February 24, 2022 - cascad#222



## **Execution Report**

## Title: Do carbon emissions impact stocks' returns: An evidence from EU Emissions Trading Scheme Authors: Inessa Benchora & Sébastien Galanti

**Full reference:** Benchora, Inessa, and Galanti, Sébastien "Do carbon emissions impact stocks' returns: An evidence from EU Emissions Trading Scheme" Working paper, February 23, 2022.

The structure and contents of this execution report provided by **cascad** for the certification are similar to those recommended by the <u>AEA Data Editor</u>.

### 1. DATA DESCRIPTION

This study relies on data on environmental, social, and governance (ESG) disclosures of firms to build a global carbon risk score based on 1,637 firms from 43 countries (2010-2016). There are two main sources of data: (1) the European Union Emissions Trading System (EU-ETS), from which the authors extracted carbon emission data for more than 1,000 firms from 31 European countries and 16 sectors and (2) Datastream-Refinitiv Eikon, from which the authors obtained equity prices that they used to compute monthly stock returns.

For a thorough description of the data, please refer to Section 3 of the paper.

### 2. CODE DESCRIPTION

For the purpose of this certification, we aimed to check the results displayed in Tables 1-6, 9, and in Figures 1-8. Note that Tables 7 and 8 do not contain any result.

The replication package contains 11 data files called *allX.dta* (where  $X \in \{0;5\}$ ) and *sallX.dta* (where  $X \in \{1;5\}$ ), and one Stata 17 script, *code.do*, which creates all the Tables and Figures of the paper. It uses three Excel files, "data.xlsx", "market\_cap.xslx" and "price\_trade.xlsx" to create the aforementioned dta files, which are then used to compute the Tables and Figures.

### 3. REPLICATION STEPS

The replication material was downloaded from the cascad website, and run using Stata 17 on a computer with 64GB RAM, intel<sup>®</sup> Core<sup>™</sup> i9-9900K CPU @3.60-5.00GHz, Nvidia Geforce RTX 2060, and Windows 10 OS. We encountered one issue during the replication. Please note however, that the authors did not provide the raw Excel data files. We only ran the parts of the code that generate the results using the dta files.

## 4. FINDINGS

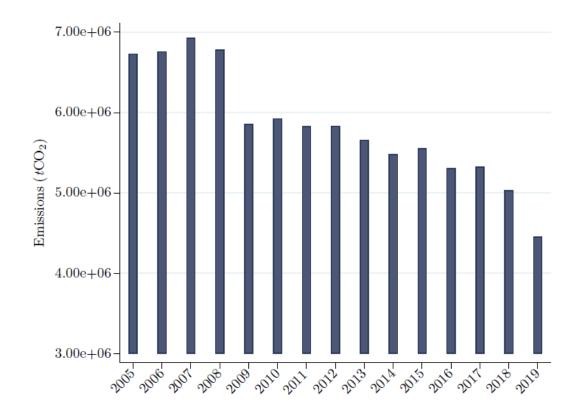
We reproduced all the Tables and Figures with perfect accuracy.

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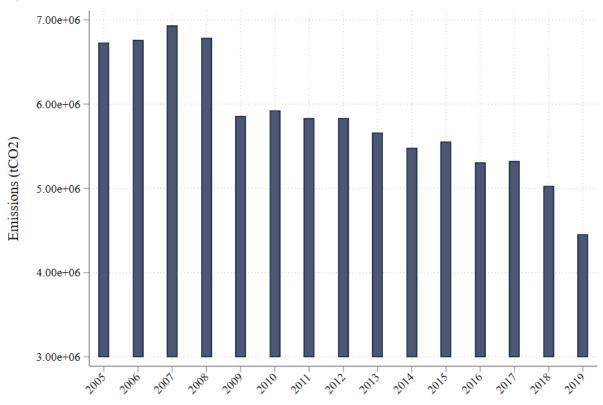
Year	Ν	Mean	Std.Dev.	p25	p75
2005	166	6729848	1.73e+07	117462	4356134
2006	166	6757043	1.72e + 07	127106	4648817
2007	166	6928775	1.73e+07	117538	4389100
2008	166	6783255	1.65e+07	125844	5117255
2009	166	5856253	1.44e + 07	108705	4084708
2010	166	5923742	1.45e + 07	119072	3967388
2011	166	5828297	1.44e + 07	109993	4044198
2012	166	5834122	1.53e+07	100140	3681461
2013	166	5659437	1.42e + 07	117226	4744431
2014	166	5479751	1.39e+07	117314	4217064
2015	166	5553444	1.42e+07	104734	4173898
2016	166	5304566	1.38e+07	108326	4487749
2017	166	5324252	1.33e+07	106894	4248754
2018	166	5029537	1.24e + 07	104111	4091576
2019	166	4454682	1.01e+07	102503	3941068
Total	2490	5829800	1.47e+07	111655	4356134

year	N	Mean	SD	p25	p75	Max	Min
2005	166	6729848	1.73e+07	117462	4356134	1.48e+08	0
2006	166	6757043	1.72e+07	127106	4648817	1.49e+08	0
2007	166	6928775	1.73e+07	117538	4389100	1.49e+08	Ø
2008	166	6783255	1.65e+07	125844	5117255	1.44e+08	0
2009	166	5856253	1.44e+07	108705	4084708	1.32e+08	0
2010	166	5923742	1.45e+07	119072	3967388	1.33e+08	0
2011	166	5828297	1.44e+07	109993	4044198	1.31e+08	0
2012	166	5834122	1.53e+07	100140	3681461	1.47e+08	0
2013	166	5659437	1.42e+07	117226	4744431	1.37e+08	Ø
2014	166	5479751	1.39e+07	117314	4217064	1.34e+08	0
2015	166	5553444	1.42e+07	104734	4173898	1.38e+08	Ø
2016	166	5304566	1.38e+07	108326	4487749	1.39e+08	0
2017	166	5324252	1.33e+07	106894	4248754	1.28e+08	0
2018	166	5029537	1.24e+07	104111	4091576	1.19e+08	0
2019	166	4454682	1.01e+07	102503	3941068	9.02e+07	0
Total	2490	5829800	1.47e+07	111655	4356134	1.49e+08	0

