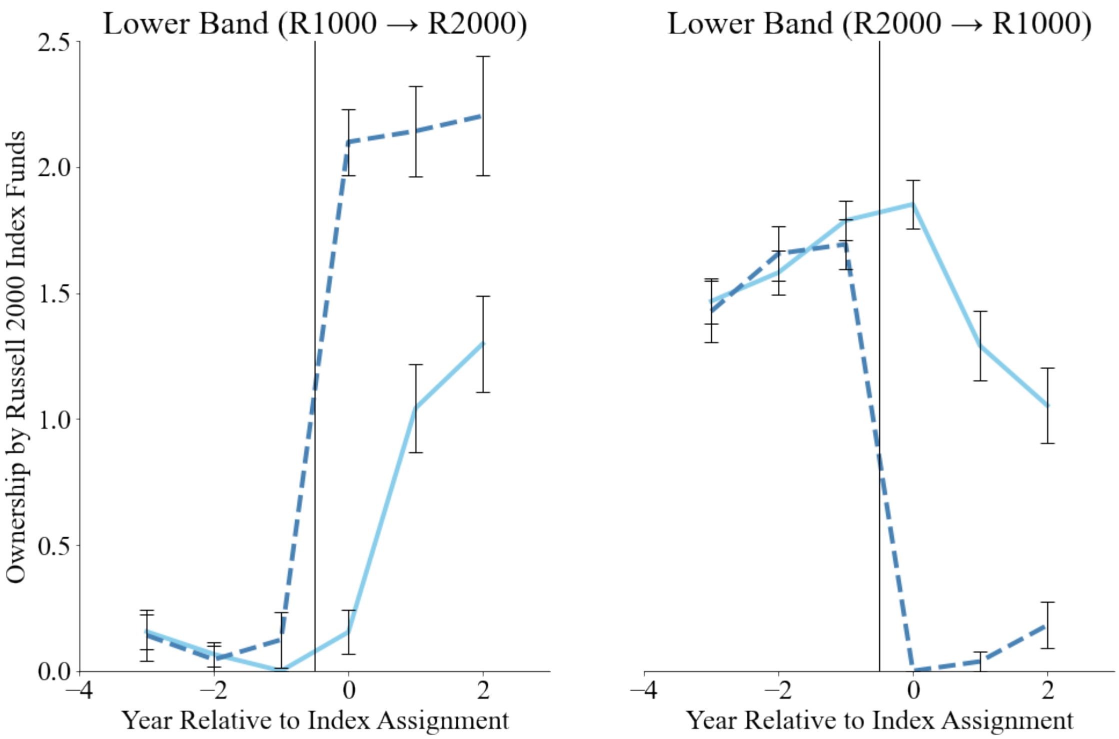
```
[59]:              mean0      sem0     mean1      sem1  upper       lb0       ub0  \
      rel_year
      -3        0.156030  0.035166  0.141302  0.051118      0  0.085697  0.226362
      -2        0.066345  0.024558  0.045150  0.028412      0  0.017230  0.115460
      -1        0.000000  0.000000  0.123961  0.054510      0  0.000000  0.000000
       0        0.154263  0.043493  2.099414  0.065674      0  0.067278  0.241248
       1        1.042622  0.087734  2.142434  0.090097      0  0.867154  1.218089
       2        1.298348  0.095086  2.202878  0.117981      0  1.108175  1.488520
      -3        1.467304  0.044630  1.427165  0.060834      1  1.378045  1.556564
      -2        1.581118  0.043268  1.656058  0.054325      1  1.494582  1.667655
      -1        1.787587  0.039851  1.693187  0.048941      1  1.707884  1.867289
       0        1.851963  0.047595  0.000002  0.000002      1  1.756772  1.947153
       1        1.290208  0.069332  0.037541  0.019472      1  1.151545  1.428872
       2        1.053380  0.075274  0.181435  0.045752      1  0.902832  1.203929

                     lb1       ub1  lower                             lower2
      rel_year
      -3        0.039066  0.243538   True  Lower Band (R1000 {&rarr} R2000)
      -2       -0.011674  0.101974   True  Lower Band (R1000 {&rarr} R2000)
      -1        0.014941  0.232981   True  Lower Band (R1000 {&rarr} R2000)
       0        1.968066  2.230761   True  Lower Band (R1000 {&rarr} R2000)
       1        1.962241  2.322627   True  Lower Band (R1000 {&rarr} R2000)
```

```
 2        1.966915  2.438841   True  Lower Band (R1000 {&rarr} R2000)
-3        1.305497  1.548833  False  Lower Band (R2000 {&rarr} R1000)
-2        1.547408  1.764708  False  Lower Band (R2000 {&rarr} R1000)
-1        1.595305  1.791070  False  Lower Band (R2000 {&rarr} R1000)
 0       -0.000002  0.000006  False  Lower Band (R2000 {&rarr} R1000)
 1       -0.001403  0.076486  False  Lower Band (R2000 {&rarr} R1000)
 2        0.089931  0.272939  False  Lower Band (R2000 {&rarr} R1000)
```

[151]:

```
fig,ax = plt.subplots(1,2,figsize=(16,10))
#
temp1 = temp[temp.lower].copy()
ax[0].plot(temp1.reset_index().rel_year, temp1['mean0'], linewidth=4,␣
 ↪color='skyblue')
ax[0].plot(temp1.reset_index().rel_year, temp1['mean1'], '--', linewidth=4,␣
 ↪color='steelblue')
ax[0].set_xlim(-4,3)
ax[0].set_ylim(0,2.5)
ax[0].spines['right'].set_visible(False)
ax[0].spines['top'].set_visible(False)
ax[0].set_title("Lower Band (R1000 → R2000)")
ax[0].set_xlabel('Year Relative to Index Assignment')
ax[0].set_ylabel('Ownership by Russell 2000 Index Funds')
ax[0].axvline(-0.5, color='black', linewidth=1)
for i in temp1.index: # stayer
    ax[0].axvline(i, color='black', linewidth=1, marker='_', markersize=12,␣
 ↪ymin=temp1.loc[i,'lb0']/2.5, ymax=temp1.loc[i,'ub0']/2.5)
for i in temp1.index: # switcher
    ax[0].axvline(i, color='black', linewidth=1, marker='_', markersize=12,␣
 ↪ymin=temp1.loc[i,'lb1']/2.5, ymax=temp1.loc[i,'ub1']/2.5)
#
temp2 = temp[~temp.lower]
ax[1].plot(temp2.reset_index().rel_year, temp2['mean0'], linewidth=4,␣
 ↪color='skyblue')
ax[1].plot(temp2.reset_index().rel_year, temp2['mean1'], '--', linewidth=4,␣
 ↪color='steelblue')
ax[1].set_xlim(-4,3)
ax[1].set_ylim(0,2.5)
plt.gca().axes.get_yaxis().set_visible(False) # y
ax[1].spines['right'].set_visible(False)
ax[1].spines['left'].set_visible(False)
ax[1].spines['top'].set_visible(False)
ax[1].axvline(-0.5, color='black', linewidth=1)
for i in temp2.index: # stayer
    ax[1].axvline(i, color='black', linewidth=1, marker='_', markersize=12,␣
 ↪ymin=temp2.loc[i,'lb0']/2.5, ymax=temp2.loc[i,'ub0']/2.5)
for i in temp2.index: # switcher
```

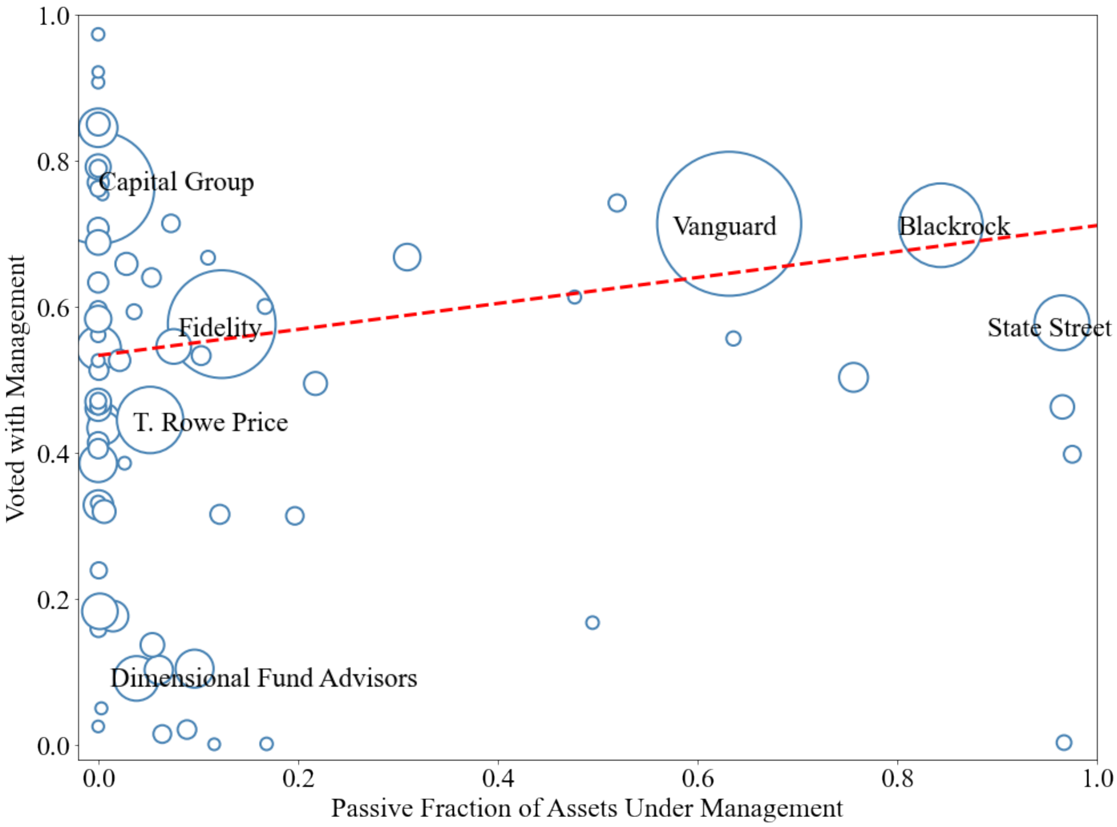
```
    ax[1].axvline(i, color='black', linewidth=1, marker='_', markersize=12,␣
 ↪ymin=temp2.loc[i,'lb1']/2.5, ymax=temp2.loc[i,'ub1']/2.5)

ax[1].set_title("Lower Band (R2000 → R1000)")
ax[1].set_xlabel('Year Relative to Index Assignment')
plt.show()
fig.savefig('figure 5.png',dpi=1000, bbox_inches='tight')
```



