



Università Commerciale
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CARBON PRICE SIGNAL

IN THE ITALIAN ELECTRIC POWER SECTOR

ASSESSING THE STOCK MARKET VALUE OF ITALIAN POWER PRODUCERS
IN THE THIRD PHASE OF THE EU ETS

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Why - Emissions Trading

Article 1 of the EU ETS Directive outlines its broad objectives:

*“This Directive establishes a scheme for greenhouse gas emission allowance trading within the Community in order to **promote reductions of greenhouse gas emissions in a cost-effective and economically efficient manner**. This Directive also provides for the reductions of greenhouse gas emissions to be increased so as to contribute to the levels of reductions that are considered scientifically necessary to avoid dangerous climate change. ”*

THROUGH **CARBON PRICES** THAT EMERGE FROM THE **TRADING OF EMISSIONS ALLOWANCES**

How - Carbon Pricing in the Power Sector

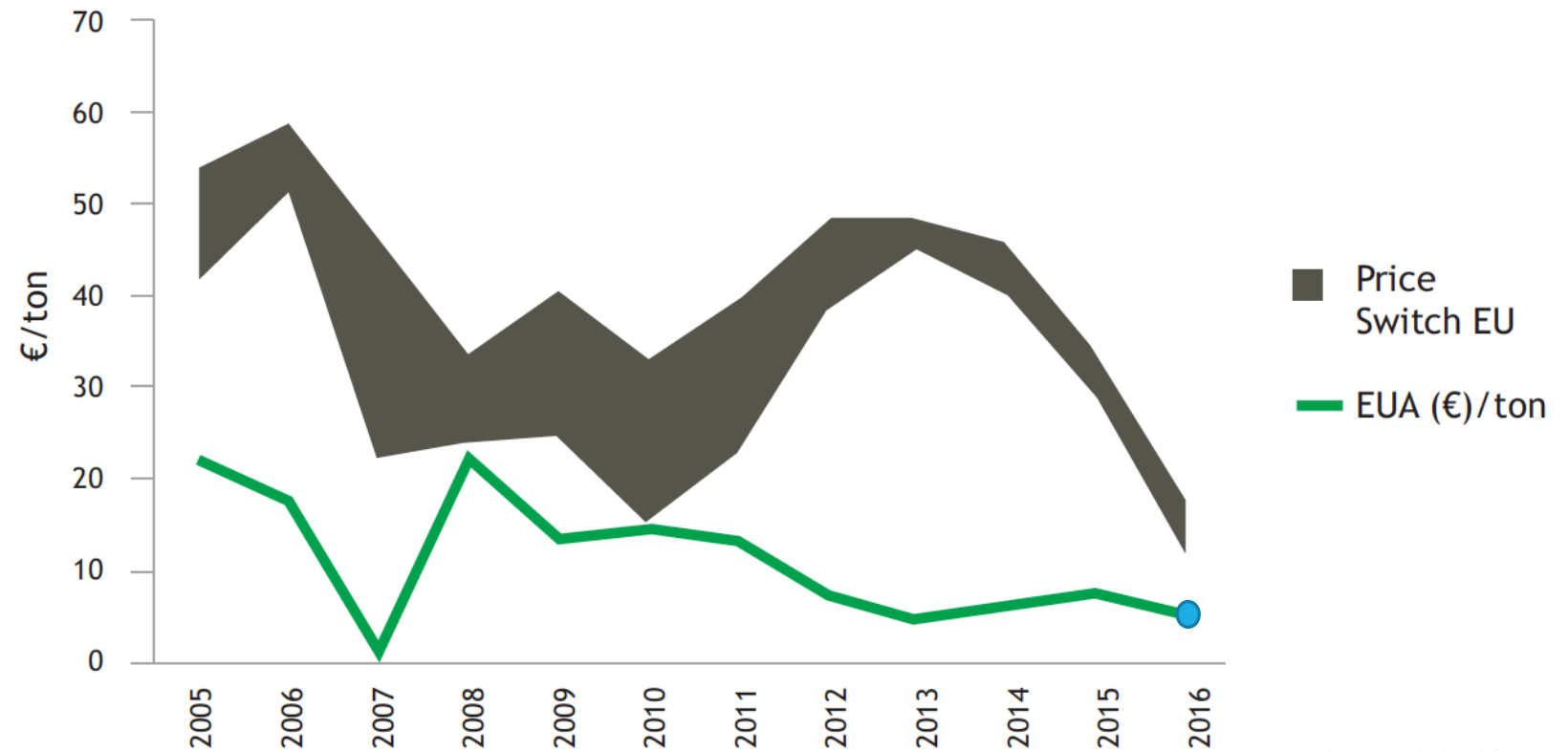
Channels for the promotion of GHG emissions reduction