### 4.2. FIGURE 1: ANNUAL AVERAGE OF VERIFIED EMISSIONS (2005-2019)



Original:



## Original:

	Percentiles	Smallest	Obs.	2.490
1%	0	0	Mean	5829800
5%	4766	0	Sd. Dev.	1.47e+07
10%	18385	0	Variance	2.16e+14
25%	111655	0	Skewness	5.545885
			Kurtosis	43.43437
50%	564409.5			
	Percentiles	Largest		
75%	4356134	1.47e + 08		
90%	1.77e + 07	1.48e + 08		
95%	2.73e + 07	1.49e + 08		
99%	6.96e + 07	1.49e + 08		

Source: Authors' calculations. The unit is tons of  $CO_2$ .

		emissions	;	
	Percentiles	Smallest		
1%	0	Ø		
5%	4766	0		
10%	18385	0	Obs	2,490
25%	111655	0	Sum of wgt.	2,490
50%	564409.5		Mean	5829800
		Largest	Std. dev.	1.47e+07
75%	4356134	1.47e+08		
90%	1.77e+07	1.48e+08	Variance	2.16e+14
95%	2.73e+07	1.49e+08	Skewness	5.545885
99%	6.96e+07	1.49e+08	Kurtosis	43.43437

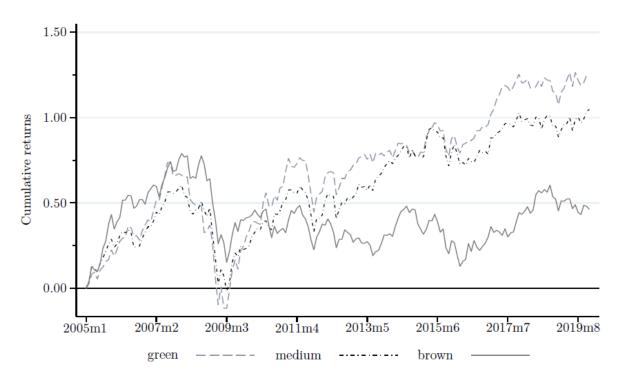
Original:

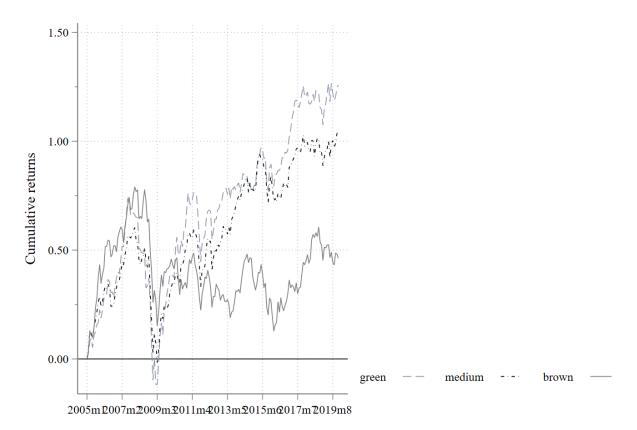
Portfolios	Ν	Mean	Min.	Max.	Sd.	p25	p75			
All ob	oservat	ion perio	od: Janua	ary 2005	- Decem	nber 2019				
Green	179	0.007	-0.205	0.130	0.054	-0.013	0.040			
Medium	179	0.006	-0.154	0.121	0.047	-0.016	0.036			
Brown	179	0.003	-0.143	0.100	0.050	-0.029	0.039			
Total	537	0.005	-0.205	0.130	0.050	-0.018	0.038			
Phase 1: January 2005 - December 2007										
Green	35	0.019	-0.075	0.077	0.039	-0.010	0.056			
Medium	35	0.016	-0.086	0.095	0.036	-0.009	0.038			
Brown	35	0.022	-0.085	0.100	0.047	-0.009	0.057			
Total	105	0.019	-0.086	0.100	0.041	-0.009	0.046			
	Phas	e 2: Janu	uary 2008	- Decem	ber 2012	2				
Green	60	0.001	-0.205	0.130	0.074	-0.020	0.052			
Medium	60	-0.000	-0.154	0.121	0.060	-0.021	0.042			
Brown	60	-0.008	-0.143	0.099	0.060	-0.048	0.038			
Total	180	-0.002	-0.205	0.130	0.065	-0.031	0.043			
	Phas	e 3: Janu	uary 2013	- Decem	ber 2019	9				
Green	84	0.006	-0.112	0.103	0.040	-0.014	0.033			
Medium	84	0.006	-0.108	0.095	0.040	-0.016	0.034			
Brown	84	0.002	-0.111	0.092	0.041	-0.025	0.027			
Total	252	0.005	-0.112	0.103	0.040	-0.017	0.032			
Source: Author	s' calcul	ations. The	phases ref	er to the th	ree phas	es of the EU	U-ETS.			

