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Capital markets as greenhouse gas emission reduction drivers

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PARTICIPANTS IN INTERNATIONAL CAPITAL MARKETS TRADITIONALLY GATHER IN LONDON EVERY JUNE AT THE ANNUAL EUROMONEY BORROWERS AND INVESTORS CONFERENCE. INVESTMENT BANKERS AND THEIR CLIENTS LIKE TO TAKE THE PULSE OF THE MARKET AND DISCUSS THE LATEST HOT TOPICS.

The 2007 event was a memorable one, as the topic of sustainable development² compellingly captured the limelight. The Stern Report, published in the previous fall, was passionately debated. Later in the year, the members of the Intergovernmental Panel on Climate Change (IPCC) and Al Gore received the Nobel Prize, and the fledgling carbon market soon heralded record growth.

Capital markets have not only realised the exceptional potential for expansion on the key issue of climate change mitigation, they have also noticeably helped in developing this global public good. Capital markets could potentially bring considerable support to carbon markets. We discuss in this chapter how they could play a much stronger role in fostering emission-reducing investments worldwide.

Climate change mitigation: a global public good built on market power

The concept of sustainable development conveys a strong collective sense of responsibility towards future generations. It also provides a striking illustration of the power of free markets.

The global political responsibility for mitigating climate change has gradually become a strong commitment. The United Nations Framework Convention on Climate Change (UNFCCC), the landmark 1992 Rio treaty, recognised three principles:

- 1) *Precaution* (the lack of scientific certainty is no excuse for postponing preemptive measures);
- 2) *Common but differentiated responsibility* (industrialised nations carry a greater responsibility than less developed ones); and
- 3) *Preserved right to development* (for developing economies). In the 1997 Kyoto Protocol, 38 industrial countries (the so-called ‘Annex B countries’) agreed on a commitment to reduce their greenhouse gas (GHG) emissions by at least 5.2% below their 1990 level over 2008-2012.

In addition, the Kyoto Protocol (Kyoto) created a powerful tool – the market for GHG emissions rights. Carbon markets would help Annex B nations benefit from the most cost-efficient emission-reducing projects anywhere – either in Annex B or in developing countries – as the globe has but a single atmosphere. In this global cap-and-trade scheme, a direct application of the economic theory on externalities³, carbon markets would provide an efficient price signal and raise the awareness that natural resources can no longer be exploited for free.

Kyoto created two categories of instruments:

- 1) allocated emission rights, or Assigned Amount Units (AAUs); these are allocated to Annex B countries and correspond to the caps placed on their GHG emissions; and

2) Project-based emissions reductions (ERs) generated by projects located in either developing countries, i.e., Certified Emission Reductions (CERs), or in Annex B countries, i.e., Emission Reduction Units (ERUs). Kyoto opens the choice between domestic reduction effort and the purchase of carbon rights (see Exhibit 1).