1. POWER PRODUCTION
 - Production cost of carbon-intensive power plants
 - Merit order of power production
 - ✓ Operations
 - ✓ Investments decisions
2. POWER CONSUMPTION (industry and end-users)
 - Price of electricity (cost pass-through)
 - ✓ Demand of energy
 - ✓ Investments
3. INNOVATION
 - Demand of new carbon-free and/or energy-efficient technologies
4. FINANCIAL MARKETS
 - Expectations of financial investors

The numbers – EU ETS (I)

16 €/tCO₂ avg
coal to natural gas
switching cost

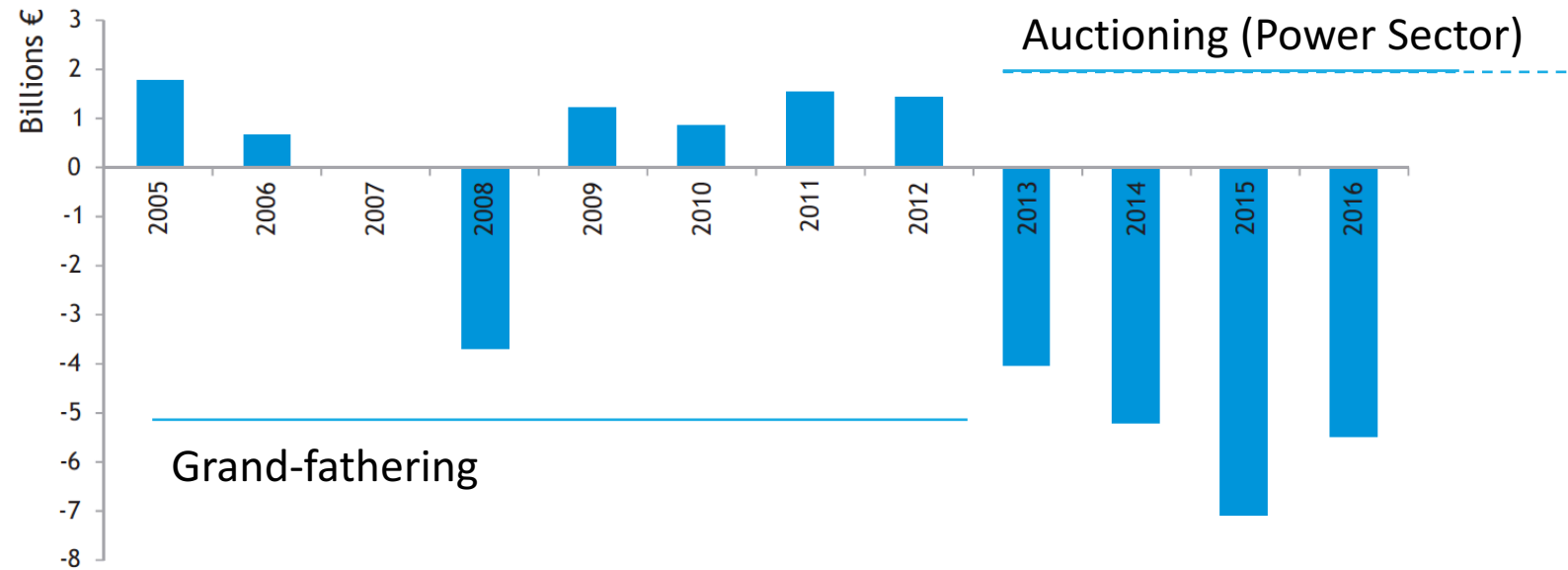
EU ETS carbon
price is not able to
drive innovation on
its own



Source: ICTSD, 2017.

