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Climate Change
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the Environment

System responsiveness and the European Union Emissions Trading System

Luca Taschini, Sascha Kollenberg and Chris Duffy

Policy paper

January 2014

Centre for Climate Change Economics and Policy
Grantham Research Institute on Climate Change and
the Environment

CHANGING
THE EUROPEAN DAHRENDORF
DEBATE SYMPOSIUM

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The 2013 Dahrendorf Symposium on 'Changing the European Debate: Focus on Climate Change' took place at the Akademie der Künste, Pariser Platz, Berlin, on 14 and 15 November 2013. The symposium is an initiative of the Hertie School of Governance, the London School of Economics and Political Science (LSE) and Stiftung Mercator. Its objective is to shine a light on how academia can have a productive influence on socio-political discourse and aims to offer European perspectives on the most pressing global challenges of our time. Further details about the symposium can be found at: <http://www.dahrendorf-symposium.eu/>

FP7 ENTRACTE - This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 308481.

This policy paper is intended to inform decision-makers in the public, private and third sectors. It has been reviewed by at least two internal referees before publication. The views expressed in this paper represent those of the author(s) and do not necessarily represent those of the host institutions or

fundings. This paper is based on a presentation at the 2013 Dahrendorf Symposium.

Executive Summary

Whether the European Union Emission Trading System (EU ETS) needs to be reformed, and if so how, is an important issue in the European policy debate.

A key question is whether the objective of the EU ETS is solely to bring down greenhouse gas emissions at least cost, which it is achieving, or whether it also intended to deliver a price signal that induces low-carbon innovation, which it is not achieving on a significant level. The European Union Emissions Trading Directive is not explicit about the latter objective, giving those who argue that reducing greenhouse gas emissions is the only aim of the EU ETS, and that a reform of the system is therefore not necessary, a relatively good opportunity to do so.

This policy paper argues that reforming the EU ETS is justified whether or not one believes that stimulating low-carbon innovation is an objective of the EU ETS. In particular, this paper argues that a large part of the problem is that market agents believe there is an excessive market imbalance and, consequently, the price of allowances (EUAs) will remain low even when the European economy returns to growth. This arises because the regulator (the European Commission) is unable to respond to downward price shocks by withdrawing allowances.

The crucial point is to incorporate a responsiveness mechanism into the EU ETS so that it would change the perception of market agents that the price of EUAs can remain low for long periods after unexpected price shocks. A responsiveness mechanism would encourage regulated businesses to bank EUAs while the price is low.

To be effective, the mechanism would have to be based on a transparent system of rules for determining when EUAs should be injected or withdrawn. The price trend over a given time period would appear to be the most transparent and simple trigger for a withdrawal or injection of EUAs. Here, the mechanism could extend Article

29(A) of the European Union Emissions Trading Directive which enables the injection of EUAs when, for more than six consecutive months, the EUA price is higher than the average price of the EUAs during the preceding two years. Accordingly, the mechanism would enable the withdrawal of EUAs, when for a given period (that which is stipulated in Article may or may not be the correct time period), the price trend is significantly lower than during a preceding pre-determined time period.

Once a withdrawal or injection of EUAs has been triggered, the European Commission will have to calculate the volume of EUAs to be withdrawn. This calculation should be based on the time remaining in the current market phase, the number of EUAs that remain to be auctioned and future projected emissions.

If the mechanism described here is implemented, it could induce self-adjusting behaviour by market agents. When the price of EUAs either persistently rises or falls over a given time period (for instance 6-12 months), businesses will expect an intervention in the market. In particular, when there is a relatively higher rise in the price trend, businesses would face a situation where they expect an injection of EUAs. So, for those businesses in possession of excess of EUAs, it would seem to be in their interest to sell; for those businesses in shortage of EUAs it would seem to be in their interest to wait. When there is a relatively large decreasing price trend, businesses would face a situation where they expect withdrawal of EUAs. So, for those companies that are short of EUAs, it would seem to be in their interest to buy; for those businesses having an excess of EUAs it would seem to be in their interest to wait.