3.6 Figure 6

[149]:
```
df = pd.read_stata('fundfamilies.dta')
fig,ax = plt.subplots(figsize=(16,12))
ax.scatter(df['frac_passive'], df['voted_with_mgmt'], s=df['tna_total']/100,␣
 ↪marker='o', color='white', edgecolor='steelblue',linewidth=2)
ax.text(0.575,0.7,"Vanguard", ha='left')
ax.text(0.8,0.7,"Blackrock", ha='left')
ax.text(0.89,0.56, "State Street", ha='left')
ax.text(0.08,0.56, "Fidelity")
ax.text(0.012,0.08, "Dimensional Fund Advisors")
ax.text(0,0.76, "Capital Group")
ax.text(0.035,0.43, "T. Rowe Price")
mod = smf.wls(formula='voted_with_mgmt ~ frac_passive', weights=df.tna_total,␣
 ↪data=df) # WLS
```

```
temp = np.linspace(0,100,100)
temp = pd.DataFrame(temp, columns=['x'])
temp['y'] = mod.fit().params[0] + temp['x'] * mod.fit().params[1]
ax.plot(temp['x'], temp['y'], '--', color='red', linewidth=3)
ax.set_xlim(-0.02,1)
ax.set_ylim(-0.02,1)
ax.set_xlabel('Passive Fraction of Assets Under Management')
ax.set_ylabel('Voted with Management')
plt.show()
fig.savefig('figure 6.png',dpi=1000, bbox_inches='tight')
```



3.7 Table 1

```
[131]: # AUM expense ratio
df = pd.read_stata('fundyear_panel.dta')
temp = df[['tna_latest','exp_ratiow','indexfund']].groupby('indexfund').
 ↪describe(percentiles=[.1,.5,.9]) #  indexfund
#temp2 = df[['tna_latest','exp_ratiow']].describe(percentiles=[.1,.5,.9]) #
#temp2.columns = [0,1] #  stata       0,1
table1 = (temp['tna_latest'].round(0)).append(temp['exp_ratiow'].round(2)) #␣
 ↪latest 0  exp_ratiow 2
```

```
table1.index.name = 'indexfund'

#
df = pd.read_stata('fundholdings_byyear.dta')
temp1 = df[['nholdings','indexfund']].groupby('indexfund').
 ↪describe(percentiles=[.1,.5,.9])
table1 = table1.append(temp1['nholdings'].round(0)).
 ↪sort_values(by='indexfund',ascending=False)
table1['variable'] = ['AUM ($M)','Expense ratio (%)','# stocks hold','AUM␣
 ↪($M)','Expense ratio (%)','# stocks hold']
table1 = table1[['variable','mean','std','10%','50%','90%','count']]

#  indexfund activefund
df = pd.read_stata('fundyear_panel.dta')
print('index fund  {} active fund  {} '.format(len(df[df.
 ↪indexfund==1]['fundid_anon'].drop_duplicates()), len(df[df.
 ↪activefund==1]['fundid_anon'].drop_duplicates())))
table1.to_excel('table1.xlsx')
```

```
index fund  613 active fund  2646
```

3.8 Table 2

[13]:

```
df = pd.read_stata('Russell_sample_100.dta')
temp = df.describe(percentiles=[.1,.5,.9])
temp =␣
 ↪temp[['ME','passivefund_own_R2000','passivefund_own_R1000','MFPassive','MFActive','delta','
    ␣
 ↪'bcf','bcf5','supermajority_req','limitspecialmeet','writtenconsent','dualclass']]
temp.T[['mean','std','10%','50%','90%','count']].to_excel('table 2.xlsx')
```

3.9 Table 3

[68]:

```
def table3_reg(y_name):
    df = pd.read_stata('Russell_sample_100.dta')
    df['firmid_anon#cohort'] = df['firmid_anon'] * df['cohort']
    df.set_index(['firmid_anon#cohort',df.year], inplace=True) #
    X = df[['R1000_to_R2000','R2000_to_R1000']]
    y = df[[y_name]]
    mod = PanelOLS(y, X, entity_effects=True, time_effects=True,␣
 ↪singletons=False)
    res = mod.fit(cov_type='clustered',clusters=df[['firmid_anon','year']])
    return res
```

[70]:

```
# index own 2000
table3_reg('passivefund_own_R2000')
```

```
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 1 singleton observations dropped
  warn.warn(
```

[70]:

```
                          PanelOLS Estimation Summary
================================================================================
===
Dep. Variable:     passivefund_own_R2000   R-squared:
0.3209
Estimator:                      PanelOLS   R-squared (Between):
-0.2171
No. Observations:                   4649   R-squared (Within):
0.2977
Date:                   Sat, Jun 12 2021   R-squared (Overall):
-0.0607
Time:                           16:24:49   Log-likelihood
-4888.1
Cov. Estimator:                Clustered
                                           F-statistic:
900.08
Entities:                            824   P-value
0.0000
Avg Obs:                          5.6420   Distribution:
F(2,3809)
Min Obs:                          2.0000
Max Obs:                          6.0000   F-statistic (robust):
186.28
                                           P-value
0.0000
Time periods:                         15   Distribution:
F(2,3809)
Avg Obs:                          309.93
Min Obs:                          39.000
Max Obs:                          504.00

                             Parameter Estimates
================================================================================
==
                Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper
CI
--------------------------------------------------------------------------------
--
R1000_to_R2000     1.7181     0.1453     11.824     0.0000      1.4332
2.0030
R2000_to_R1000    -1.6300     0.0888    -18.348     0.0000     -1.8042
-1.4559
================================================================================
==

F-test for Poolability: 5.4117
P-value: 0.0000
Distribution: F(837,3809)

Included effects: Entity, Time
PanelEffectsResults, id: 0x16c1aa532b0
```

[71]:
```
# index own 1000
table3_reg('passivefund_own_R1000')
```

```
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 1 singleton observations dropped
  warn.warn(
```

[71]:
```
                            PanelOLS Estimation Summary
================================================================================
===
Dep. Variable:     passivefund_own_R1000   R-squared:
0.3387
Estimator:                      PanelOLS   R-squared (Between):
0.0012
No. Observations:                   4649   R-squared (Within):
0.3525
Date:                   Sat, Jun 12 2021   R-squared (Overall):
0.1489
Time:                           16:25:04   Log-likelihood
4728.6
Cov. Estimator:                Clustered
                                           F-statistic:
975.24
Entities:                            824   P-value
0.0000
Avg Obs:                          5.6420   Distribution:
F(2,3809)
Min Obs:                          2.0000
Max Obs:                          6.0000   F-statistic (robust):
121.53
                                           P-value
0.0000
Time periods:                         15   Distribution:
F(2,3809)
Avg Obs:                          309.93
Min Obs:                          39.000
Max Obs:                          504.00

                               Parameter Estimates
```

```
================================================================================
==
                 Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper
CI
--------------------------------------------------------------------------------
--
R1000_to_R2000    -0.2141     0.0216    -9.9313     0.0000     -0.2564
-0.1719
R2000_to_R1000     0.2217     0.0143     15.538     0.0000      0.1937
0.2497
================================================================================
==

F-test for Poolability: 5.0986
P-value: 0.0000
Distribution: F(837,3809)

Included effects: Entity, Time
PanelEffectsResults, id: 0x16c1f9b8d60
```

[72]:

```
# index own mfpassive
table3_reg('MFPassive')
```

```
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 1 singleton observations dropped
  warn.warn(
```

[72]:

```
                          PanelOLS Estimation Summary
================================================================================
Dep. Variable:              MFPassive   R-squared:                        0.0299
Estimator:                   PanelOLS   R-squared (Between):             -0.0102
No. Observations:                4649   R-squared (Within):              -0.0106
Date:                Sat, Jun 12 2021   R-squared (Overall):             -0.0104
Time:                        16:25:36   Log-likelihood                   -9884.7
Cov. Estimator:             Clustered
                                        F-statistic:                      58.798
Entities:                         824   P-value                           0.0000
Avg Obs:                       5.6420   Distribution:                  F(2,3809)
Min Obs:                       2.0000
Max Obs:                       6.0000   F-statistic (robust):             17.265
                                        P-value                           0.0000
Time periods:                      15   Distribution:                  F(2,3809)
Avg Obs:                       309.93
Min Obs:                       39.000
Max Obs:                       504.00

                             Parameter Estimates
================================================================================
==
                Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper
CI
--------------------------------------------------------------------------------
--
R1000_to_R2000     1.3119     0.3677     3.5678     0.0004      0.5910
2.0328
R2000_to_R1000    -1.2041     0.2599    -4.6330     0.0000     -1.7136
-0.6945
================================================================================
==

F-test for Poolability: 29.718
P-value: 0.0000
Distribution: F(837,3809)

Included effects: Entity, Time
PanelEffectsResults, id: 0x16c1f9f8ac0
```

[73]:

```python
# index own mfpassive
table3_reg('MFActive')
```

```
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 1 singleton observations dropped
  warn.warn(
```