The numbers – EU ETS (II)

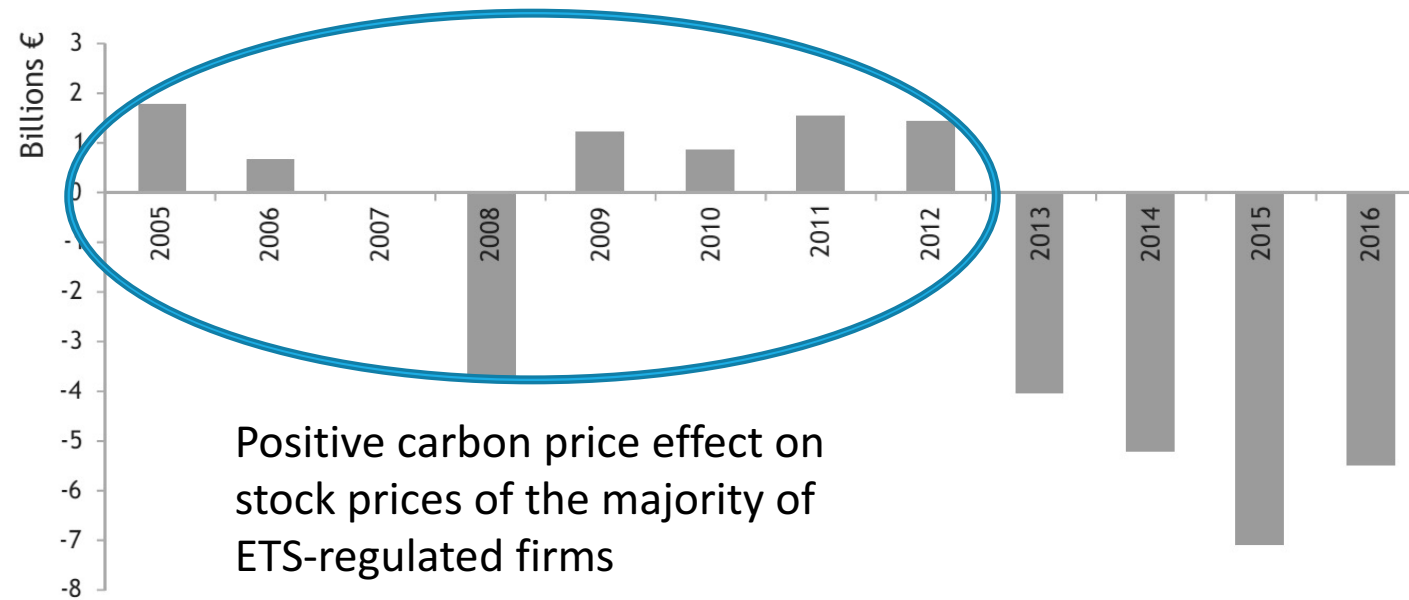
Net monetary position of EU ETS market participants



Source: Elaboration on EEA and ICE data ; ICTSD, 2017.