1. Introduction

Whether the European Union Emission Trading System (EU ETS) needs to be reformed - and if so how - is an important issue in the European policy debate.

The debate about reform was prompted by a marked and persistent drop in the price of allowances (EUAs) from €30 in January 2008 to €4.50 in July 2013. There is a broad consensus that the weak price of EUAs has been caused by a number of factors: the economic recession; the overlap with other policies, such as renewable energy policy and energy efficiency policy; a pronounced short-termism;¹ and general uncertainty about long-term emission targets within the European Union and internationally (Aldy & Stavins, 2012; Neuhoff *et al.*, 2012; Egenhofer *et al.*, 2012; Van den Bergh *et al.*, 2013; Piris-Cabezas & Lubowski, 2013).

There appears to be much less consensus on whether the current low price is *per se* a problem that warrants regulatory reform (CEPS, 2013; Grosjean 2013; Verdonk *et al.*, 2013). Differences of opinion on this point usually originate from different perceptions about the implicit objectives of the EU ETS. For some, the EU ETS was established purely to reduce greenhouse gas emissions at least-cost (Goulder, 2013, and references therein). Others expected the EU ETS to not only deliver greenhouse gas emission reductions, but also to provide a price signal that induces technological innovation (for example, see the Ministerial call for ambitious and immediate low carbon action by the European Union; EC, 2013).

There is an ongoing debate about whether stimulating low-carbon investment is a stated aim of the EU ETS (CEPS, 2013; Grosjean *et al.*, 2013). This has made the debate about its reform a polarised, political topic and distracted from the real issue: the lack of ‘responsiveness’ in the system. This policy paper argues that reforming the EU ETS is justified whether or not one believes that stimulating low-carbon

¹ ‘Short-termism’ means an excessive short-term focus by some corporate leaders, investors, and analysts, combined with insufficient regard for long-term strategy. Such a view can undermine the market’s credibility, and discourage long-term investments.

innovation is an objective of the EU ETS. In particular, the paper argues that a significant problem for the EU ETS is market agents believing there is an excessive market imbalance, which means that the price of EUAs will remain low even when the economy of the European Union returns to growth. This arises because the regulator (the European Commission) is unable to respond to unexpected downward price shocks by withdrawing EUAs.²

Intuition suggests that making the system more responsive to changes in economic circumstances has appeal. This is supported by research which shows that loosening the cap when the price of EUAs is extremely high and tightening it when the price is extremely low could lower the expected cost of achieving emission reduction targets.³

In an attempt to increase the price of EUAs and restore credibility in the EU ETS, the European Parliament has passed proposals to temporarily withhold, or 'backload', 900 million EUAs from the system, releasing them back to the market at an unspecified point before 2020. However, as analysis in this paper shows, backloading is insufficient because although it will mean that EUAs will be scarcer in the short-term, there is no impact on the long-term market price expectation. Even a one-time measure that permanently withdraws EUAs is insufficient because, although it will have an impact on the market price expectation, and so the price of EUAs would rise, its one-time nature is limiting. Structurally, such a measure still leaves the EU ETS vulnerable to unexpected future economic and technology shocks in the future. Therefore, one-time measures treat the symptom of the problem – weak price – rather than the cause – a lack of system responsiveness.

² The EU ETS has a provision for the event of excessive price; Article 29a, accounts for the possibility to make available allowances when "for more than six consecutive months, the allowance price is more than three times the average price of allowances during the two preceding years".

³ This is related to the academic literature that investigates price-quantity combinations (Weitzman, 1974; Hepburn, 2006; Gruell & Taschini, 2011; Goulder & Schein, 2013).

Currently, the European Commission cannot intervene in the EU ETS in response to unforeseen economic or technological shocks in a way that alters market price expectation. There is a wide range of conceivable mechanisms that could achieve this. A supply management system that can inject and withdraw permits from the market, based on an agreed set of rules, is appealing to a broad range of stakeholders because it would be non-discretionary and would require minimal intervention in the market.