group	N	Mean	Min	Max	SD	p75	
0	179		2046391	.1298488	.0536359	.0395947	
1	179		1544265	.1212421	.0468777	.0360201	
2	179	.0025877	1425302	.1003767	.0501713	.0388724	
Total	537	.0051581	2046391	.1298488	.0502453	.0380142	
group	N	Mean	Min	Max	SD	p25	p75
0	35.000	0.019	-0.075	0.077	0.039	-0.010	0.056
1	35.000	0.016	-0.086	0.095	0.036	-0.009	0.038
2	35.000	0.022	-0.085	0.100	0.047	-0.009	0.057
Total	105.000	0.019	-0.086	0.100	0.041	-0.009	0.046
group	N	Mean	Min	Max	SD	p25	p75
0	60.000	0.001	-0.205	0.130	0.074	-0.020	0.052
1	60.000	-0.000	-0.154	0.121	0.060	-0.021	0.042
2	60.000	-0.008	-0.143	0.099	0.060	-0.048	0.038
Total	180.000	-0.002	-0.205	0.130	0.065	-0.031	0.043
group	N	Mean	Min	Max	SD	p25	p75
0	84.000	0.006	-0.112	0.103	0.040	-0.014	0.033
1	84.000	0.006	-0.108	0.095	0.040	-0.016	0.034
2	84.000	0.002	-0.111	0.092	0.041	-0.025	0.027
Total	252.000	0.005	-0.112	0.103	0.040	-0.017	0.032

# 4.5. FIGURE 2: CUMULATIVE RETURNS OF THE THREE CARBON PORTFOLIOS ON THE OVERALL OBSERVATION PERIOD (ALL EU-ETS PHASES)

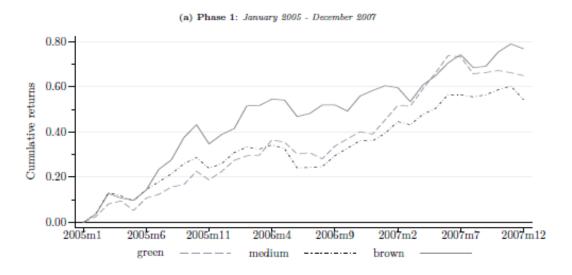
Original:



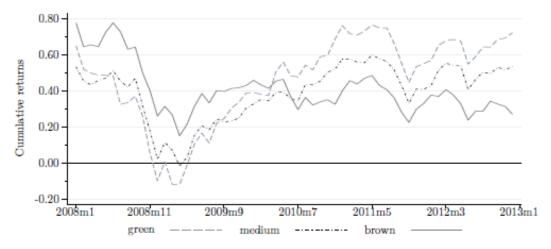


## 4.6. FIGURE 3: CUMULATIVE CARBON PORTFOLIOS RETURNS FOR THE THREE PHASES OF THE EU ETS

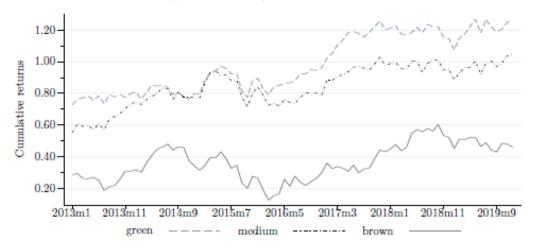
#### Original:













### 4.7. TABLE 4: ESTIMATION RESULTS FOR THE FOUR FACTOR MODEL

## Original:

		FF3			FF4	
Variables	(1) Green	(2) Medium	(3) Brown	(1) Green	(2) Medium	(3) Brown
MKT	$\begin{array}{c} 0.27832^{**} \\ (0.0914) \end{array}$	$\begin{array}{c} 0.20589^{*} \\ (0.0872) \end{array}$	$0.17759^{*}$ (0.0807)	$\begin{array}{c} 0.26785^{**} \\ (0.0970) \end{array}$	$\begin{array}{c} 0.22487^{*} \\ (0.0877) \end{array}$	$0.18549^{*}$ (0.0844)
SMB	$1.05556^{***}$ (0.2707)	$1.01420^{***}$ (0.2283)	$\begin{array}{c} 0.84513^{***} \\ (0.2198) \end{array}$	$\begin{array}{c} 1.05521^{***} \\ (0.2719) \end{array}$	$1.01483^{***}$ (0.2285)	0.84540** (0.2207)
HML	$\begin{array}{c} 0.04779 \\ (0.2046) \end{array}$	-0.08012 (0.1694)	$\binom{0.11260}{(0.1837)}$	$\begin{pmatrix} 0.00565 \\ (0.2093) \end{pmatrix}$	-0.00369 (0.1839)	0.14439 (0.1983)
MOM				-0.06695 (0.1046)	$\begin{array}{c} 0.12143 \\ (0.0992) \end{array}$	0.05050 (0.1205)
Constant	-0.00392 (0.0039)	-0.00554 (0.0035)	-0.00866* (0.0038)	-0.00347 (0.0041)	-0.00636 (0.0037)	-0.00900* (0.0040)
Observations $R^2$	179 0.187	179 0.178	179 0.127	179 0.188	$179 \\ 0.183$	179 0.128

### Reproduced:

	FF3F			FF4F		
	Green	Medium	Brown	Green	Medium	Brown
Mkt_euri	$0.27832^{**}$	$0.20589^{*}$	$0.17759^{*}$	$0.26785^{**}$	$0.22487^{*}$	$0.18549^{*}$
	(0.0914)	(0.0872)	(0.0807)	(0.0970)	(0.0877)	(0.0844)
SMB	$1.05556^{***}$	$1.01420^{***}$	$0.84513^{***}$	$1.05521^{***}$	1.01483***	$0.84540^{***}$
	(0.2707)	(0.2283)	(0.2198)	(0.2719)	(0.2285)	(0.2207)
HML	0.04779	-0.08012	0.11260	0.00565	-0.00369	0.14439
	(0.2046)	(0.1694)	(0.1837)	(0.2093)	(0.1839)	(0.1983)
MOM				-0.06695	0.12143	0.05050
				(0.1046)	(0.0992)	(0.1205)
_cons	-0.00392	-0.00554	-0.00866*	-0.00347	-0.00636	-0.00900*
	(0.0039)	(0.0035)	(0.0038)	(0.0041)	(0.0037)	(0.0040)
N	179	179	179	179	179	179
$R^2$	0.187	0.178	0.127	0.188	0.183	0.128
	0.101	0.110	0.121	0.100	0.100	0.120