[73]:

```
                          PanelOLS Estimation Summary
================================================================================
Dep. Variable:               MFActive   R-squared:                        0.0077
Estimator:                   PanelOLS   R-squared (Between):              0.0041
No. Observations:                4649   R-squared (Within):               0.0098
Date:                Sat, Jun 12 2021   R-squared (Overall):              0.0045
Time:                        16:25:47   Log-likelihood                -1.492e+04
Cov. Estimator:             Clustered
                                        F-statistic:                      14.832
Entities:                         824   P-value                           0.0000
Avg Obs:                       5.6420   Distribution:                  F(2,3809)
Min Obs:                       2.0000
Max Obs:                       6.0000   F-statistic (robust):             7.1720
                                        P-value                           0.0008
Time periods:                      15   Distribution:                  F(2,3809)
Avg Obs:                       309.93
Min Obs:                       39.000
Max Obs:                       504.00

                             Parameter Estimates
================================================================================
==
                Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper
CI
--------------------------------------------------------------------------------
--
R1000_to_R2000    -2.2053     0.7960    -2.7706     0.0056     -3.7659
-0.6447
R2000_to_R1000     1.6008     0.6064     2.6398     0.0083      0.4119
2.7896
================================================================================
==

F-test for Poolability: 14.162
P-value: 0.0000
Distribution: F(837,3809)

Included effects: Entity, Time
PanelEffectsResults, id: 0x16c1f9cbb50
```

[74]:

```
# index own mfpassive
table3_reg('allother')
```

```
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 1 singleton observations dropped
  warn.warn(
```

[74]:

```
                          PanelOLS Estimation Summary
================================================================================
Dep. Variable:               allother   R-squared:                        0.0007
Estimator:                   PanelOLS   R-squared (Between):              0.0002
No. Observations:                4649   R-squared (Within):           -1.307e-05
Date:                Sat, Jun 12 2021   R-squared (Overall):              0.0002
Time:                        16:25:57   Log-likelihood                -1.553e+04
Cov. Estimator:             Clustered
                                        F-statistic:                      1.2844
Entities:                         824   P-value                           0.2769
Avg Obs:                       5.6420   Distribution:                  F(2,3809)
Min Obs:                       2.0000
Max Obs:                       6.0000   F-statistic (robust):             0.6447
                                        P-value                           0.5249
Time periods:                      15   Distribution:                  F(2,3809)
Avg Obs:                       309.93
Min Obs:                       39.000
Max Obs:                       504.00

                             Parameter Estimates
================================================================================
==
                Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper
```

```
CI
--------------------------------------------------------------------------------
--
R1000_to_R2000     0.8934     0.9433     0.9471     0.3436     -0.9560
2.7428
R2000_to_R1000    -0.3967     0.7169    -0.5534     0.5801     -1.8023
1.0089
================================================================================
==

F-test for Poolability: 16.442
P-value: 0.0000
Distribution: F(837,3809)

Included effects: Entity, Time
PanelEffectsResults, id: 0x16c1aa66430
```

3.10 Table 4

[43]:

```
df = pd.read_stata('fundvotes.dta')
df = df[['votedyes', 'votedno', 'abstained', 'didnotvote', 'indexfund',␣
 ↪'mgmt_against', 'iss_against']]
indexdf = df[df.indexfund==1].copy() #  index fund
activedf = df[df.indexfund==0].copy() #  active fund
```

[44]:

```
##
#
tabledf = pd.DataFrame()
temp1 = pd.DataFrame(indexdf.sum(),columns=['index fund'])
temp2 = pd.DataFrame(activedf.sum(),columns=['active fund'])
temp = pd.concat([temp1,temp2],axis=1)
temp = temp.loc[['votedyes', 'votedno', 'abstained', 'didnotvote']]
temp = temp / temp.sum()
temp = pd.DataFrame(temp.unstack(), columns=['all']).T
temp['Difference PctYes'] = temp['index fund']['votedyes'] - temp['active␣
 ↪fund']['votedyes']
temp['N'] = df.count()[0]
tabledf = tabledf.append(temp)
tabledf
```

[44]:

```
    index fund                                active fund                    \
      votedyes   votedno abstained didnotvote    votedyes   votedno abstained
all   0.898148  0.066869  0.032586   0.002397     0.88877  0.075739   0.03122

               Difference PctYes         N
    didnotvote
all   0.004271          0.009378  27297366
```

[45]:
```
#   yes yes
temp1 = pd.DataFrame(indexdf[(indexdf.mgmt_against==0) & (indexdf.
 ↪iss_against==0)].sum(),columns=['index fund'])
temp2 = pd.DataFrame(activedf[(activedf.mgmt_against==0) & (activedf.
 ↪iss_against==0)].sum(),columns=['active fund'])
temp = pd.concat([temp1,temp2],axis=1)
temp = temp.loc[['votedyes', 'votedno', 'abstained', 'didnotvote']]
temp = temp / temp.sum()
temp = pd.DataFrame(temp.unstack(), columns=['yes yes']).T
temp['Difference PctYes'] = temp['index fund']['votedyes'] - temp['active␣
 ↪fund']['votedyes']
temp['N'] = indexdf[(indexdf.mgmt_against==0) & (indexdf.iss_against==0)].
 ↪count()[0] + activedf[(activedf.mgmt_against==0) & (activedf.
 ↪iss_against==0)].count()[0]
tabledf = tabledf.append(temp)
tabledf
```

[45]:
```
        index fund                                   active fund            \
          votedyes   votedno abstained didnotvote    votedyes   votedno
all       0.898148  0.066869  0.032586   0.002397    0.888770  0.075739
yes yes   0.948730  0.036646  0.013684   0.000940    0.952452  0.033084

                             Difference PctYes         N
        abstained didnotvote
all      0.031220   0.004271          0.009378  27297366
yes yes  0.011785   0.002679         -0.003723  24293163
```

[46]:
```
#   yes yes
temp1 = pd.DataFrame(indexdf[(indexdf.mgmt_against==1) & (indexdf.
 ↪iss_against==1)].sum(),columns=['index fund'])
temp2 = pd.DataFrame(activedf[(activedf.mgmt_against==1) & (activedf.
 ↪iss_against==1)].sum(),columns=['active fund'])
temp = pd.concat([temp1,temp2],axis=1)
temp = temp.loc[['votedyes', 'votedno', 'abstained', 'didnotvote']]
temp = temp / temp.sum()
temp = pd.DataFrame(temp.unstack(), columns=['no no']).T
temp['Difference PctYes'] = temp['index fund']['votedyes'] - temp['active␣
 ↪fund']['votedyes']
temp['N'] = indexdf[(indexdf.mgmt_against==1) & (indexdf.iss_against==1)].
 ↪count()[0] + activedf[(activedf.mgmt_against==1) & (activedf.
 ↪iss_against==1)].count()[0]
tabledf = tabledf.append(temp)
tabledf
```

[46]:
```
        index fund                                   active fund            \
          votedyes   votedno abstained didnotvote    votedyes   votedno
all       0.898148  0.066869  0.032586   0.002397    0.888770  0.075739
```

```
yes yes   0.948730  0.036646  0.013684   0.000940    0.952452  0.033084
no no     0.050827  0.826508  0.099179   0.023486    0.053712  0.829371

                               Difference PctYes         N
        abstained didnotvote
all      0.031220   0.004271           0.009378  27297366
yes yes  0.011785   0.002679          -0.003723  24293163
no no    0.101189   0.015728          -0.002885    398666
```

[47]:
```
#   yes no
temp1 = pd.DataFrame(indexdf[(indexdf.mgmt_against==0) & (indexdf.
 ↪iss_against==1)].sum(),columns=['index fund'])
temp2 = pd.DataFrame(activedf[(activedf.mgmt_against==0) & (activedf.
 ↪iss_against==1)].sum(),columns=['active fund'])
temp = pd.concat([temp1,temp2],axis=1)
temp = temp.loc[['votedyes', 'votedno', 'abstained', 'didnotvote']]
temp = temp / temp.sum()
temp = pd.DataFrame(temp.unstack(), columns=['yes no']).T
temp['Difference PctYes'] = temp['index fund']['votedyes'] - temp['active␣
 ↪fund']['votedyes']
temp['N'] = indexdf[(indexdf.mgmt_against==0) & (indexdf.iss_against==1)].
 ↪count()[0] + activedf[(activedf.mgmt_against==0) & (activedf.
 ↪iss_against==1)].count()[0]
tabledf = tabledf.append(temp)
tabledf
```

[47]:
```
        index fund                                    active fund           \
          votedyes   votedno abstained didnotvote    votedyes   votedno
all       0.898148  0.066869  0.032586   0.002397    0.888770  0.075739
yes yes   0.948730  0.036646  0.013684   0.000940    0.952452  0.033084
no no     0.050827  0.826508  0.099179   0.023486    0.053712  0.829371
yes no    0.533978  0.200873  0.247289   0.017860    0.438823  0.248889

                               Difference PctYes         N
        abstained didnotvote
all      0.031220   0.004271           0.009378  27297366
yes yes  0.011785   0.002679          -0.003723  24293163
no no    0.101189   0.015728          -0.002885    398666
yes no   0.286819   0.025469           0.095156   1761341
```

[48]:
```
#   no yes
temp1 = pd.DataFrame(indexdf[(indexdf.mgmt_against==1) & (indexdf.
 ↪iss_against==0)].sum(),columns=['index fund'])
temp2 = pd.DataFrame(activedf[(activedf.mgmt_against==1) & (activedf.
 ↪iss_against==0)].sum(),columns=['active fund'])
temp = pd.concat([temp1,temp2],axis=1)
temp = temp.loc[['votedyes', 'votedno', 'abstained', 'didnotvote']]
temp = temp / temp.sum()
temp = pd.DataFrame(temp.unstack(), columns=['no yes']).T
temp['Difference PctYes'] = temp['index fund']['votedyes'] - temp['active␣
 ↪fund']['votedyes']
temp['N'] = indexdf[(indexdf.mgmt_against==1) & (indexdf.iss_against==0)].
 ↪count()[0] + activedf[(activedf.mgmt_against==1) & (activedf.
 ↪iss_against==0)].count()[0]
tabledf = tabledf.append(temp)
tabledf
```

```
[48]:        index fund                                active fund           \
               votedyes   votedno abstained didnotvote    votedyes   votedno
      all      0.898148  0.066869  0.032586   0.002397    0.888770  0.075739
      yes yes  0.948730  0.036646  0.013684   0.000940    0.952452  0.033084
      no no    0.050827  0.826508  0.099179   0.023486    0.053712  0.829371
      yes no   0.533978  0.200873  0.247289   0.017860    0.438823  0.248889
      no yes   0.431135  0.512965  0.054824   0.001076    0.472298  0.467568

                                  Difference PctYes         N
              abstained didnotvote
      all      0.031220   0.004271          0.009378  27297366
      yes yes  0.011785   0.002679         -0.003723  24293163
      no no    0.101189   0.015728         -0.002885    398666
      yes no   0.286819   0.025469          0.095156   1761341
      no yes   0.057004   0.003130         -0.041163    844196
```

```
[51]: tabledf.round(3).to_excel('table 4.xlsx')
```