The crucial point about incorporating a responsiveness mechanism into the EU ETS is that it would change the perception that the price of EUAs could remain low for long periods after a severe change in the economic circumstances.⁴ This would encourage regulated businesses to bank EUAs when the price is low, and have an upward effect on the price. Using the 2008 economic crisis as an example; had such a responsiveness mechanism existed prior to the crisis, the latent threat that the European Commission could have withdrawn EUAs in response to their rapidly falling price would have changed market perceptions, encouraged banking of EUAs, mitigated the price collapse and caused the EUA price to follow the economic recovery more closely, rather than stagnating as it has done.

This paper gives an overview of how a responsiveness mechanism could work. It suggests that a rules-based reserve management system could be designed using a double trigger: a price-trend trigger indicating the timing of the intervention and a volume-based trigger indicating the magnitude of the intervention.

⁴ Given the large uncertainties prevalent in carbon policy, we are suggesting a policy that is itself contingent on other factors.

2. What is the issue, if there is an issue?

The low price of EUAs in the EU ETS is not necessarily a problem. In a cap-and-trade system, the number of EUAs is, by design, highly inelastic in the short term, changing only as a result of government policy decisions (for example, a one-time allowance removal). With highly inelastic supply, shifts in demand can cause significant price changes. However, the ups and downs of the EUA price can play a beneficial role.

During economic downturns, the demand for EUAs will fall, which also causes their price to fall. The lower price is desirable because it softens the impact of the pollution regulation on businesses during the difficult economic times. This is what happened in 2008: the economic recession, coupled with overlapping policies,⁵ put downward pressure on the EUA demand and, unsurprisingly, their price fell.

The current supply-demand imbalance in the EU ETS is expected to persist until the end of the third trading period in 2020. Although rules allow EUAs to be banked for use in future phases after 2020, the persistence of the low price even though some Member States are undergoing economic growth again indicates that the market as a whole believes that the system is significantly oversupplied even over the long term. Research by Piris-Cabezas & Lubowski (2013) shows that, without intervention,⁶ the existing oversupply of EUAs will be absorbed very slowly and so EUA prices will remain relatively low for longer; not reaching a level comparable with the pre-2008 prices until the mid-to-late 2020s (**THIS IS NOT WHAT FIGURE 1 SHOWS!**). The large oversupply has distorted the orderly functioning of the EU ETS so that, despite economic growth across Europe since the 2008 crisis, there has been

⁵ New energy efficiency or renewable obligations, as currently contemplated, are liable to affect future allowance demand. Economic theory as well as recent experience shows that policy interactions can significantly reduce both environmental effectiveness and cost-effectiveness. This is particularly important in the case of cap-and-trade (Lecuyer & Quirion, 2013).

⁶ The analysis by Piris-Cabezas & Lubowski (2013) suggests that the market is currently behaving as if the surplus will be absorbed very slowly, which is only consistent with a very high discount rate from holding and banking allowances - given future post-2020 targets and assuming that information about those future targets is absorbed incrementally over time.

no upturn in the price of EUAs. This is muting the incentive for businesses to reduce emissions.⁷ What seems to be missing is the ability of the policy regulator to respond to unforeseen changes in the economic circumstances⁸ that generate downward price pressure. Lack of system responsiveness depresses demand to bank or purchase EUAs and, consequently, keeps their price low.

⁷ In other words, the inter-temporal efficiency of the system is undermined by the large oversupply.

⁸ More generally, what seems to be missing is the ability of the policy regulator to respond to changes in economic circumstances, technological advancement and complementary policies.

3. The exam question: A rules-based ‘responsiveness’ mechanism

The European Commission has attempted to increase the price of allowances (EUA) by temporarily withdrawing, or backloading, 900 million EUAs from the market. The EUAs will be released back into the system at an unspecified date before 2020. The backloading proposal means that EUAs will be scarcer in the short term, which some analysts predict will increase their price by approximately 35 per cent to €6 by the end of 2014 (Thomson Reuters, 2014). However, there will be relatively little impact on the long-term market price expectation, so backloading alone will be insufficient to restore the proper functioning of the market.