Litterature on Carbon Pricing in Financial Markets

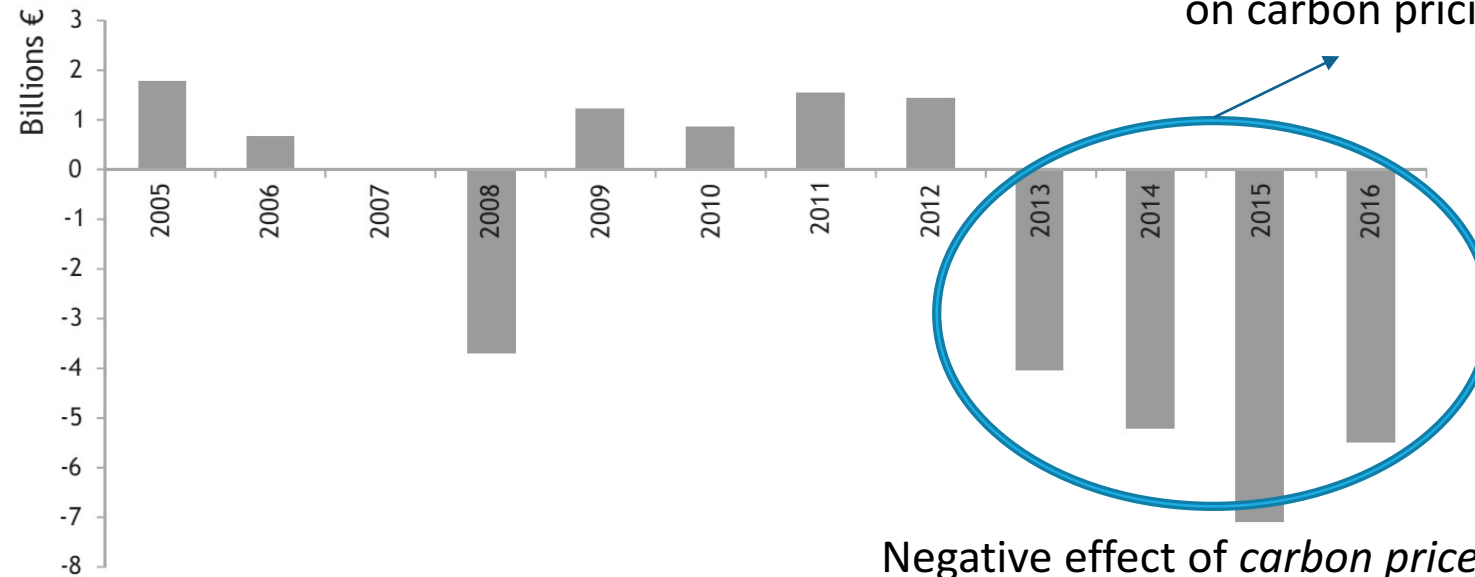
Net monetary position of EU ETS market participants



Source: Elaboration on EEA and ICE data ; ICTSD, 2017.

Phase 3 Carbon Pricing in Financial Markets

Net monetary position of EU ETS market participants



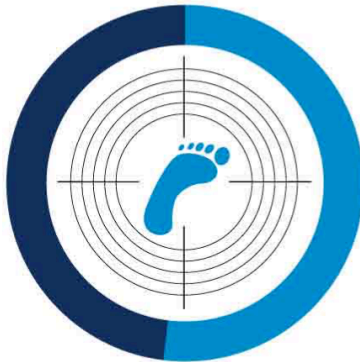
Source: Elaboration on EEA and ICE data ; ICTSD, 2017.

Negative effect of *carbon price signal* on stock values of carbon-intensive power production companies ?



RESEARCH QUESTION :

Does the carbon price signal of Phase III of the EU ETS generate a loss of market value of Italian electricity production companies according to their carbon intensity?



RESEARCH METHODOLOGY :

STEP 1: Analysis of the Italian Power Market

STEP 2: Multivariate time-series regression model to test the effect of EUAs' returns on the returns of three different portfolios of stocks of Italian power production companies

Analysis of the Italian Power Market (I)