3.11 Table 5

```
[173]: #
df = pd.read_stata('fundvotes.dta')
df = df[df.contentious_vote==1]  #
df['activefund'] = (df['indexfund']==0)
df.set_index([df.firmid_anon2, df.year], inplace=True) #
X = df[['indexfund']]
y = df[['voted_with_mgmt']]
mod = PanelOLS(y, X, entity_effects=True, time_effects=True, singletons=False)
res = mod.fit(cov_type='clustered',clusters=df[['fundid_anon2','firmid_anon2']])
res.summary
```

```
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 97 singleton observations dropped
  warn.warn(
```

```
[173]: <class 'linearmodels.compat.statsmodels.Summary'>
"""
                            PanelOLS Estimation Summary
```

```
================================================================================
Dep. Variable:          voted_with_mgmt   R-squared:                        0.0092
Estimator:                     PanelOLS   R-squared (Between):              0.1728
No. Observations:               2601806   R-squared (Within):               0.0093
Date:                  Sun, Jun 13 2021   R-squared (Overall):              0.0768
Time:                          13:02:30   Log-likelihood                -1.804e+06
Cov. Estimator:               Clustered
                                          F-statistic:                   2.417e+04
Entities:                          5590   P-value                           0.0000
Avg Obs:                         465.44   Distribution:                F(1,2596201)
Min Obs:                         2.0000
Max Obs:                      2.843e+04   F-statistic (robust):             17.794
                                          P-value                           0.0000
Time periods:                        15   Distribution:                F(1,2596201)
Avg Obs:                      1.735e+05
Min Obs:                         8210.0
Max Obs:                       2.82e+05

                             Parameter Estimates
==============================================================================
            Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper CI
------------------------------------------------------------------------------
indexfund      0.1006     0.0238     4.2183     0.0000      0.0538      0.1473
==============================================================================

F-test for Poolability: 28.846
P-value: 0.0000
Distribution: F(5603,2596201)

Included effects: Entity, Time
"""
```

```
[176]: #
       df['exp_ratiow#indexfund'] = df['exp_ratiow'] * df['indexfund']
       df['exp_ratiow#activefund'] = df['exp_ratiow'] * df['activefund']
       X = df[['indexfund','exp_ratiow#indexfund','exp_ratiow#activefund']]
       y = df[['voted_with_mgmt']]
       mod = PanelOLS(y, X, entity_effects=True, time_effects=True, singletons=False)
       res = mod.fit(cov_type='clustered',clusters=df[['fundid_anon2','firmid_anon2']])
       res.summary
```

```
[176]: <class 'linearmodels.compat.statsmodels.Summary'>
       """
                                 PanelOLS Estimation Summary
       ================================================================================
       Dep. Variable:          voted_with_mgmt   R-squared:                        0.0204
       Estimator:                     PanelOLS   R-squared (Between):              0.1841
```

```
No. Observations:             2601806   R-squared (Within):               0.0206
Date:                Sun, Jun 13 2021   R-squared (Overall):              0.0831
Time:                        13:11:09   Log-likelihood                  -1.789e+06
Cov. Estimator:             Clustered
                                        F-statistic:                   1.805e+04
Entities:                        5590   P-value                           0.0000
Avg Obs:                       465.44   Distribution:                F(3,2596199)
Min Obs:                       2.0000
Max Obs:                    2.843e+04   F-statistic (robust):             12.170
                                        P-value                           0.0000
Time periods:                      15   Distribution:                F(3,2596199)
Avg Obs:                    1.735e+05
Min Obs:                       8210.0
Max Obs:                     2.82e+05

                                 Parameter Estimates
================================================================================
=========
                       Parameter  Std. Err.     T-stat    P-value    Lower CI
Upper CI
--------------------------------------------------------------------------------
---------
indexfund                 0.1017     0.0235     4.3287     0.0000      0.0557
0.1478
exp_ratiow#indexfund     -0.2863     0.0619    -4.6243     0.0000     -0.4076
-0.1649
exp_ratiow#activefund    -0.0225     0.0356    -0.6317     0.5276     -0.0922
0.0473
================================================================================
=========

F-test for Poolability: 29.813
P-value: 0.0000
Distribution: F(5603,2596199)

Included effects: Entity, Time
"""
```

[174]:

```
#
df[['firmid_anon2#year']] = df['firmid_anon2'] * df['year']
X = df[['indexfund']]
y = df[['voted_with_mgmt']]
mod = PanelOLS(y, X, entity_effects=False, time_effects=False,␣
 ↪singletons=False, other_effects=df['firmid_anon2#year'])
res = mod.fit(cov_type='clustered',clusters=df[['fundid_anon2','firmid_anon2']])
res.summary
```

```
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
```

```
SingletonWarning: 193 singleton observations dropped
  warn.warn(
```

```
[174]: <class 'linearmodels.compat.statsmodels.Summary'>
"""
                          PanelOLS Estimation Summary
================================================================================
Dep. Variable:        voted_with_mgmt   R-squared:                        0.0093
Estimator:                   PanelOLS   R-squared (Between):              0.1677
No. Observations:             2601710   R-squared (Within):               0.0093
Date:                Sun, Jun 13 2021   R-squared (Overall):              0.0757
Time:                        13:02:54   Log-likelihood                -1.753e+06
Cov. Estimator:             Clustered
                                        F-statistic:                   2.417e+04
Entities:                        5627   P-value                           0.0000
Avg Obs:                       462.36   Distribution:               F(1,2586133)
Min Obs:                       1.0000
Max Obs:                    2.843e+04   F-statistic (robust):             17.388
                                        P-value                           0.0000
Time periods:                      15   Distribution:               F(1,2586133)
Avg Obs:                    1.734e+05
Min Obs:                       8170.0
Max Obs:                     2.82e+05

                             Parameter Estimates
==============================================================================
            Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper CI
------------------------------------------------------------------------------
indexfund      0.0990     0.0237     4.1699     0.0000      0.0525      0.1455
==============================================================================

F-test for Poolability: 17.414
P-value: 0.0000
Distribution: F(15575,2586133)

Included effects: Other Effect (firmid_anon2#year)
Model includes 5 other effects
Other Effect Observations per group (firmid_anon2#year):
Avg Obs: 164.99, Min Obs: 0.0000, Max Obs: 7168.0, Groups: 15769
"""
```

```
[177]: #
X = df[['indexfund','exp_ratiow#indexfund','exp_ratiow#activefund']]
y = df[['voted_with_mgmt']]
mod = PanelOLS(y, X, entity_effects=False, time_effects=False,␣
 ↪singletons=False, other_effects=df['firmid_anon2#year'])
res = mod.fit(cov_type='clustered',clusters=df[['fundid_anon2','firmid_anon2']])
```

```
res.summary
```

[177]:

```
<class 'linearmodels.compat.statsmodels.Summary'>
"""
                          PanelOLS Estimation Summary
================================================================================
Dep. Variable:        voted_with_mgmt   R-squared:                        0.0209
Estimator:                   PanelOLS   R-squared (Between):              0.1781
No. Observations:             2601710   R-squared (Within):               0.0206
Date:                Sun, Jun 13 2021   R-squared (Overall):              0.0818
Time:                        13:11:29   Log-likelihood                -1.737e+06
Cov. Estimator:             Clustered
                                        F-statistic:                   1.836e+04
Entities:                        5627   P-value                           0.0000
Avg Obs:                       462.36   Distribution:               F(3,2586131)
Min Obs:                       1.0000
Max Obs:                    2.843e+04   F-statistic (robust):             12.023
                                        P-value                           0.0000
Time periods:                      15   Distribution:               F(3,2586131)
Avg Obs:                    1.734e+05
Min Obs:                       8170.0
Max Obs:                     2.82e+05

                                   Parameter Estimates
================================================================================
=========
                       Parameter  Std. Err.     T-stat    P-value    Lower CI
Upper CI
--------------------------------------------------------------------------------
---------
indexfund                 0.0999     0.0234     4.2711     0.0000      0.0541
0.1458
exp_ratiow#indexfund     -0.2859     0.0614    -4.6529     0.0000     -0.4063
-0.1655
exp_ratiow#activefund    -0.0228     0.0352    -0.6480     0.5170     -0.0919
0.0462
================================================================================
=========

F-test for Poolability: 17.846
P-value: 0.0000
Distribution: F(15575,2586131)

Included effects: Other Effect (firmid_anon2#year)
Model includes 5 other effects
Other Effect Observations per group (firmid_anon2#year):
Avg Obs: 164.99, Min Obs: 0.0000, Max Obs: 7168.0, Groups: 15769
```

"""