Standard errors in parentheses

\* p < 0.05,\*\* p < 0.01,\*\*\* p < 0.001

### Original:

	Phase 1 (January 2005 - December 2007)			(January	Phase 2 (January 2008 - December 2012)			Phase 3 (January 2012 - December 2019)		
					Portfolios					
Variables	(1) Green	(2) Medium	(3) Brown	(1) Green	(2) Medium	(3) Brown	(1) Green	(2) Medium	(3) Brown	
MKT	$\begin{array}{c} 0.1699\\ (0.275) \end{array}$	$\begin{array}{c} 0.1721 \\ (0.378) \end{array}$	$\begin{pmatrix} 0.1605\\ (0.334) \end{pmatrix}$	$0.2999^{*}$ (0.141)	0.2528 (0.128)	0.2140 (0.113)	$\begin{array}{c} 0.0131 \\ (0.125) \end{array}$	-0.0153 (0.112)	-0.0616 (0.123)	
SMB	$1.0549^{*}$ (0.391)	$0.6259^{*}$ (0.268)	$\frac{0.7761}{(0.425)}$	$1.3493^{*}$ (0.533)	$1.2605^{**}$ (0.411)	$1.0939^{**}$ (0.384)	$\begin{array}{c} 0.6160^{*} \\ (0.253) \end{array}$	$0.7346^{**}$ (0.269)	$\frac{0.4026}{(0.255)}$	
HML	$\begin{array}{c} 0.4141 \\ (0.723) \end{array}$	0.3185 (1.004)	0.2793 (0.948)	0.1730 (0.452)	$\begin{array}{c} 0.0370 \\ (0.394) \end{array}$	0.0388 (0.379)	-0.0018 (0.194)	0.1342 (0.182)	0.2841 (0.240)	
MOM	-0.2731 (0.496)	-0.0115 (0.616)	$\begin{array}{c} 0.0175 \\ (0.596) \end{array}$	0.0261 (0.162)	0.1368 (0.136)	0.0683 (0.174)	-0.1575 (0.200)	$\begin{array}{c} 0.2116 \\ (0.179) \end{array}$	-0.1281 (0.191)	
Constant	-0.0093 (0.013)	-0.0154 (0.017)	-0.0094 (0.017)	-0.0101 (0.009)	-0.0131 (0.008)	-0.0217** (0.008)	$\begin{array}{c} 0.0074 \\ (0.005) \end{array}$	0.0043 (0.005)	$\begin{array}{c} 0.0045 \\ (0.005) \end{array}$	
Observations $\mathbb{R}^2$	35 0.272	35 0.159	35 0.119	60 0.229	60 0.238	60 0.192	84 0.059	84 0.102	84 0.048	

Note: This table provides estimated coefficients  $\alpha$ ,  $\beta$ ,  $\gamma$ ,  $\phi$ ,  $\theta$  from the time series regression for the three carbon portfolios. The estimated regression models cover the period from 2005 to 2019. Newey-West standard errors are in parentheses. The symbols \*\*\* denotes significance at 1% level; \*\* denotes significance at 5% level; \* denotes significance at 10% level.

#### Reproduced:

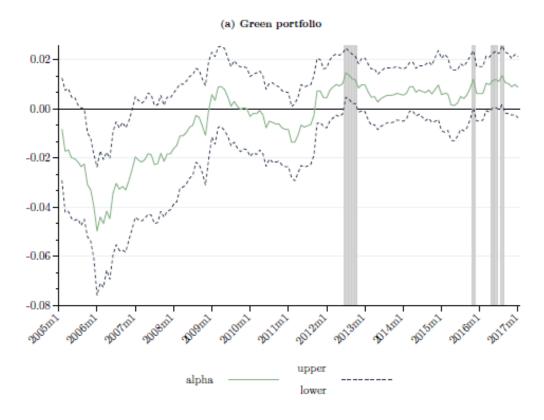
	Phase 1			Phase 2			Phase 3		
	Green	Medium	Brown	Green	Medium	Brown	Green	Medium	Brown
Mkt_euri	0.1699	0.1721	0.1605	0.2999*	0.2528	0.2140	0.0131	-0.0153	-0.0616
	(0.275)	(0.378)	(0.334)	(0.141)	(0.128)	(0.113)	(0.125)	(0.112)	(0.123)
SMB	$1.0549^{*}$	$0.6259^{*}$	0.7761	1.3493*	1.2605**	1.0939**	$0.6160^{*}$	0.7346**	0.4026
	(0.391)	(0.268)	(0.425)	(0.533)	(0.411)	(0.384)	(0.253)	(0.269)	(0.255)
HML	0.4141	0.3185	0.2793	0.1730	0.0370	0.0388	-0.0018	0.1342	0.2841
	(0.723)	(1.004)	(0.948)	(0.452)	(0.394)	(0.379)	(0.194)	(0.182)	(0.240)
MOM	-0.2731	-0.0115	0.0175	0.0261	0.1368	0.0683	-0.1575	0.2116	-0.1281
	(0.496)	(0.616)	(0.596)	(0.162)	(0.136)	(0.174)	(0.200)	(0.179)	(0.191)
_cons	-0.0093	-0.0154	-0.0094	-0.0101	-0.0131	-0.0217**	0.0074	0.0043	0.0045
	(0.013)	(0.017)	(0.017)	(0.009)	(0.008)	(0.008)	(0.005)	(0.005)	(0.005)
N	35	35	35	60	60	60	84	84	84
$R^2$	0.272	0.159	0.119	0.229	0.238	0.192	0.059	0.102	0.048