1999

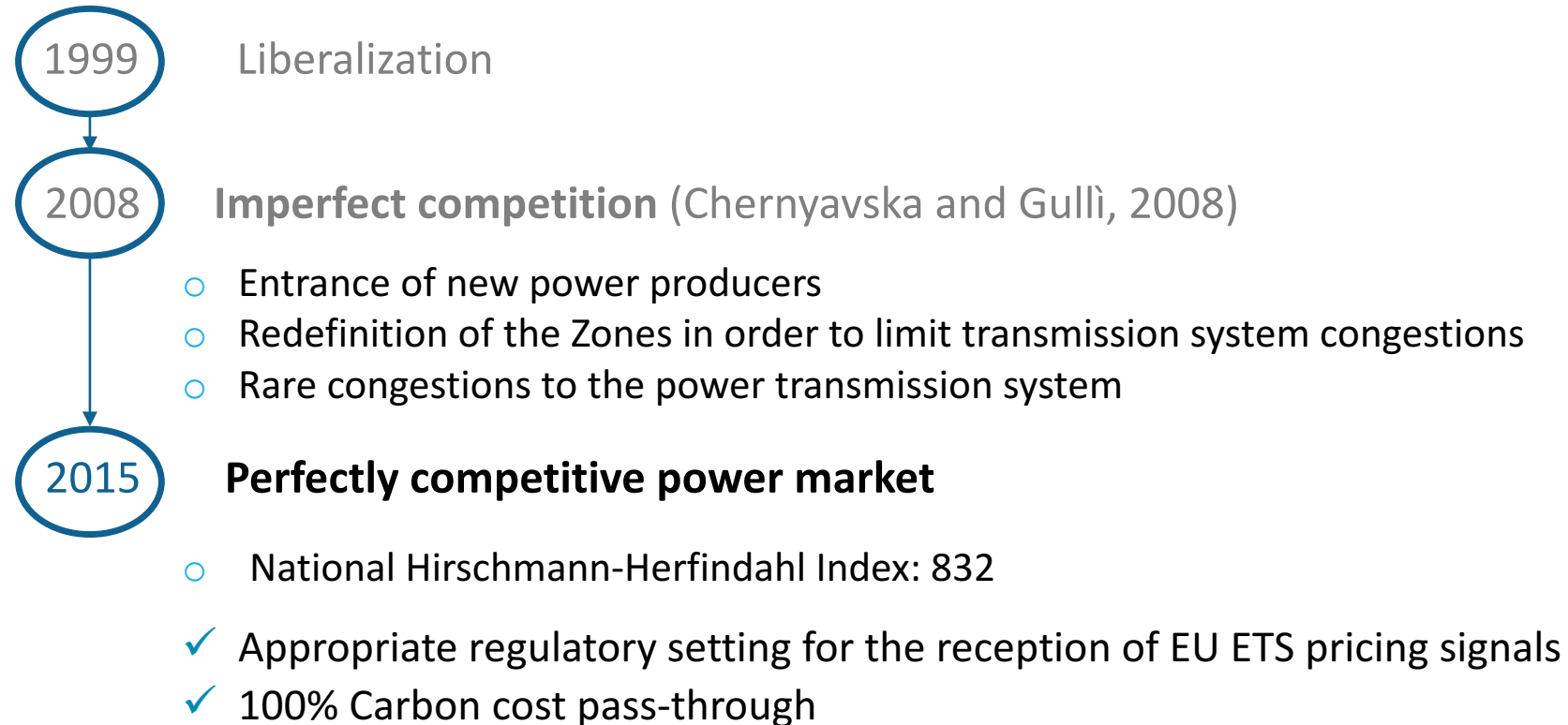
Liberalization

- Breakup of the state-controlled monopolist Enel
- Zonal market
- Merit-order criterion for the determination of the PUN (national single price)
- Frequent congestions to the power transmission system → Zonal sub-markets

2008

Imperfect competition (Chernyavska and Gullì, 2008)