Even if the backloaded EUAs were permanently withdrawn from the EU ETS, such one-time measures leave the system vulnerable to future unexpected economic and technology shocks. Hence, one-time measures address the symptoms of structural weakness - low EUA prices - but not the cause: the perception that the price will remain low due to oversupply and that the regulator cannot intervene to change the situation.

In order to change the market perception, the system has to have – and be known to have - the ability to respond to situations of significant oversupply. Article 29(A) of the European Union Emissions Trading Directive introduces the possibility for the European Commission to respond when, for more than six consecutive months, the EUA price is higher than the average price of the EUAs during the preceding two years, by injecting new EUAs into the system. Using this provision, we suggest the introduction of an article that is similar in spirit and introduces the possibility of withdrawing EUAs. Figure 1 shows the impact that a responsiveness mechanism could have on the price of EUAs.

Figure 1. Modeled EUA price from 2014 to 2020 with and without ‘responsiveness’



Key

Blue line – Historic EUA prices 2008 to 2013

Purple line – Simulated EUA prices 2013-2020 where there is no responsiveness mechanism adopted (and no one-time permanent removal of permits)

Green line – Simulated EUA prices 2013-2020 where a responsiveness mechanism is incorporated in 2013 (an exemplary withdrawal of allowances is made in 2014 and 2016)

Note* a similar simulation of EUA prices 2013-2020 ‘without responsiveness’ can be found in Piris-Cabezas & Lubowski (2013).

The inability of the EU ETS to respond to the downward price shock depresses the incentive to bank or purchase EUAs. This is what we observe in Figure 1 from 2009 onwards. EUA prices stay low until the oversupply is entirely absorbed in the system, as observed in the **purple line**. However, as soon as a responsive mechanism, as described here, is introduced, the price of EUAs rises more quickly because of the combined effect of a withdrawal of EUAs and the increased incentive the mechanism

provides for businesses to bank EUAs while their price is low in anticipation of a possible withdrawal.⁹ The **green line** in Figure 1 shows this result.

There are a number of options for the design of a responsiveness mechanism for the EU ETS. A natural approach would be to index the emissions cap to an economic activity indicator. Indexing will adjust the emission cap to changes in the economy and, ultimately, make the cap respond to shocks. An indexed policy could be a better option than a fixed cap policy if somehow the post-shock cap is adjusted properly.¹⁰ That would require an appropriate indicator. However, as observed by Newell and Pizer (2008), identifying the proper economic activity indicator is a complex task: the indicator should capture the direction and the right intensity of the shock.¹¹ The identification of the proper (under- or oversupply) indicator is crucial to the proper functioning of the mechanism.

Instead of indexing the cap to an economic indicator, we suggest a responsiveness mechanism such that the oversupply and undersupply of EUAs is controlled by the regulator in line with a transparent set of rules.¹² The rules would put in place a double trigger system, whereby the price trend (trigger 1) is used to identify if and when EUAs need to be withdrawn or injected from the system and a quantity-based trigger (trigger 2) to determine the magnitude of the withdrawal or injection. The

⁹ It is important to note that market participants should have confidence that the desired interventions will happen. We propose a transparent, rule-based mechanism that would maximise the confidence in an intervention.

¹⁰ Unexpected fluctuations in economic activity and technology development can result in shifts of the expected least-cost emissions reduction trajectory over time. Adjustments are then required in order to restore the optimality of the policy.

¹¹ Ellerman & Wang (2003); and Marschinski & Edenhofer (2010) show that the incentive for a lasting transformation of the regulated sectors is not necessarily stronger if an economic indicator is applied (for example, with an index or intensity target). Overall, their results suggest that indexed policies have potentially only modest benefits.

¹² The Technical Appendix to this paper provides an analysis of market behavior with and without a responsiveness mechanism. The analysis shows how market imbalances disrupt the orderly functioning of the allowance market. Based on the analysis, the mechanism described in the text is derived as a cost-effective and efficient means to reinstate the orderly functioning of the market.

response mechanism proposed adjusts the supply of EUAs by depleting or replenishing a reserve and can therefore be referred to as a rules-based reserve management mechanism. We do not suggest rules that generate price bounds based on administrative discretion, for example, a price floor or a price ceiling. Rather, we propose a trigger based on the daily rate of return over a past period (for instance, 6-12 months).