Standard errors in parentheses

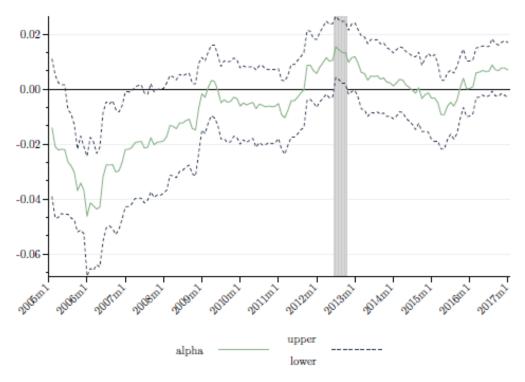
\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

## 4.9. FIGURE 4: ALPHA PLOT OF THE THREE CARBON PORTFOLIOS WITH A 3-YEAR ROLLING WINDOW

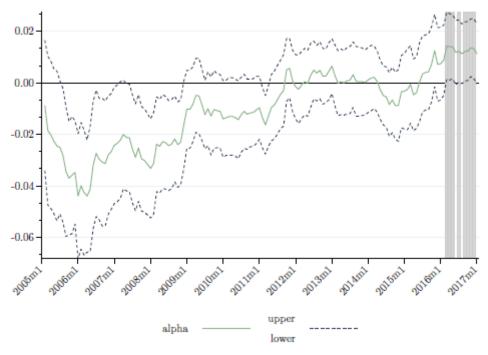
## Original:



(b) Medium portfolio



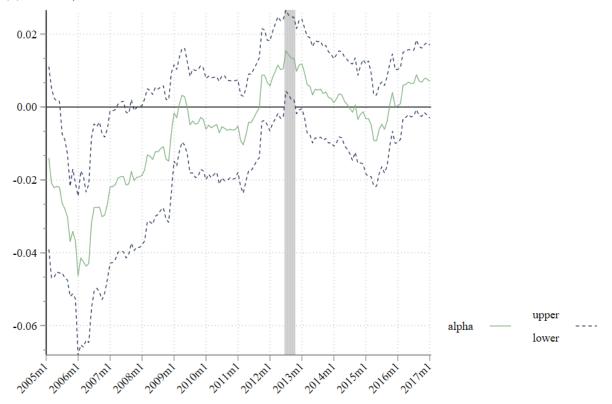
(c) Brown portfolio



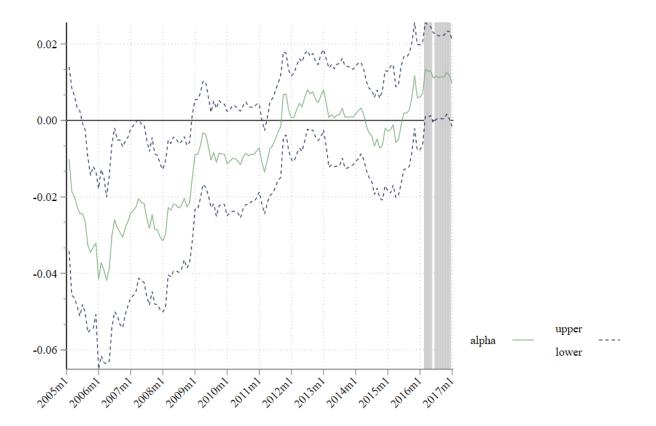
Reproduced: (a) Green portfolio:



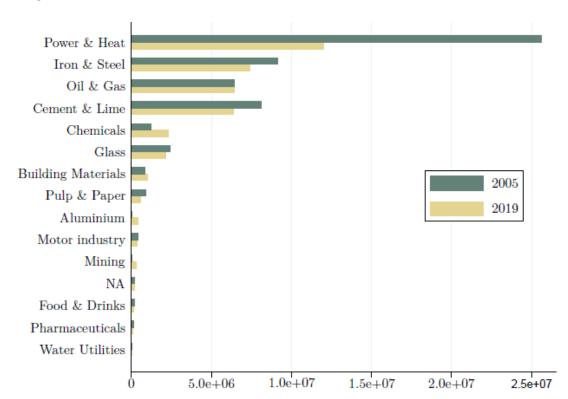
### (b) Medium portfolio:



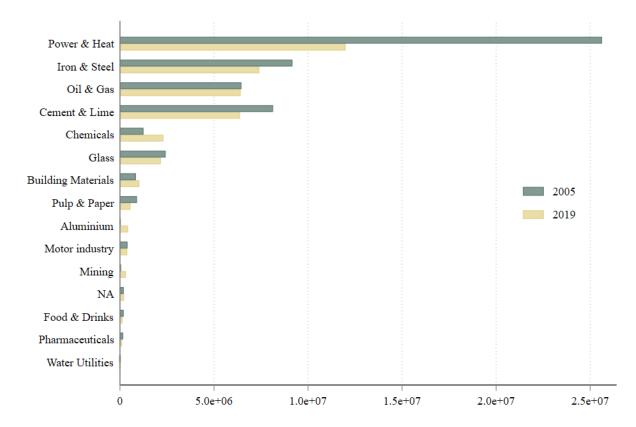
(c) Brown portfolio:



#### 4.10. FIGURE 5: ANNUAL AVERAGE OF VERIFIED EMISSIONS BY SECTOR



#### Original:



### 4.11. TABLE 6: ESTIMATION RESULTS FOR THE FOUR FACTOR MODEL

### Original:

	Phase 1 (January 2005 - December 2007)			(January	Phase 2 (January 2008 - December 2012)			Phase 3 (January 2012 - December 2019)		
					Portfolios					
Variables	(1) Green	(2) Medium	(3) Brown	(1) Green	(2) Medium	(3) Brown	(1) Green	(2) Medium	(3) Brown	
MKT	0.2328 (0.319)	$\begin{array}{c} 0.0616\\ (0.285) \end{array}$	0.1675 (0.330)	$0.3500^{*}$ (0.161)	0.2460* (0.118)	0.2189 (0.110)	$\begin{array}{c} 0.0401 \\ (0.124) \end{array}$	$\begin{array}{c} 0.0382\\ (0.094) \end{array}$	-0.0647 (0.124)	
SMB	$1.1939^{*}$ (0.268)	** 0.7147 (0.392)	$\frac{0.5548}{(0.395)}$	$1.2597^{*}$ (0.513)	1.4750** (0.452)	1.1067** (0.379)	0.6632* (0.273)	0.5452** (0.188)	0.4778 (0.253)	
HML	$\begin{array}{c} 0.0790 \\ (0.909) \end{array}$	0.9275 (0.761)	0.2734 (0.911)	0.0857 (0.514)	$\begin{array}{c} 0.0625\\ (0.400) \end{array}$	0.0754 (0.356)	0.2008 (0.193)	-0.1048 (0.162)	$\begin{array}{c} 0.2252 \\ (0.222) \end{array}$	
MOM	-0.2816 (0.630)	0.1070 (0.476)	$\begin{pmatrix} 0.0380\\ (0.593) \end{pmatrix}$	0.0144 (0.178)	$\begin{array}{c} 0.1523 \\ (0.150) \end{array}$	0.0928 (0.171)	0.2082 (0.183)	-0.1600 (0.165)	-0.1237 (0.189)	
Constant	-0.0059 (0.018)	-0.0184 (0.013)	-0.0103 (0.016)	-0.0127 (0.010)	-0.0152 (0.008)	-0.0197* (0.008)	$\begin{array}{c} 0.0050 \\ (0.005) \end{array}$	0.0086* (0.004)	$\begin{array}{c} 0.0046 \\ (0.005) \end{array}$	
Observations R <sup>2</sup>	35 0.226	35 0.209	35 0.104	60 0.217	60 0.253	60 0.208	84 0.081	84 0.074	84 0.050	

Note: This table provides estimated coefficients  $\alpha$ ,  $\beta$ ,  $\gamma$ ,  $\phi$ ,  $\theta$  from the time series regression for the three carbon portfolios. The estimated regression models cover the period from 2005 to 2019. Newey-West standard errors are in parentheses. The symbols \*\*\* denotes significance at 1% level; \*\* denotes significance at 5% level; \* denotes significance at 10% level.

### Reproduced:

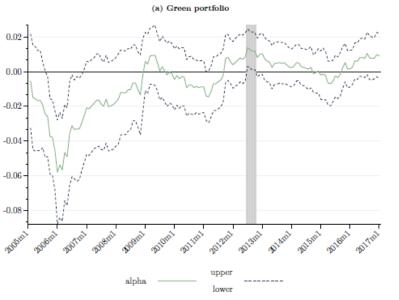
Phase 1			Phase 2			Phase 3		
Green	Medium	Brown	Green	Medium	Brown	Green	Medium	¿ column1cBrown
0.2328	0.0616	0.1675	0.3500*	0.2460*	0.2189	0.0401	0.0382	-0.0647
(0.319)	(0.285)	(0.330)	(0.161)	(0.118)	(0.110)	(0.124)	(0.094)	(0.124)
1.1939***	0.7147	0.5548	1.2597*	1.4750**	1.1067**	$0.6632^{*}$	0.5452**	0.4778
(0.268)	(0.392)	(0.395)	(0.513)	(0.452)	(0.379)	(0.273)	(0.188)	(0.253)
0.0790	0.9275	0.2734	0.0857	0.0625	0.0754	0.2008	-0.1048	0.2252
(0.909)	(0.761)	(0.911)	(0.514)	(0.400)	(0.356)	(0.193)	(0.162)	(0.222)
-0.2816	0.1070	0.0380	0.0144	0.1523	0.0928	0.2082	-0.1600	-0.1237
(0.630)	(0.476)	(0.593)	(0.178)	(0.150)	(0.171)	(0.183)	(0.165)	(0.189)
-0.0059	-0.0184	-0.0103	-0.0127	-0.0152	-0.0197*	0.0050	0.0086*	0.0046
(0.018)	(0.013)	(0.016)	(0.010)	(0.008)	(0.008)	(0.005)	(0.004)	(0.005)
35	35	35	60	60	60	84	84	84
0.226	0.209	0.104	0.217	0.253	0.208	0.081	0.074	0.050
	Green 0.2328 (0.319) 1.1939*** (0.268) 0.0790 (0.909) -0.2816 (0.630) -0.0059 (0.018) 35	$\begin{array}{llllllllllllllllllllllllllllllllllll$	$\begin{array}{cccccc} Green & Medium & Brown \\ 0.2328 & 0.0616 & 0.1675 \\ (0.319) & (0.285) & (0.330) \\ 1.1939^{\ast\ast\ast} & 0.7147 & 0.5548 \\ (0.268) & (0.392) & (0.395) \\ 0.0790 & 0.9275 & 0.2734 \\ (0.909) & (0.761) & (0.911) \\ -0.2816 & 0.1070 & 0.0380 \\ (0.630) & (0.476) & (0.593) \\ -0.0059 & -0.0184 & -0.0103 \\ (0.018) & (0.013) & (0.016) \\ 35 & 35 & 35 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

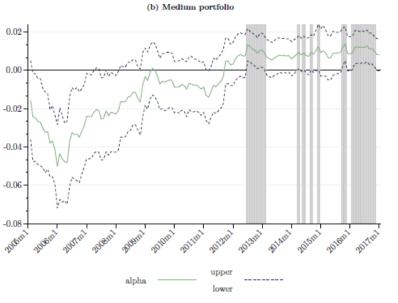
Standard errors in parentheses

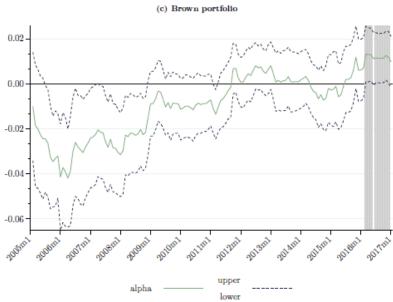
\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