3.12 Table 6

[183]:
```
#
df = pd.read_stata('fundvotes.dta')
df = df[df.contentious_vote==1] #
df[['firmid_anon2#year']] = df['firmid_anon2'] * df['year']
df.set_index([df.firmid_anon2, df.year], inplace=True) #
for vote_type in ['item_board', 'item_compensation', 'item_disclosure',␣
↪'item_E']:
    temp = df[df[vote_type]==1]
    X = temp[['indexfund']]
    y = temp[['voted_with_mgmt']]
    mod = PanelOLS(y, X, entity_effects=False, time_effects=False,␣
↪singletons=False, other_effects=temp['firmid_anon2#year'])
    res = mod.
↪fit(cov_type='clustered',clusters=temp[['fundid_anon2','firmid_anon2']])
    print(res.summary)
```

```
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 181 singleton observations dropped
  warn.warn(

                          PanelOLS Estimation Summary
================================================================================
Dep. Variable:        voted_with_mgmt   R-squared:                        0.0117
Estimator:                   PanelOLS   R-squared (Between):              0.1743
No. Observations:             1428111   R-squared (Within):               0.0114
Date:                Sun, Jun 13 2021   R-squared (Overall):              0.0927
Time:                        13:39:42   Log-likelihood                -9.552e+05
Cov. Estimator:             Clustered
                                        F-statistic:                   1.685e+04
Entities:                        4619   P-value                           0.0000
Avg Obs:                       309.18   Distribution:               F(1,1417144)
Min Obs:                       1.0000
Max Obs:                     1.73e+04   F-statistic (robust):             15.922
                                        P-value                           0.0001
Time periods:                      15   Distribution:               F(1,1417144)
Avg Obs:                    9.521e+04
Min Obs:                       5444.0
Max Obs:                    1.561e+05

                             Parameter Estimates
==============================================================================
            Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper CI
------------------------------------------------------------------------------
indexfund      0.1094     0.0274     3.9903     0.0001      0.0557      0.1631
```

```
==============================================================================

F-test for Poolability: 14.373
P-value: 0.0000
Distribution: F(10965,1417144)

Included effects: Other Effect (firmid_anon2#year)
Model includes 5 other effects
Other Effect Observations per group (firmid_anon2#year):
Avg Obs: 128.12, Min Obs: 0.0000, Max Obs: 5058.0, Groups: 11147

D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 2 singleton observations dropped
  warn.warn(

                          PanelOLS Estimation Summary
================================================================================
Dep. Variable:        voted_with_mgmt   R-squared:                        0.0105
Estimator:                   PanelOLS   R-squared (Between):              0.1422
No. Observations:               35131   R-squared (Within):               0.0106
Date:                Sun, Jun 13 2021   R-squared (Overall):              0.0680
Time:                        13:39:48   Log-likelihood                -2.388e+04
Cov. Estimator:             Clustered
                                        F-statistic:                      370.99
Entities:                         214   P-value                           0.0000
Avg Obs:                       164.16   Distribution:                 F(1,34856)
Min Obs:                       2.0000
Max Obs:                       2516.0   F-statistic (robust):             13.080
                                        P-value                           0.0003
Time periods:                      15   Distribution:                 F(1,34856)
Avg Obs:                       2342.1
Min Obs:                       126.00
Max Obs:                       7811.0

                             Parameter Estimates
==============================================================================
            Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper CI
------------------------------------------------------------------------------
indexfund      0.1136     0.0314     3.6167     0.0003      0.0520      0.1751
==============================================================================

F-test for Poolability: 6.1292
P-value: 0.0000
Distribution: F(273,34856)

Included effects: Other Effect (firmid_anon2#year)
Model includes 5 other effects
Other Effect Observations per group (firmid_anon2#year):
Avg Obs: 127.29, Min Obs: 0.0000, Max Obs: 1106.0, Groups: 276
```

```
                        PanelOLS Estimation Summary
================================================================================
Dep. Variable:        voted_with_mgmt   R-squared:                        0.0035
Estimator:                   PanelOLS   R-squared (Between):              0.0589
No. Observations:              122322   R-squared (Within):               0.0034
Date:                Sun, Jun 13 2021   R-squared (Overall):              0.0346
Time:                        13:39:49   Log-likelihood                -7.856e+04
Cov. Estimator:             Clustered
                                        F-statistic:                      430.62
Entities:                        5479   P-value                           0.0000
Avg Obs:                       22.326   Distribution:                F(1,121793)
Min Obs:                       0.0000
Max Obs:                       4126.0   F-statistic (robust):             3.9597
                                        P-value                           0.0466
Time periods:                      15   Distribution:                F(1,121793)
Avg Obs:                       8154.8
Min Obs:                       14.000
Max Obs:                    1.812e+04

                             Parameter Estimates
==============================================================================
            Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper CI
------------------------------------------------------------------------------
indexfund      0.0629     0.0316     1.9899     0.0466      0.0009      0.1248
==============================================================================

F-test for Poolability: 4.8949
P-value: 0.0000
Distribution: F(527,121793)

Included effects: Other Effect (firmid_anon2#year)
Model includes 5 other effects
Other Effect Observations per group (firmid_anon2#year):
Avg Obs: 231.67, Min Obs: 2.0000, Max Obs: 852.00, Groups: 528
```

```
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 11 singleton observations dropped
  warn.warn(
```

```
                        PanelOLS Estimation Summary
================================================================================
Dep. Variable:        voted_with_mgmt   R-squared:                        0.0039
Estimator:                   PanelOLS   R-squared (Between):              0.1335
No. Observations:               80767   R-squared (Within):               0.0043
Date:                Sun, Jun 13 2021   R-squared (Overall):              0.0409
Time:                        13:39:50   Log-likelihood                -3.265e+04
Cov. Estimator:             Clustered
                                        F-statistic:                      315.61
Entities:                         676   P-value                           0.0000
```

```
Avg Obs:                       119.48   Distribution:                  F(1,79863)
Min Obs:                       2.0000
Max Obs:                       2519.0   F-statistic (robust):              7.8399
                                        P-value                            0.0051
Time periods:                      15   Distribution:                  F(1,79863)
Avg Obs:                       5384.5
Min Obs:                       319.00
Max Obs:                    1.024e+04

                             Parameter Estimates
==============================================================================
            Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper CI
------------------------------------------------------------------------------
indexfund      0.0483     0.0173     2.8000     0.0051      0.0145      0.0822
==============================================================================

F-test for Poolability: 13.021
P-value: 0.0000
Distribution: F(902,79863)

Included effects: Other Effect (firmid_anon2#year)
Model includes 5 other effects
Other Effect Observations per group (firmid_anon2#year):
Avg Obs: 88.367, Min Obs: 0.0000, Max Obs: 534.00, Groups: 914
```

3.13 Table 7

[254]:

```python
df = pd.read_stata('blockholding_disclosure.dta')
#
X = df[['frac_passive']]
y = df[['frac_13D']].copy()
threhold = y.median()[0]
y[y>threhold] = 1
y[y<=threhold] = 0
mod = Probit(y, sm.add_constant(X))
res = mod.fit()
print(res.summary())
print(res.get_margeff().summary())

#
X = df[['frac_passive', 'logAUM']]
y = df[['frac_13D']].copy()
threhold = y.median()[0]
y[y>threhold] = 1
y[y<=threhold] = 0
mod = Probit(y, sm.add_constant(X))
res = mod.fit()
```

```python
print(res.summary())
print(res.get_margeff().summary())
#
X = df[['frac_passive', 'n_blocks']]
y = df[['frac_13D']].copy()
threhold = y.median()[0]
y[y>threhold] = 1
y[y<=threhold] = 0
mod = Probit(y, sm.add_constant(X))
res = mod.fit()
print(res.summary())
print(res.get_margeff().summary())
# lf=LabelEncoder().fit(df['mgmt_cd'])
# df['mgmt_label'] = lf.transform(df['mgmt_cd'])
# cov_type='cluster', groups=np.array(df['mgmt_label'])
# mod = PanelOLS(y, X, entity_effects=True, time_effects=True, singletons=False)
```

```
Optimization terminated successfully.
         Current function value: 0.444528
         Iterations 6
                          Probit Regression Results
==============================================================================
Dep. Variable:               frac_13D   No. Observations:                 1070
Model:                         Probit   Df Residuals:                     1068
Method:                           MLE   Df Model:                            1
Date:                Sun, 13 Jun 2021   Pseudo R-squ.:                 0.01229
Time:                        15:24:38   Log-Likelihood:                -475.64
converged:                       True   LL-Null:                       -481.56
Covariance Type:            nonrobust   LLR p-value:                 0.0005802
================================================================================
                   coef    std err          z      P>|z|      [0.025      0.975]
--------------------------------------------------------------------------------
const           -0.9247      0.047    -19.593      0.000      -1.017      -0.832
frac_passive    -0.9965      0.332     -3.005      0.003      -1.646      -0.347
================================================================================
       Probit Marginal Effects
=====================================
Dep. Variable:               frac_13D
Method:                          dydx
At:                           overall
================================================================================
                  dy/dx    std err          z      P>|z|      [0.025      0.975]
--------------------------------------------------------------------------------
frac_passive    -0.2459      0.082     -3.010      0.003      -0.406      -0.086
================================================================================
Optimization terminated successfully.
         Current function value: 0.443178
         Iterations 6
```

```
                          Probit Regression Results
==============================================================================
Dep. Variable:               frac_13D   No. Observations:                 1070
Model:                         Probit   Df Residuals:                     1067
Method:                           MLE   Df Model:                            2
Date:                Sun, 13 Jun 2021   Pseudo R-squ.:                 0.01529
Time:                        15:24:38   Log-Likelihood:                -474.20
converged:                       True   LL-Null:                       -481.56
Covariance Type:            nonrobust   LLR p-value:                 0.0006339
================================================================================
                   coef    std err          z      P>|z|      [0.025      0.975]
--------------------------------------------------------------------------------
const           -0.5438      0.229     -2.378      0.017      -0.992      -0.096
frac_passive    -0.9050      0.331     -2.737      0.006      -1.553      -0.257
logAUM          -0.0423      0.025     -1.696      0.090      -0.091       0.007
================================================================================
       Probit Marginal Effects
=====================================
Dep. Variable:               frac_13D
Method:                          dydx
At:                           overall
================================================================================
                  dy/dx    std err          z      P>|z|      [0.025      0.975]
--------------------------------------------------------------------------------
frac_passive    -0.2225      0.081     -2.740      0.006      -0.382      -0.063
logAUM          -0.0104      0.006     -1.700      0.089      -0.022       0.002
================================================================================
Optimization terminated successfully.
         Current function value: 0.443931
         Iterations 6
                          Probit Regression Results
==============================================================================
Dep. Variable:               frac_13D   No. Observations:                 1070
Model:                         Probit   Df Residuals:                     1067
Method:                           MLE   Df Model:                            2
Date:                Sun, 13 Jun 2021   Pseudo R-squ.:                 0.01362
Time:                        15:24:38   Log-Likelihood:                -475.01
converged:                       True   LL-Null:                       -481.56
Covariance Type:            nonrobust   LLR p-value:                  0.001419
================================================================================
                   coef    std err          z      P>|z|      [0.025      0.975]
--------------------------------------------------------------------------------
const           -0.9415      0.050    -19.007      0.000      -1.039      -0.844
frac_passive    -1.0258      0.335     -3.062      0.002      -1.682      -0.369
n_blocks         0.0003      0.000      1.165      0.244      -0.000       0.001
================================================================================
       Probit Marginal Effects
=====================================
Dep. Variable:               frac_13D
Method:                          dydx
At:                           overall
================================================================================
                  dy/dx    std err          z      P>|z|      [0.025      0.975]
--------------------------------------------------------------------------------
frac_passive    -0.2527      0.082     -3.068      0.002      -0.414      -0.091
n_blocks      7.912e-05   6.78e-05      1.167      0.243   -5.38e-05       0.000
================================================================================
```