The mechanism could borrow from Article 29(A) which enables the injection of EUAs when, for more than six consecutive months, the EUA price is higher than three times the average price of EUAs during the preceding two years. Accordingly, the mechanism would enable the withdrawal of EUAs, when for a specified period (that stipulated in Article may or may not be the correct time period), the price trend is significantly lower than during a preceding and pre-determined reference time period.

The decision to intervene should be based on the price trend because:

- A price-trend trigger is the most transparent and simple indicator available.
- Regulated entities can try to exploit regulatory changes to their own advantage. A price-trend trigger cannot be easily manipulated - in particular when the trend is observed over a period of 6-12 months. A purely quantity-based trigger provides firms with an incentive to distort investment decisions in order to signal high under- or over-compliance and prepare the ground for more or fewer EUAs being released for subsequent trading periods (Harstad & Eskeland, 2010).
- A price-trend trigger can be incorporated by extending an existing mechanism in the form of Article 29(A) of the European Union Emissions Trading Directive.

Once a withdrawal or injection of EUAs has been triggered, the European Commission will have to calculate the volume to be withdrawn. This calculation

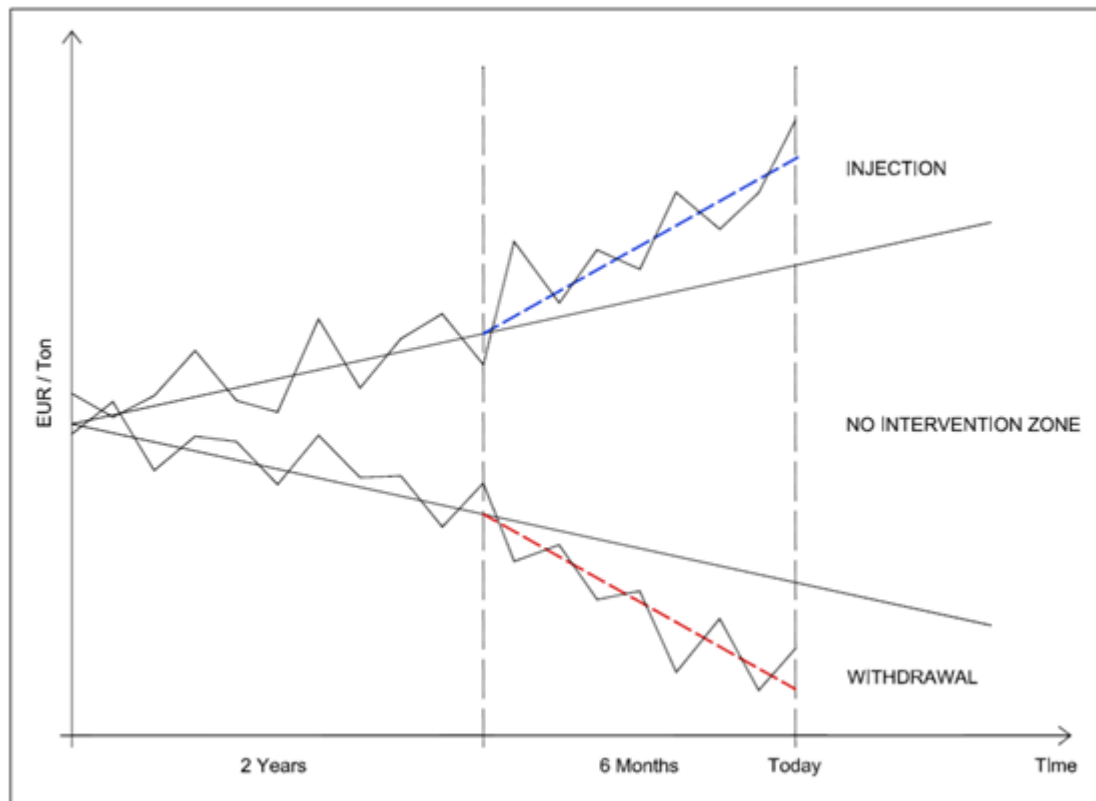
should be based on the time remaining in the current market phase, the number of EUAs that remain to be auctioned and future projected emissions.¹³