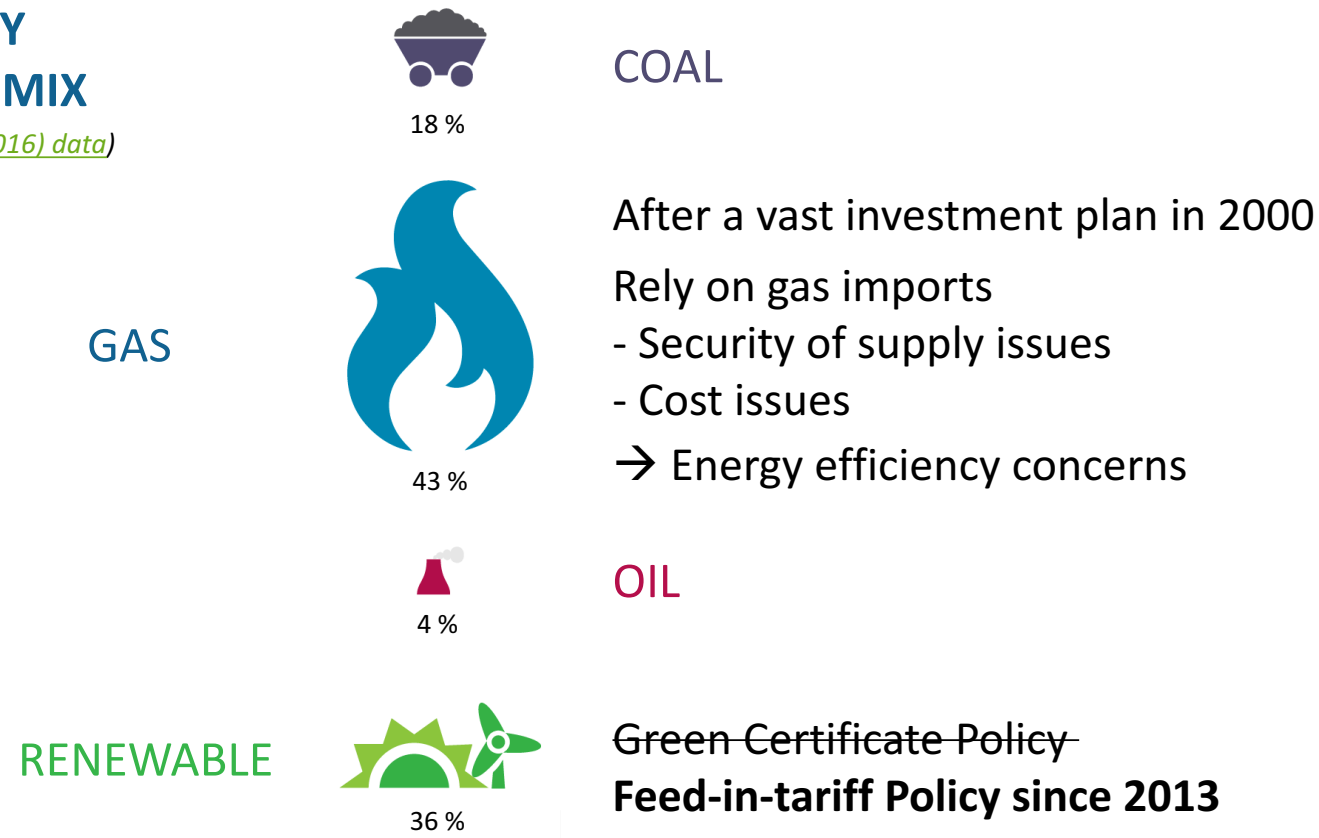
Analysis of the Italian Power Market (II)



Analysis of the Italian Power Market (III)

GROSS ENERGY PRODUCTION MIX

(Elaboration on [Terna \(2016\) data](#))



Regression Analysis (I)

Multivariate time-series regression model :

$$r_{Portf, it} = \beta_1 + \beta_2 r_{Oil\ t} + \beta_3 r_{Gas\ t} + \beta_4 r_{Coal\ t} + \beta_5 r_{P_{Elec}\ t} + \beta_6 r_{Fin\ Market\ t} + \beta_{carbon, i} r_{carbon\ t} + \varepsilon_i$$

r = returns (log first differences)

t = weeks (Jan 2013 – March 2017)

i = Portfolio

1. Carbon-intensive portfolio

Portfolio composed by the biggest carbon-intensive power production companies

2. Clean portfolio

Portfolio of renewable energy companies

3. Clean – Carbon-intensive portfolio

Regression Analysis (II)

Multivariate time-series regression model :

$$r_{Portf, it} = \beta_1 + \beta_2 r_{Oil\ t} + \beta_3 r_{Gas\ t} + \beta_4 r_{Coal\ t} + \beta_5 r_{P_{Elec}\ t} + \beta_6 r_{Fin\ Market\ t} + \beta_{carbon, i} r_{carbon\ t} + \varepsilon_i,$$

r = returns (log first differences)

t = weeks (Jan 2013 – March 2017)

i = Portfolio (1,2,3)