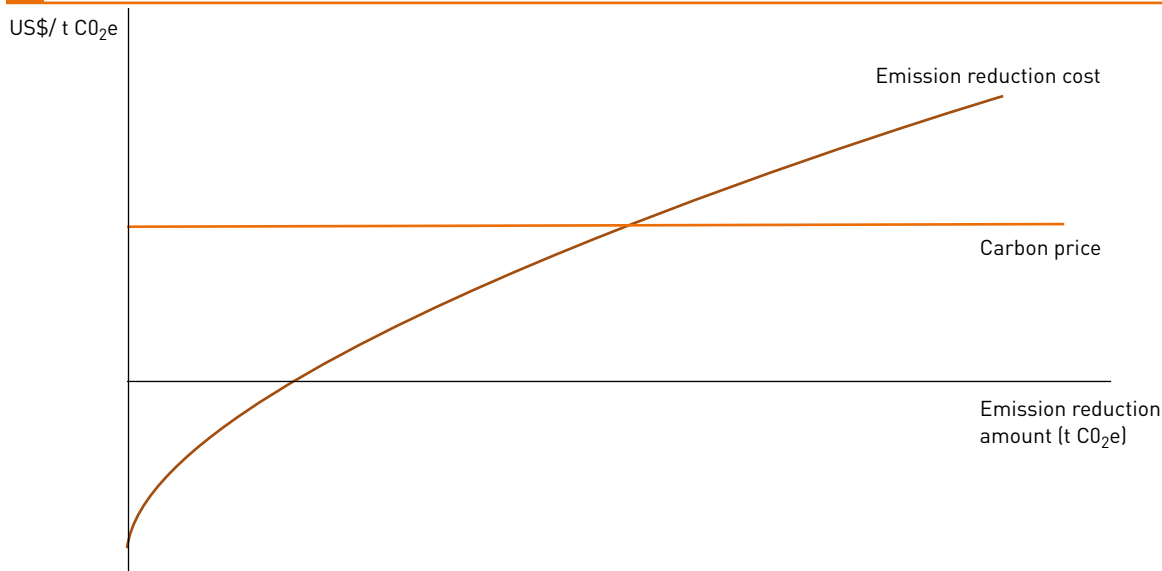
ER markets first developed slowly. The World Bank set up the first carbon fund, the Prototype Carbon Fund (PCF) in 2000. Since then The World Bank Carbon Finance Unit (CFU) has been continuously purchasing ERs using money contributed by governments and companies in OECD countries. CFU's operations have been shown to increase the bankability of emission-reducing projects. There are now 11 carbon funds and facilities pooling the stakes of 16 governments and 66 companies for a total of US\$2.2bn⁴.

The largest carbon market today is the EU Emission Trading Scheme (ETS), started in 2005 as a regional EU cap-and-trade system, consistent with Kyoto. Tradeable emission rights called EU Allowances (EUAs) are allocated to 12,000 entities in 27 European countries.

Voluntary emission trading schemes were also developed, in particular in the US (the US is not a Party to Kyoto), but the Kyoto mechanism and the EU ETS are by far the main schemes.

There are classically two ways to look at carbon rights. They can be thought of as a commodity, i.e., an input (and a source of cost) reintegrated in the productive process. They can also be seen as a currency. The comparison is particularly compelling for AAUs and EUAs. EUAs are issued, in a way similar to a central bank creating money, in amounts which condition their value relative to other currencies (€ and US\$), and which are determined by a public authority – the European Commission. Project-based CERs and ERUs would then correspond to bank money in that they are created by the private sector, except that there is no control on the quantity created. There are several currencies which are linked to specific carbon amounts (1 CER = 1 tonne CO₂e⁵) but with different conversion rates (1 CER = US\$17, 1 EUA = €20), depending on quality and acceptability.⁶

A carbon emitter with a mandatory cap can compare its internal emission reduction cost with the market price of carbon **Exhibit 1**



Source: World Bank

This currency paradigm suggests a close relation to capital markets. Carbon markets have actually been built and developed on the very foundations of capital markets.

Carbon market growth is deeply rooted in capital markets

Carbon markets have experienced tremendous growth over the past three years with transactions rising from US\$11bn in 2005 to US\$64bn in 2007 in value. This dollar figure is equivalent to a size of 3 billion metric tonnes CO₂e (CO₂ equivalent). Between the two main market segments, Kyoto roughly represents 0.9 billion tonnes while the EU ETS accounts for 2 billion tonnes CO₂e.

The EU ETS is now by far the most developed and most active market for emissions trading. The development of a consistent and interconnected system of registries in the EU, the Community International Transaction Log (CITL), allowing for delivery, custody and book keeping of carbon rights has brought considerable support to the market. Several

exchanges were launched in 2005, offering contracts for spot and future EUAs (ECX, Bluenext, Nordpool) as well as clearing services including delivery-versus-payment settlement. In fact, the CITL provided to the EU ETS a ready-made access to the entire, pre-existing capital market infrastructure, not only in terms of access to the settlement and clearing systems, but also in terms of access to a powerful trading platform: dealers' trading teams, analysts, law firms, market data, etc.