3.14 Table 8

[259]:

```
# table 8a management proposals
df = pd.read_stata('fundvotes.dta')
df = df[df.contentious_vote==1] #
df[['firmid_anon2#year']] = df['firmid_anon2'] * df['year']
df.set_index([df.firmid_anon2, df.year], inplace=True) #
for y_name in ['votedyes', 'votedno', 'abstained']:
    df = df[df['shprop']==0] # management proposals
    X = df[['indexfund']]
    y = df[[y_name]]
    mod = PanelOLS(y, X, entity_effects=False, time_effects=False,␣
 ↪singletons=False, other_effects=df['firmid_anon2#year'])
    res = mod.
 ↪fit(cov_type='clustered',clusters=df[['fundid_anon2','firmid_anon2']])
    print('*******************************************' + y_name +␣
 ↪'*******************************************')
    print(res.summary)
```

```
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 203 singleton observations dropped
  warn.warn(
```

```
*******************************************votedyes*****************************
**************
                          PanelOLS Estimation Summary
================================================================================
Dep. Variable:               votedyes   R-squared:                        0.0133
Estimator:                   PanelOLS   R-squared (Between):              0.1942
No. Observations:             1738874   R-squared (Within):               0.0130
Date:                Sun, Jun 13 2021   R-squared (Overall):              0.1010
Time:                        15:31:39   Log-likelihood                -1.166e+06
Cov. Estimator:             Clustered
                                        F-statistic:                   2.332e+04
Entities:                        5456   P-value                           0.0000
Avg Obs:                       318.71   Distribution:               F(1,1724993)
Min Obs:                       1.0000
Max Obs:                    1.924e+04   F-statistic (robust):             16.489
```

```
                                        P-value                           0.0000
Time periods:                      15   Distribution:               F(1,1724993)
Avg Obs:                    1.159e+05
Min Obs:                       5638.0
Max Obs:                    2.046e+05

                             Parameter Estimates
==============================================================================
            Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper CI
------------------------------------------------------------------------------
indexfund      0.1161     0.0286     4.0606     0.0000      0.0600      0.1721
==============================================================================

F-test for Poolability: 13.034
P-value: 0.0000
Distribution: F(13879,1724993)

Included effects: Other Effect (firmid_anon2#year)
Model includes 5 other effects
Other Effect Observations per group (firmid_anon2#year):
Avg Obs: 123.47, Min Obs: 0.0000, Max Obs: 5376.0, Groups: 14083

D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 203 singleton observations dropped
  warn.warn(

*******************************************votedno******************************
*************
                          PanelOLS Estimation Summary
================================================================================
Dep. Variable:                votedno   R-squared:                        0.0034
Estimator:                   PanelOLS   R-squared (Between):             -0.0854
No. Observations:             1738874   R-squared (Within):               0.0024
Date:                Sun, Jun 13 2021   R-squared (Overall):             -0.0362
Time:                        15:31:56   Log-likelihood                 -6.14e+05
Cov. Estimator:             Clustered
                                        F-statistic:                      5940.5
Entities:                        5456   P-value                           0.0000
Avg Obs:                       318.71   Distribution:               F(1,1724993)
Min Obs:                       1.0000
Max Obs:                    1.924e+04   F-statistic (robust):             16.033
                                        P-value                           0.0001
Time periods:                      15   Distribution:               F(1,1724993)
Avg Obs:                    1.159e+05
Min Obs:                       5638.0
Max Obs:                    2.046e+05

                             Parameter Estimates
==============================================================================
            Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper CI
------------------------------------------------------------------------------
indexfund     -0.0426     0.0106    -4.0042     0.0001     -0.0635     -0.0218
==============================================================================

F-test for Poolability: 58.865
P-value: 0.0000
Distribution: F(13879,1724993)

Included effects: Other Effect (firmid_anon2#year)
Model includes 5 other effects
Other Effect Observations per group (firmid_anon2#year):
Avg Obs: 123.47, Min Obs: 0.0000, Max Obs: 5376.0, Groups: 14083
```

```
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 203 singleton observations dropped
  warn.warn(
```

```
*******************************************abstained****************************
***************
                          PanelOLS Estimation Summary
================================================================================
Dep. Variable:              abstained   R-squared:                        0.0068
Estimator:                   PanelOLS   R-squared (Between):             -0.1496
No. Observations:             1738874   R-squared (Within):               0.0071
Date:                Sun, Jun 13 2021   R-squared (Overall):             -0.0600
Time:                        15:32:13   Log-likelihood                -7.769e+05
Cov. Estimator:             Clustered
                                        F-statistic:                   1.177e+04
Entities:                        5456   P-value                           0.0000
Avg Obs:                       318.71   Distribution:               F(1,1724993)
Min Obs:                       1.0000
Max Obs:                    1.924e+04   F-statistic (robust):             13.697
                                        P-value                           0.0002
Time periods:                      15   Distribution:               F(1,1724993)
Avg Obs:                    1.159e+05
Min Obs:                       5638.0
Max Obs:                    2.046e+05

                             Parameter Estimates
==============================================================================
            Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper CI
------------------------------------------------------------------------------
indexfund     -0.0659     0.0178    -3.7009     0.0002     -0.1008     -0.0310
==============================================================================

F-test for Poolability: 47.309
P-value: 0.0000
Distribution: F(13879,1724993)
```

```
Included effects: Other Effect (firmid_anon2#year)
Model includes 5 other effects
Other Effect Observations per group (firmid_anon2#year):
Avg Obs: 123.47, Min Obs: 0.0000, Max Obs: 5376.0, Groups: 14083
```