If the responsiveness mechanism described here is implemented, it will induce self-adjusting behaviour by market agents. When the price of EUAs either rises or falls over the specified period more quickly than the reference period, businesses will expect an intervention in the market (see dashed lines in Figure 2). In particular, when there is a relatively bigger rise in the price trend, businesses would expect an injection of EUAs (see the blue line in Figure 2). So, for those businesses possessing an excess of EUAs, it would be in their interest to sell in advance of the injection; for those businesses having a shortage of EUAs, it would be in their interest to wait until the injection. When there is a relatively bigger fall in the price trend, businesses would expect withdrawal of EUAs (see red line in Figure 2). So, for those businesses having a shortage of EUAs, it would be in their interest to buy in advance of the withdrawal; for those businesses possessing an excess of EUAs, it would be in their interest to wait until the withdrawal.

These dynamics (i) determine the level of intervention (quantity of allowances injected and withdrawn); and (ii) significantly reduce the level of intervention required to change the behaviour of market agents.

¹³ We show in the Technical Appendix that the price for EUAs can be decomposed into (i) the marginal abatement cost and (ii) the market implied under- or over-compliance level. This last component is used for the calculation of the volume of EUAs to be withdrawn from or injected into the system.

Figure 2. First trigger of the responsiveness mechanism – price trends for intervention



Key

Dashed red line – scenario in which, for more than six consecutive months, the EUA price trend is lower than three times the average price trend of EUAs during the two preceding years ⇒ withdrawal of EUAs

Dashed blue line - scenario in which, for more than six consecutive months, the EUA price trend is higher than three times the average price trend of EUAs during the two preceding years ⇒ injection of EUAs

This behavior is likely to mean that the mechanism will ‘trigger’ only when there are significant and unforeseen price shocks. Stakeholders should therefore be reassured that such a mechanism would not result in a highly interventionist approach by the European Commission, but rather, injection or withdrawal of EUAs would happen only infrequently and in exceptional circumstances.

4. Conclusions and policy recommendations

- Reforming the EU ETS is necessary whether or not one believes that the system should stimulate low-carbon innovation.
- Temporary and permanent one-time measures should be replaced by a mechanism that allows the system to automatically respond to changes in economic circumstances, technological advancement and complementary policies.
- We suggest a mechanistic response through which EUAs are withdrawn from or injected into the market, based on a pre-specified set of rules. We call this system a rules-based reserve management mechanism.
- We propose that the timing of an intervention should be dependent on price development over a specified timeframe (e.g. 6-12 months). Such a design is preferable to discretionary one-time measures because:
 - A trigger based on a price trend is transparent, is simple to explain, and gives the market clarity.
 - Such a trigger can be incorporated by extending an existing mechanism in the form of Article 29(A) of the European Union Emissions Trading Directive through which a trigger price is used to identify the contingency for intervention i.e. Article 29(A) stipulates that EUAs can be injected into the market when for more than six consecutive months, the allowance price is more than three times the average price of allowances during the two preceding years.
- Once a withdrawal or injection of EUAs has been triggered, the European Commission will have to calculate the volume of EUAs to be withdrawn. This calculation should be based on the time remaining in the current market phase, the number of EUAs that remain to be auctioned, and future projected emissions.
- If a second objective of the EU ETS is to send a price signal that is strong enough to promote innovation, the proposed rules-based reserve management mechanism could be effectively used to enforce a price target zone. A price target zone would depend on the combined objectives: to reduce carbon emissions at the least cost and to promote innovation. However, the European Commission needs to be explicit about these objectives and how it prioritises them. Whether a price target zone is desirable depends on these explicit objectives.

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