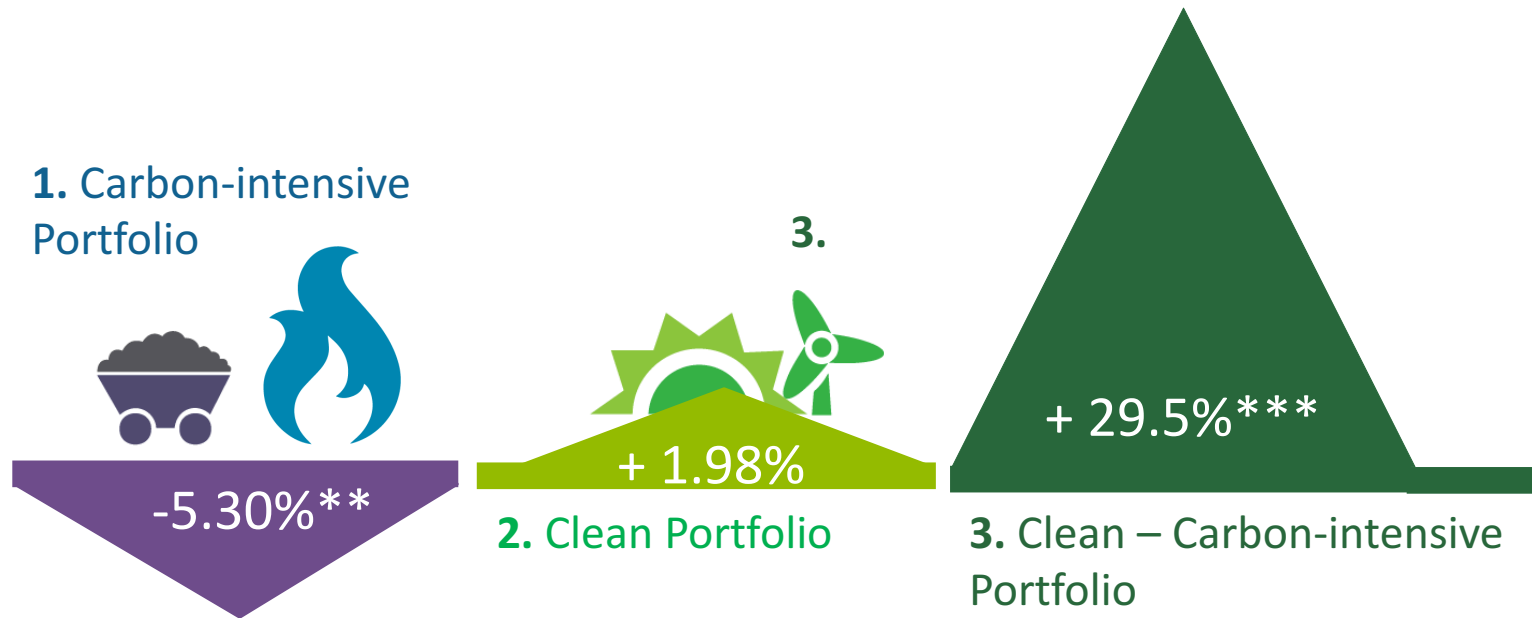
Independent Variable:

carbon = EU Allowances Future contract (Dec 2017) continuous price

Control variables:

- Oil commodity;
- Gas commodity;
- Coal commodity;
- Electricity Prices - Italian Energy Agency;
- Financial Market (FTSE MIB index) .

Results (I)



Robustness check of the assumptions

Electricity price determinants (Multivariate time-series regression) – ✓ 100% Carbon cost pass-through

Results (II)

In the context of the study, financial investors perceive carbon emissions as:

- a pervasive risk factor,
- which translates into an even higher opportunity cost when renewable energy subsidies are in place.

Despite EU ETS *carbon price* is not able to drive innovation on its own,
EU ETS *carbon price signal* is able to drive the expectations of financial investors.

Conclusions

The climate discussions of the last years (EU ETS Phase III) have given political impetus to accelerate climate action. The sense of urgency has increased.

- ✓ Financial investors respond to climate policy signals by reducing their investments in carbon-intensive companies.
- ✓ EU ETS policy has been delivering effective carbon signals despite its carbon price levels.

National incentives for renewable energy sources of power can be a powerful complement to the carbon price signal.

THANK YOU