[260]:

```
# table 8a shareholders proposals
df = pd.read_stata('fundvotes.dta')
df = df[df.contentious_vote==1] #
df[['firmid_anon2#year']] = df['firmid_anon2'] * df['year']
df.set_index([df.firmid_anon2, df.year], inplace=True) #
for y_name in ['votedyes', 'votedno', 'abstained']:
    df = df[df['shprop']==1] # shareholders proposals
    X = df[['indexfund']]
    y = df[[y_name]]
    mod = PanelOLS(y, X, entity_effects=False, time_effects=False,␣
 ↪singletons=False, other_effects=df['firmid_anon2#year'])
    res = mod.
 ↪fit(cov_type='clustered',clusters=df[['fundid_anon2','firmid_anon2']])
    print('*******************************************' + y_name +␣
 ↪'*******************************************')
    print(res.summary)
```

```
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 5 singleton observations dropped
  warn.warn(

*******************************************votedyes*****************************
**************
                          PanelOLS Estimation Summary
================================================================================
Dep. Variable:               votedyes   R-squared:                        0.0039
Estimator:                   PanelOLS   R-squared (Between):             -0.0859
No. Observations:              862821   R-squared (Within):               0.0040
Date:                Sun, Jun 13 2021   R-squared (Overall):             -0.0378
Time:                        15:39:26   Log-likelihood                 -5.68e+05
Cov. Estimator:             Clustered
                                        F-statistic:                      3338.1
Entities:                        1120   P-value                           0.0000
Avg Obs:                       770.38   Distribution:                F(1,859462)
Min Obs:                       1.0000
Max Obs:                    1.875e+04   F-statistic (robust):             7.9822
                                        P-value                           0.0047
Time periods:                      15   Distribution:                F(1,859462)
Avg Obs:                    5.752e+04
Min Obs:                       2524.0
Max Obs:                    1.056e+05
```

```
                             Parameter Estimates
==============================================================================
            Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper CI
------------------------------------------------------------------------------
indexfund     -0.0664     0.0235    -2.8253     0.0047     -0.1125     -0.0203
==============================================================================

F-test for Poolability: 33.783
P-value: 0.0000
Distribution: F(3357,859462)

Included effects: Other Effect (firmid_anon2#year)
Model includes 5 other effects
Other Effect Observations per group (firmid_anon2#year):
Avg Obs: 256.56, Min Obs: 0.0000, Max Obs: 3236.0, Groups: 3363

D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 5 singleton observations dropped
  warn.warn(

*******************************************votedno******************************
*************
                          PanelOLS Estimation Summary
================================================================================
Dep. Variable:                votedno   R-squared:                        0.0040
Estimator:                   PanelOLS   R-squared (Between):              0.1069
No. Observations:              862821   R-squared (Within):               0.0043
Date:                Sun, Jun 13 2021   R-squared (Overall):              0.0391
Time:                        15:39:34   Log-likelihood                -5.825e+05
Cov. Estimator:             Clustered
                                        F-statistic:                      3462.5
Entities:                        1120   P-value                           0.0000
Avg Obs:                       770.38   Distribution:                F(1,859462)
Min Obs:                       1.0000
Max Obs:                    1.875e+04   F-statistic (robust):             9.9115
                                        P-value                           0.0016
Time periods:                      15   Distribution:                F(1,859462)
Avg Obs:                    5.752e+04
Min Obs:                       2524.0
Max Obs:                    1.056e+05

                             Parameter Estimates
==============================================================================
            Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper CI
------------------------------------------------------------------------------
indexfund      0.0688     0.0219     3.1482     0.0016      0.0260      0.1116
==============================================================================

F-test for Poolability: 26.183
```

```
P-value: 0.0000
Distribution: F(3357,859462)

Included effects: Other Effect (firmid_anon2#year)
Model includes 5 other effects
Other Effect Observations per group (firmid_anon2#year):
Avg Obs: 256.56, Min Obs: 0.0000, Max Obs: 3236.0, Groups: 3363

D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 5 singleton observations dropped
  warn.warn(

*******************************************abstained****************************
***************
                          PanelOLS Estimation Summary
================================================================================
Dep. Variable:              abstained   R-squared:                     6.279e-06
Estimator:                   PanelOLS   R-squared (Between):              0.0040
No. Observations:              862821   R-squared (Within):            -4.23e-06
Date:                Sun, Jun 13 2021   R-squared (Overall):              0.0007
Time:                        15:39:42   Log-likelihood                 8.433e+04
Cov. Estimator:             Clustered
                                        F-statistic:                      5.3970
Entities:                        1120   P-value                           0.0202
Avg Obs:                       770.38   Distribution:                F(1,859462)
Min Obs:                       1.0000
Max Obs:                    1.875e+04   F-statistic (robust):             0.0256
                                        P-value                           0.8730
Time periods:                      15   Distribution:                F(1,859462)
Avg Obs:                    5.752e+04
Min Obs:                       2524.0
Max Obs:                    1.056e+05

                             Parameter Estimates
==============================================================================
            Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper CI
------------------------------------------------------------------------------
indexfund      0.0013     0.0078     0.1599     0.8730     -0.0141      0.0166
==============================================================================

F-test for Poolability: 30.720
P-value: 0.0000
Distribution: F(3357,859462)

Included effects: Other Effect (firmid_anon2#year)
Model includes 5 other effects
Other Effect Observations per group (firmid_anon2#year):
Avg Obs: 256.56, Min Obs: 0.0000, Max Obs: 3236.0, Groups: 3363
```

```
[266]: # table 8b shareholders proposals
       df = pd.read_stata('Russell_sample_100.dta')
       df['firmid_anon#cohort'] = df['firmid_anon'] * df['cohort']
       df.set_index([df['firmid_anon#cohort'],df.year], inplace=True) #
       X = df[['R1000_to_R2000','R2000_to_R1000']]
       for y_name in ['n_contentious_mgmtprop', 'frac_contentious_mgmtprop',␣
        ↪'frac_mgmtprop_passed', 'n_contentious_shprop', 'frac_contentious_shprop',␣
        ↪'frac_shprop_passed']:
           y = df[[y_name]]
           mod = PanelOLS(y, X, entity_effects=True, time_effects=True,␣
        ↪singletons=False)
           res = mod.fit(cov_type='clustered',clusters=df[['firmid_anon','year']])
           print('*******************************************' + y_name +␣
        ↪'*******************************************')
           print(res.summary)
```

```
D:\program files\Anaconda\lib\site-
packages\linearmodels\shared\exceptions.py:35: MissingValueWarning:
Inputs contain missing values. Dropping rows with missing observations.
  warnings.warn(missing_value_warning_msg, MissingValueWarning)
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 11 singleton observations dropped
  warn.warn(

*******************************************n_contentious_mgmtprop***************
****************************
                            PanelOLS Estimation Summary
================================================================================
====
Dep. Variable:     n_contentious_mgmtprop   R-squared:
0.0004
Estimator:                       PanelOLS   R-squared (Between):
-0.0056
No. Observations:                    4137   R-squared (Within):
0.0005
Date:                    Sun, Jun 13 2021   R-squared (Overall):
-0.0034
Time:                            15:56:24   Log-likelihood
-6314.2
Cov. Estimator:                 Clustered
                                            F-statistic:
0.6370
Entities:                             798   P-value
0.5290
Avg Obs:                           5.1842   Distribution:
F(2,3323)
Min Obs:                           2.0000
Max Obs:                           6.0000   F-statistic (robust):
```

```
0.3404
                                            P-value
0.7115
Time periods:                          15   Distribution:
F(2,3323)
Avg Obs:                           275.80
Min Obs:                           18.000
Max Obs:                           474.00

                               Parameter Estimates
================================================================================
==
                Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper
CI
--------------------------------------------------------------------------------
--
R1000_to_R2000    -0.1359     0.1665    -0.8160     0.4146     -0.4624
0.1906
R2000_to_R1000     0.0051     0.1019     0.0497     0.9603     -0.1946
0.2048
================================================================================
==

F-test for Poolability: 4.7694
P-value: 0.0000
Distribution: F(811,3323)

Included effects: Entity, Time
*******************************************frac_contentious_mgmtprop************
*******************************
                              PanelOLS Estimation Summary
================================================================================
=======
Dep. Variable:     frac_contentious_mgmtprop   R-squared:
0.0004
Estimator:                          PanelOLS   R-squared (Between):
-0.0047
No. Observations:                       4137   R-squared (Within):
0.0007
Date:                       Sun, Jun 13 2021   R-squared (Overall):
-0.0027
Time:                               15:56:25   Log-likelihood
2733.6
Cov. Estimator:                    Clustered
                                               F-statistic:
0.5851
Entities:                                798   P-value
0.5571
```

```
Avg Obs:                              5.1842   Distribution:
F(2,3323)
Min Obs:                              2.0000
Max Obs:                              6.0000   F-statistic (robust):
0.4814
                                               P-value
0.6179
Time periods:                             15   Distribution:
F(2,3323)
Avg Obs:                              275.80
Min Obs:                              18.000
Max Obs:                              474.00

                               Parameter Estimates
================================================================================
==
                Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper
CI
--------------------------------------------------------------------------------
--
R1000_to_R2000    -0.0144     0.0154    -0.9368     0.3489     -0.0446
0.0157
R2000_to_R1000     0.0012     0.0101     0.1228     0.9023     -0.0185
0.0210
================================================================================
==

F-test for Poolability: 5.0647
P-value: 0.0000
Distribution: F(811,3323)

Included effects: Entity, Time
*******************************************frac_mgmtprop_passed*****************
**************************
                           PanelOLS Estimation Summary
================================================================================
==
Dep. Variable:     frac_mgmtprop_passed   R-squared:
3.137e-06
Estimator:                     PanelOLS   R-squared (Between):
-0.0002
No. Observations:                  4137   R-squared (Within):
0.0001
Date:                  Sun, Jun 13 2021   R-squared (Overall):
-0.0002
Time:                          15:56:25   Log-likelihood
5148.3
Cov. Estimator:               Clustered
```

```
                                          F-statistic:
0.0052
Entities:                           798   P-value
0.9948
Avg Obs:                         5.1842   Distribution:
F(2,3323)
Min Obs:                         2.0000
Max Obs:                         6.0000   F-statistic (robust):
0.0061
                                          P-value
0.9939
Time periods:                        15   Distribution:
F(2,3323)
Avg Obs:                         275.80
Min Obs:                         18.000
Max Obs:                         474.00

                               Parameter Estimates
================================================================================
==
                Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper
CI
--------------------------------------------------------------------------------
--
R1000_to_R2000    -0.0005     0.0072    -0.0739     0.9411     -0.0146
0.0136
R2000_to_R1000    -0.0005     0.0066    -0.0735     0.9414     -0.0135
0.0125
================================================================================
==

F-test for Poolability: 1.7625
P-value: 0.0000
Distribution: F(811,3323)

Included effects: Entity, Time

D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 106 singleton observations dropped
  warn.warn(

******************************************n_contentious_shprop******************
**************************
                           PanelOLS Estimation Summary
================================================================================
==
Dep. Variable:     n_contentious_shprop   R-squared:
0.0095
Estimator:                     PanelOLS   R-squared (Between):
```

```
0.0566
No. Observations:                 198   R-squared (Within):
0.0073
Date:                Sun, Jun 13 2021   R-squared (Overall):
0.0473
Time:                        15:56:25   Log-likelihood
-112.95
Cov. Estimator:             Clustered
                                        F-statistic:
0.5799
Entities:                          63   P-value
0.5615
Avg Obs:                       3.1429   Distribution:
F(2,121)
Min Obs:                       2.0000
Max Obs:                       6.0000   F-statistic (robust):
0.5995
                                        P-value
0.5507
Time periods:                      13   Distribution:
F(2,121)
Avg Obs:                       15.231
Min Obs:                       3.0000
Max Obs:                       27.000

                              Parameter Estimates
================================================================================
==
                Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper
CI
--------------------------------------------------------------------------------
--
R1000_to_R2000     0.2197     0.3928     0.5594     0.5769     -0.5580
0.9975
R2000_to_R1000     0.2448     0.3238     0.7559     0.4512     -0.3963
0.8859
================================================================================
==

F-test for Poolability: 1.4162
P-value: 0.0447
Distribution: F(74,121)

Included effects: Entity, Time
****************************************frac_contentious_shprop*************
****************************
                            PanelOLS Estimation Summary
================================================================================
=====
Dep. Variable:     frac_contentious_shprop   R-squared:
0.0041
Estimator:                        PanelOLS   R-squared (Between):
0.0306
No. Observations:                      198   R-squared (Within):
0.0096
Date:                     Sun, Jun 13 2021   R-squared (Overall):
0.0268
Time:                             15:56:25   Log-likelihood
-6.7535
Cov. Estimator:                  Clustered
                                             F-statistic:
0.2496
Entities:                               63   P-value
0.7795
Avg Obs:                            3.1429   Distribution:
F(2,121)
Min Obs:                            2.0000
Max Obs:                            6.0000   F-statistic (robust):
0.2906
                                             P-value
0.7484
Time periods:                           13   Distribution:
F(2,121)
Avg Obs:                            15.231
Min Obs:                            3.0000
Max Obs:                            27.000

                               Parameter Estimates
================================================================================
==
                Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper
CI
--------------------------------------------------------------------------------
--
R1000_to_R2000     0.0776     0.1270     0.6105     0.5427     -0.1740
0.3291
R2000_to_R1000     0.0960     0.2259     0.4252     0.6715     -0.3512
0.5433
================================================================================
==

F-test for Poolability: 1.6454
P-value: 0.0075
Distribution: F(74,121)

Included effects: Entity, Time
```

```
*******************************************frac_shprop_passed*******************
************************
                          PanelOLS Estimation Summary
================================================================================
Dep. Variable:     frac_shprop_passed   R-squared:                        0.0081
Estimator:                   PanelOLS   R-squared (Between):             -0.0351
No. Observations:                 198   R-squared (Within):               0.0151
Date:                Sun, Jun 13 2021   R-squared (Overall):             -0.0238
Time:                        15:56:26   Log-likelihood                    28.340
Cov. Estimator:             Clustered
                                        F-statistic:                      0.4958
Entities:                          63   P-value                           0.6103
Avg Obs:                       3.1429   Distribution:                   F(2,121)
Min Obs:                       2.0000
Max Obs:                       6.0000   F-statistic (robust):             1.3213
                                        P-value                           0.2706
Time periods:                      13   Distribution:                   F(2,121)
Avg Obs:                       15.231
Min Obs:                       3.0000
Max Obs:                       27.000

                               Parameter Estimates
================================================================================
==
                Parameter  Std. Err.     T-stat    P-value    Lower CI    Upper
CI
--------------------------------------------------------------------------------
--
R1000_to_R2000    -0.1748     0.1113    -1.5709     0.1188     -0.3950
0.0455
R2000_to_R1000    -0.0597     0.1483    -0.4028     0.6878     -0.3533
0.2339
================================================================================
==

F-test for Poolability: 3.8073
P-value: 0.0000
Distribution: F(74,121)

Included effects: Entity, Time
```