# 4.12. FIGURE 6: ALPHA PLOT OF THE THREE CARBON PORTFOLIOS WITH A 3-YEAR ROLLING WINDOW

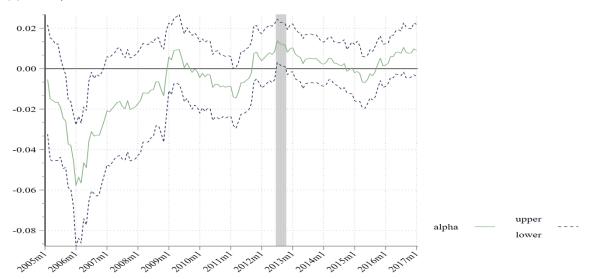
## Original:



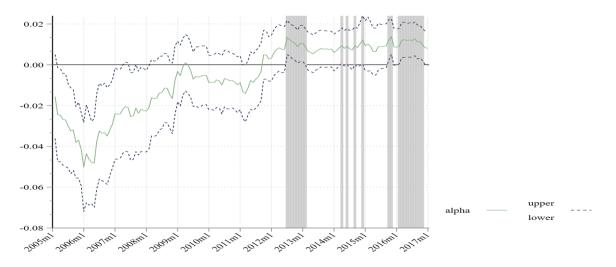




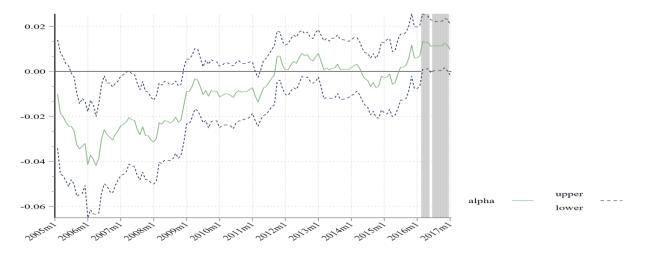
Reproduced: (a) Green portfolio



(b) Medium portfolio

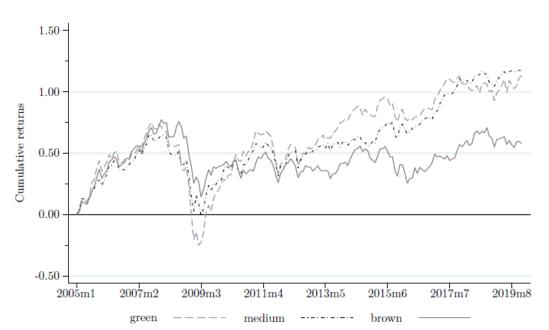


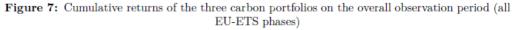
(c) Brown portfolio

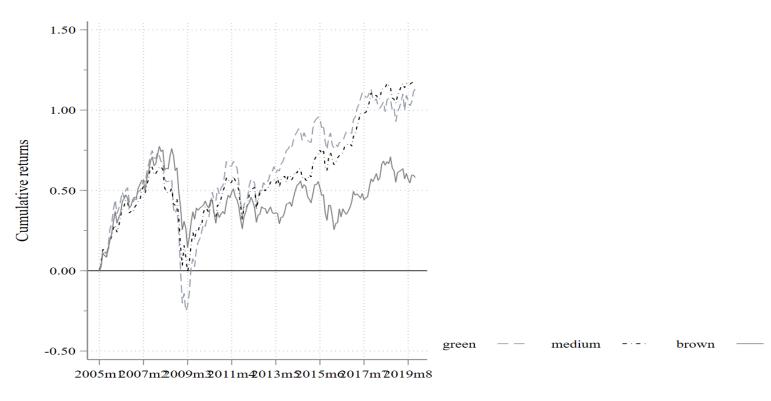


# 4.13. FIGURE 7: CUMULATIVE RETURNS OF THE THREE CARBON PORTFOLIOS ON THE OVERALL OBSERVATION PERIOD (ALL EU-ETS PHASES)