By contrast, Kyoto markets (AAUs, CERs, and ERUs) have not grown as quickly in the absence of a solid connection to the capital market infrastructure. In fact, the International Transaction Log (ITL), which would connect all registries to the UN registry and facilitate settlements in a way similar to the CITL, will not be fully operational until end-2008. The CER market, the largest Kyoto segment, has long remained essentially a primary market centred on Emission Reduction Purchase Agreements (ERPAs) – forward sales of CERs to be generated by a project.

As a result, CER prices (spot and forward) are driven by the value of EUA contracts. EUAs assigned in the first period of the

Future prices EUA December 2008 and CER December 2008

Exhibit 2



Source: World Bank, Bloomberg

EU-ETS (2005-2007) were not permitted to be carried over to the second period (2008-2012), and since the emissions caps were over-estimated, the EUA price collapsed in 2007. But allocations have been tightened for the second period, while EUAs assigned for 2008-2012 are bankable for the following phases. The price of the EUA December 2008 Futures contract has stabilised in the range of €20-€25 per t CO₂e.

A secondary market for CERs has started to develop though, and CER futures contracts (relying on the ITL being fully connected by December 2008, the first delivery date) have been launched in 2008⁷. In terms of flows, EUA and CER/ERU markets have been dominated so far on the offer side by the initial EUA amounts allocated and the production capacity of CER/ERUs worldwide, and on the demand side, mostly by compliance buyers.

Capital markets could more decisively enlarge participation in emission reduction markets.

Capital markets could play a more central role in carbon emission reduction

Carbon markets have enormous potential for further expansion and are poised for rapid growth as the international community becomes more involved and reaches agreement on post-2012 collective action. Such growth could be substantially accelerated by capital markets.

Investors worldwide are ready to participate actively, as amply evidenced by the remarkable increase in the population of socially responsible investors (SRIs) over the recent years. In response, capital markets have introduced a rapidly expanding class of SRI (or green or clean) stock indexes comprised of environmentally responsible firms. Investments in these indexes channel capital flows to emission reduction efforts. In 2007-2008, the three World Bank ECO₃-plus bonds and the European Investment Bank's Climate Awareness Bond provided apt illustration of the rising role of SRI-focused transactions in the international capital markets (see Exhibits 3 and 4).

But capital could also flow towards the core, where the price of emission reduction is established. On the demand

World Bank's 'ECO 3-Plus' bond Exhibit 3

Description	Bond linked to 'green' stock index
Amount	€230m
Maturity	Six years
Return	Linked to the performance of equity index comprised of stocks of firms engaged in alternative energy, water, and waste management projects, as well as in the production of catalysts used to reduce environmental pollution.
Other features	<ul style="list-style-type: none"> • The debt issue was accompanied by an extensive marketing campaign aimed at enhancing investor awareness and stimulating demand for 'green' debt issues. • The bond was targeted at SRIs in the retail sector in Europe

Source: World Bank

EIB's climate awareness bond Exhibit 4

Description	Bond linked to 'green' stock index
Amount	€600m
Maturity	Five years
Return	Linked to the performance of the FTSE4Good Environmental Leaders Europe 40 Index. The index consists of large European companies with leading environmental management practices. <ul style="list-style-type: none"> • At maturity, investors have the option to use a portion of their return to buy and cancel EUAs
Other features	<ul style="list-style-type: none"> • It was the first bond to be publicly offered to investors across the 27 EU member countries. • The funds raised were earmarked for disbursement to future EIB lending projects within the fields of renewable energy and energy efficiency.

Source: World Bank

side, the carbon markets to date have been dominated by compliance buyers⁸. Even a small fraction of global investors' portfolios could make a significant difference in bringing a critical mass of liquidity (and thereby price efficiency) to the very heart of carbon finance.

This would take innovation in designing carbon-linked instruments (bonds or funds). Investors should be able to take different views on EUA or CER or ERU prices while always adding to the liquidity (i.e., capital market investors could be either net buyers or sellers of carbon, contrary to compliance buyers which are structural buyers). Notes with embedded options on the December 2008 futures contract have been offered already to institutional investors in Europe, including to high net worth investors. The challenge is now to make primary markets (CERs and ERUs) directly accessible.