3.15 Table 9

[375]:
```
# Table 9a
df = pd.read_stata('Russell_sample_100.dta')
df['firmid_anon#cohort'] = df['firmid_anon'] * df['cohort']
df.set_index([df['firmid_anon#cohort'],df.year], inplace=True) #
```

```
X = df[['R1000_to_R2000','R2000_to_R1000']]
tempdf = pd.DataFrame()
for y_name in ['delta', 'totalcomp', 'equityvscash', 'bcf6', 'ceo_turnover']:
    y = df[[y_name]]
    mod = PanelOLS(y, X, entity_effects=True, time_effects=True,␣
 ↪singletons=False)
    res = mod.fit(cov_type='clustered',clusters=df[['firmid_anon','year']])
    #print('*********************************************' + y_name +␣
 ↪'*********************************************')
    #print(res.summary)
    temp = []
    temp.append(round(res.params[0],2))
    temp.append('(' + str(round(res.std_errors[0],2)) + ')')
    temp.append(round(res.params[1],2))
    temp.append('(' + str(round(res.std_errors[1],2)) + ')')
    temp.append(res.nobs)
    temp.append(round(res.rsquared,3))
    temp.append('Yes')
    temp.append('Yes')
    temp = pd.DataFrame(temp, index=['1000-2000', '1000-2000 ste', '2000-1000',␣
 ↪'2000-1000 ste', 'obs', 'R2', 'Firm Cohort FE', 'Year FE'], columns=[y_name])
    tempdf = pd.concat([tempdf,temp], axis=1)
```

```
D:\program files\Anaconda\lib\site-
packages\linearmodels\shared\exceptions.py:35: MissingValueWarning:
Inputs contain missing values. Dropping rows with missing observations.
  warnings.warn(missing_value_warning_msg, MissingValueWarning)
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 6 singleton observations dropped
  warn.warn(
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 5 singleton observations dropped
  warn.warn(
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 98 singleton observations dropped
  warn.warn(
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 7 singleton observations dropped
  warn.warn(
```

[377]:

```
tempdf
```

[377]:

```
                 delta totalcomp equityvscash    bcf6 ceo_turnover
1000-2000        -0.43      0.56        -0.06       0        -0.06
1000-2000 ste   (0.11)    (0.08)       (0.02)  (0.03)       (0.05)
2000-1000         0.27     -0.41         0.03    0.02         0.02
2000-1000 ste   (0.11)    (0.06)       (0.01)  (0.03)       (0.03)
```

```
obs                 3445      3219          3138     2592          3923
R2                 0.017     0.038         0.011        0         0.001
Firm Cohort FE       Yes       Yes           Yes      Yes           Yes
Year FE              Yes       Yes           Yes      Yes           Yes
```

[376]:

```
tempdf.to_excel('table 9a.xlsx')
```

[378]:

```
# table 9b
df = pd.read_stata('Russell_sample_100.dta')
df['firmid_anon#cohort'] = df['firmid_anon'] * df['cohort']
df.set_index([df['firmid_anon#cohort'],df.year], inplace=True) #
X = df[['R1000_to_R2000','R2000_to_R1000']]
tempdf = pd.DataFrame()
for y_name in ['indpt_board_pct', 'bcf', 'bcf5', 'supermajority_req',␣
↪'limitspecialmeet', 'writtenconsent', 'dualclass']:
    y = df[[y_name]]
    mod = PanelOLS(y, X, entity_effects=True, time_effects=True,␣
↪singletons=False)
    res = mod.fit(cov_type='clustered',clusters=df[['firmid_anon','year']])
    #print('*******************************************' + y_name +␣
↪'*******************************************')
    #print(res.summary)
    temp = []
    temp.append(round(res.params[0],2))
    temp.append('(' + str(round(res.std_errors[0],2)) + ')')
    temp.append(round(res.params[1],2))
    temp.append('(' + str(round(res.std_errors[1],2)) + ')')
    temp.append(res.nobs)
    temp.append(round(res.rsquared,3))
    temp.append('Yes')
    temp.append('Yes')
    temp = pd.DataFrame(temp, index=['1000-2000', '1000-2000 ste', '2000-1000',␣
↪'2000-1000 ste', 'obs', 'R2', 'Firm Cohort FE', 'Year FE'], columns=[y_name])
    tempdf = pd.concat([tempdf,temp], axis=1)
```

```
D:\program files\Anaconda\lib\site-
packages\linearmodels\shared\exceptions.py:35: MissingValueWarning:
Inputs contain missing values. Dropping rows with missing observations.
  warnings.warn(missing_value_warning_msg, MissingValueWarning)
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 22 singleton observations dropped
  warn.warn(
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 98 singleton observations dropped
  warn.warn(
```

[379]:

```
tempdf
```

[379]:

```
                  indpt_board_pct     bcf    bcf5 supermajority_req  \
1000-2000                   -0.03   -0.07   -0.06             -0.01
1000-2000 ste              (0.01)  (0.08)  (0.05)            (0.01)
2000-1000                       0    0.05   -0.01              0.01
2000-1000 ste              (0.01)  (0.06)  (0.04)            (0.02)
obs                          2613    2592    2592              2592
R2                          0.007   0.001   0.003             0.001
Firm Cohort FE                Yes     Yes     Yes               Yes
Year FE                       Yes     Yes     Yes               Yes

                  limitspecialmeet writtenconsent dualclass
1000-2000                       -0          -0.05         0
1000-2000 ste               (0.02)         (0.03)     (0.0)
2000-1000                        0           0.06     -0.01
2000-1000 ste               (0.03)         (0.04)    (0.01)
obs                           2592           2592      2592
R2                               0          0.005     0.002
Firm Cohort FE                 Yes            Yes       Yes
Year FE                        Yes            Yes       Yes
```

[380]:

```python
tempdf.to_excel('table 9b.xlsx')
```

3.16 Table 10

[381]:

```python
# table 10
df = pd.read_stata('Russell_sample_100.dta')
df['firmid_anon#cohort'] = df['firmid_anon'] * df['cohort']
df.set_index([df['firmid_anon#cohort'],df.year], inplace=True) #
X = df[['R1000_to_R2000','R2000_to_R1000']]
tempdf = pd.DataFrame()
for y_name in ['logQ', 'logqtot', 'logMB', 'ROA']:
    y = df[[y_name]]
    mod = PanelOLS(y, X, entity_effects=True, time_effects=True,␣
 ↪singletons=False)
    res = mod.fit(cov_type='clustered',clusters=df[['firmid_anon','year']])
    #print('*******************************************' + y_name +␣
 ↪'*******************************************')
    #print(res.summary)
    temp = []
    temp.append(round(res.params[0],2))
    temp.append('(' + str(round(res.std_errors[0],2)) + ')')
    temp.append(round(res.params[1],2))
    temp.append('(' + str(round(res.std_errors[1],2)) + ')')
    temp.append(res.nobs)
    temp.append(round(res.rsquared,3))
    temp.append('Yes')
    temp.append('Yes')
    temp = pd.DataFrame(temp, index=['1000-2000', '1000-2000 ste', '2000-1000',␣
↪'2000-1000 ste', 'obs', 'R2', 'Firm Cohort FE', 'Year FE'], columns=[y_name])
    tempdf = pd.concat([tempdf,temp], axis=1)
```

```
D:\program files\Anaconda\lib\site-
packages\linearmodels\shared\exceptions.py:35: MissingValueWarning:
Inputs contain missing values. Dropping rows with missing observations.
  warnings.warn(missing_value_warning_msg, MissingValueWarning)
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 16 singleton observations dropped
  warn.warn(
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 4 singleton observations dropped
  warn.warn(
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 2 singleton observations dropped
  warn.warn(
D:\program files\Anaconda\lib\site-packages\linearmodels\panel\model.py:1195:
SingletonWarning: 6 singleton observations dropped
  warn.warn(
```

[382]:
```
tempdf
```

[382]:
```
                   logQ  logqtot   logMB     ROA
1000-2000          -0.1    -0.21   -0.12   -0.03
1000-2000 ste    (0.03)   (0.06)  (0.05)  (0.01)
2000-1000          0.01     0.06   -0.03       0
2000-1000 ste    (0.01)   (0.03)  (0.03)  (0.01)
obs                4296     3403    4552    4188
R2                0.014    0.024   0.006   0.008
Firm Cohort FE      Yes      Yes     Yes     Yes
Year FE             Yes      Yes     Yes     Yes
```

[383]:
```
tempdf.to_excel('table 10.xlsx')
```