### Original:

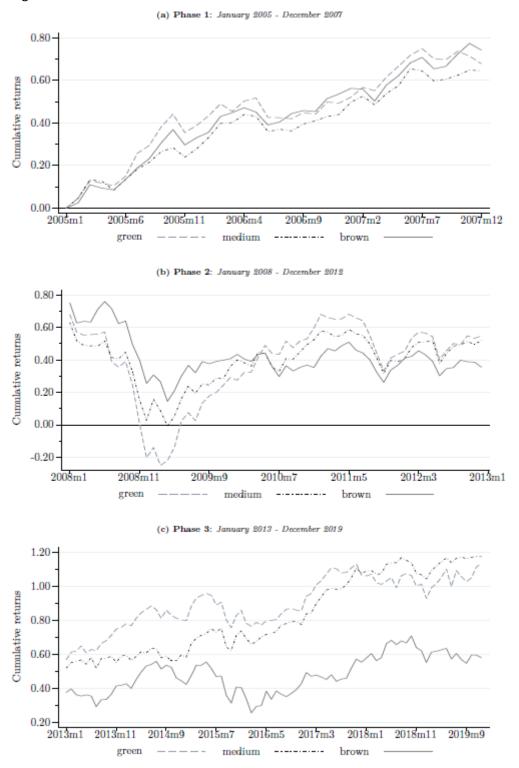


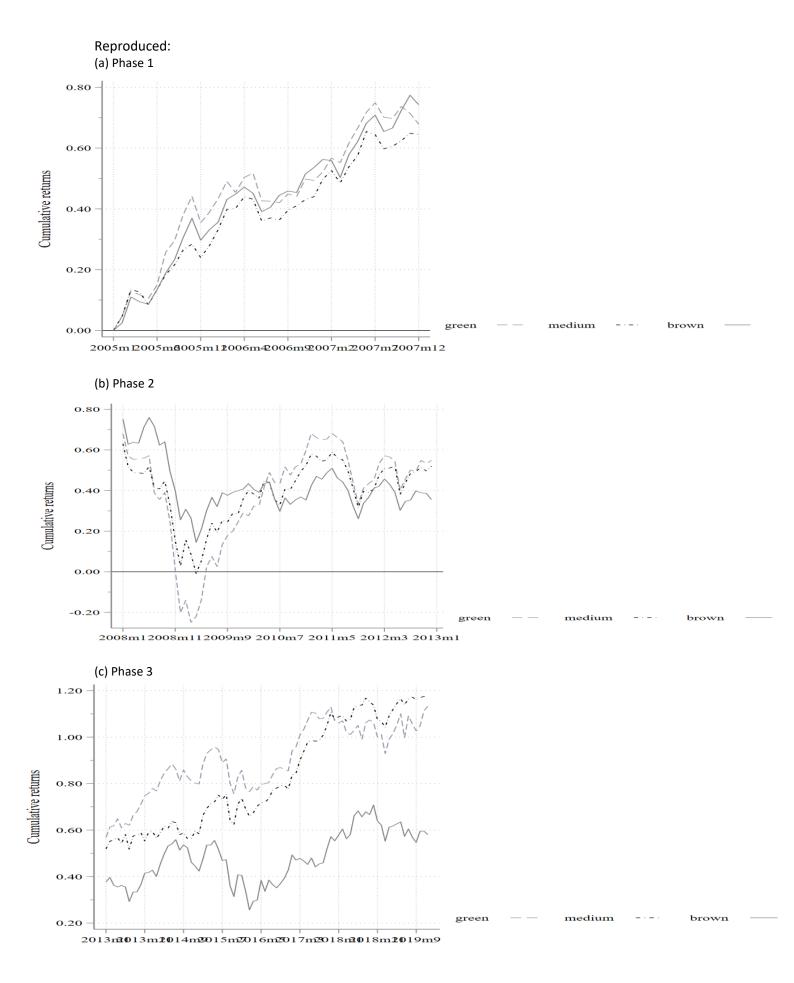




# 4.14. FIGURE 8: CUMULATIVE CARBON PORTFOLIOS RETURNS FOR THE THREE PHASES OF THE EU ETS

#### Original:





## Original:

		FF3		FF4			
Variables	(1) Green	(2) Medium	(3) Brown	(1) Green	(2) Medium	(3) Brown	
МКТ	$\begin{array}{c} 0.30700^{**} \\ (0.1014) \end{array}$	$\begin{array}{c} 0.23222^{**} \\ (0.0791) \end{array}$	$0.17842^{*}$ (0.0802)	$\begin{array}{c} 0.31215^{**} \\ (0.1066) \end{array}$	$\begin{array}{c} 0.23968^{**} \\ (0.0820) \end{array}$	$\begin{array}{c} 0.18638^{*} \\ (0.0836) \end{array}$	
SMB	$\begin{array}{c} 1.07532^{***} \\ (0.2664) \end{array}$	$1.04881^{***}$ (0.2410)	0.83473*** (0.2182)	$\begin{array}{c} 1.07549^{***} \\ (0.2670) \end{array}$	$1.04906^{***}$ (0.2416)	0.83499*** (0.2191)	
HML	$\begin{array}{c} 0.05997 \\ (0.2118) \end{array}$	-0.12527 (0.1714)	$\begin{array}{c} 0.08049 \\ (0.1738) \end{array}$	$\begin{array}{c} 0.08068\\ (0.2272) \end{array}$	-0.09520 (0.1831)	$\begin{array}{c} 0.11255 \\ (0.1852) \end{array}$	
MOM				$\begin{array}{c} 0.03291 \\ (0.1176) \end{array}$	$\begin{array}{c} 0.04776 \\ (0.0997) \end{array}$	$\begin{array}{c} 0.05094 \\ (0.1189) \end{array}$	
Constant	-0.00448 (0.0042)	-0.00477 (0.0034)	-0.00801* (0.0036)	-0.00470 (0.0045)	-0.00509 (0.0036)	-0.00836* (0.0038)	
$\begin{array}{c} \text{Observations} \\ R^2 \end{array}$	179 0.185	179 0.196	179 0.134	179 0.185	179 0.196	179 0.135	

## Reproduced:

	FF3			FF4		
	Green	Medium	Brown	Green	Medium	Brown
Mkt_euri	0.30700**	0.23222**	$0.17842^{*}$	0.31215**	0.23968**	$0.18638^{*}$
	(0.1014)	(0.0791)	(0.0802)	(0.1066)	(0.0820)	(0.0836)
SMB	1.07532***	1.04881***	0.83473***	1.07549***	1.04906***	0.83499***
	(0.2664)	(0.2410)	(0.2182)	(0.2670)	(0.2416)	(0.2191)
HML	0.05997	-0.12527	0.08049	0.08068	-0.09520	0.11255
	(0.2118)	(0.1714)	(0.1738)	(0.2272)	(0.1831)	(0.1852)
MOM				0.03291	0.04776	0.05094
				(0.1176)	(0.0997)	(0.1189)
_cons	-0.00448	-0.00477	-0.00801*	-0.00470	-0.00509	-0.00836*
	(0.0042)	(0.0034)	(0.0036)	(0.0045)	(0.0036)	(0.0038)
N	179	179	179	179	179	179
$\mathbb{R}^2$	0.185	0.196	0.134	0.185	0.196	0.135
Standard er	rors in parenthe	eses				

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001