Innovative instruments can also be offered which link more directly with projects generating emissions reductions. An example is given by the recent World Bank bond known in the market as CO₂L bond or 'Cool' bond⁹ (see Exhibit 5).

The World Bank Cool Bond issued in June 2008 was the first CER-linked bond, referencing a specific project, a hydropower plant located in the Guizhou Province in China. It was targeted primarily at Japanese high net worth retail investors (with 100% principal protection), offering a coupon linked to future CER market prices and subject to the actual vs. estimated delivery of CERs to be generated by the project.

By purchasing this bond, investors participate in the emission reduction effort. They create demand for CERs generated from a specific UNFCCC-registered clean energy project¹⁰.

Carbon securities can constitute a new asset class for sustainable development

Carbon linked securities can create an attractive new asset class with high diversification power and genuine social responsibility content. This asset class would meet the demand of a wide array of investors from money managers to hedge funds and pension funds. Capital

World Bank Cool Bond: summary of terms

Exhibit 5

Description	CER Linked US\$ denominated bond
Amount	US\$25m
Maturity date	September 30, 2013
Offering period	June 9, 2008 – June 24, 2008
Issue date	June 26
Coupon	After an initial 15-month period with a fixed coupon of 3%, the note will pay a variable interest rate. The variable rate is linked to the future performance of CER market prices and the actual vs. estimated delivery of CERs that will be generated by a hydropower plant located in the Guizhou Province in China.
Denomination	US\$100,000
Settlement	Euroclear
Listing/law	Unlisted/English Law

Source: World Bank

markets can successfully offer sustainable investments and provide a range of risk management solutions to compliance buyers and emission right producers. Capital markets could more proactively bring their expertise, innovation skills and leadership to what appears to be a win-win case. A rapid growth in carbon markets would together accelerate and reduce the cost of climate change mitigation efforts. It would benefit all capital market participants including dealers.

Notes:

1. The authors would like to thank for their input and comments: Doris Herrera-Pol, Hennie Van Greuning (World Bank Treasury), Alex Kossoy (World Bank Carbon Finance Unit), Philippe Ambrosi (World Bank Environmental Department).
2. The birth of the concept of sustainable development goes back to the publication of the Brundtland Report in 1987.
3. Externalities exist when producers can use resources at no cost while reducing the well-being of many. This market failure calls for governmental action, typically implemented through imposition of taxes. In 1960, the economist Ronald Coase proved that the creation of a market for pollution rights could achieve the same result by simply relying on market forces.
4. The two most recent funds proposed by the World Bank are the Forest Carbon Partnership Facility, launched in June 2008, targeting

deforestation and forest degradation, and the Carbon Partnership Facility, designed to develop emissions reductions and support their purchase over long periods after 2012.

5. 'CER' means a unit representing one metric tonne of CO₂ equivalent issued in accordance with Article 12 of the Kyoto Protocol.
6. There may also be restrictions on convertibility (CERs can substitute for EUAs in the EU ETS up to a certain amount only).
7. In 2007, CERs with guaranteed delivery became more widely and strongly contributed to the growth of the secondary market. Before that, an investor buying forward CERs associated with a project was taking the risk that some of these CERs would not be delivered by the producer.
8. An estimated US\$9.5bn was invested in 58 carbon funds in 2007. Analysts forecast the capitalisation to increase to US\$13.8bn with a substantial increase in funds seeking to provide cash returns to investors in the new capital inflow and more funds taking larger risks through participation in equity (I. Cochran and B. Leguet (2007), Mission Climat Caisse des Dépôts).
9. "CO₂L" and "CO₂L Bond" are the registered trademarks of Daiwa Securities SMBC Principal Investments Co. Ltd.
10. Investors in the Cool Bond carry the CER non-delivery risk (although their capital remains protected). Products could be also designed, based on portfolios of projects, with guaranteed CERs or tranches of different seniority regarding delivery.



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