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Derivatives in crisis: Policy choices for Europe

The financial crisis has thrown the spot on a class of financial instruments, which is often seen as incomprehensible and designed by banks just to generate money: derivatives.

In spite of all negative publicity¹, derivatives can play a beneficial role for the economy. However, as the crisis has demonstrated, they can entail significant risks for financial stability. In this article, we present several avenues for improving the stability of derivative markets. First, it is outlined what derivatives are and the benefits and risks they entail. We then discuss possible tools that can be used to lessen their impact on financial stability, taking inspiration from the Communication the European Commission published on 3 July 2009².

¹ They have been called, *i.a.*, «financial weapons of mass destruction».

² European Commission (2009), *Ensuring efficient, safe and sound derivatives markets*, COM(2009) 332 final, accompanying Staff Working Paper, SEC(2009) 905 final and Consultation Document *Possible initiatives to enhance the resilience of OTC Derivatives Markets*, SEC(2009) 914 final; for download at: http://ec.europa.eu/internal_market/financial-market/derivatives/index_en.htm.

What are derivatives?

Derivatives are financial contracts, concluded between two parties in order to trade and redistribute risks in the economy. They are called derivatives, as their value is "derived" from an "underlying", which can be a financial instrument, a commodity, a market price like the interest or exchange rate, or credit risk. One possible way of classifying derivatives is therefore by type of underlying.

Although derivatives come in many flavours, the three basic structures of derivatives are forwards, options and swaps. A forward is a contract whereby two parties agree to exchange an underlying asset at a pre-determined point in time at a pre-determined price. For example, the buyer of an oil forward contract has the right (and obligation) to buy a certain quantity of oil, at a certain date in the future and for a certain price from the seller of the contract. Forwards that are traded on exchanges are called futures. Under a swap agreement, two counterparties agree to exchange one stream of cash flow against another. An option is a contract that gives the buyer the right (but not the

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Abstract

Derivatives are a tool to share risks in the economy and can thus provide a benefit to the economy.

The financial crisis has demonstrated that they can also pose significant risks to financial stability. These are related to the exponential growth in derivatives over the last decade, increasing leverage and interconnectedness of financial institutions.

This went largely unnoticed by markets and prudential supervisors, because derivative markets are predominantly organised in bilateral relationships, which makes them intransparent.

The article discusses policy tools to remedy the flaws in derivative markets, taking inspiration from a recent communication by the European Commission.

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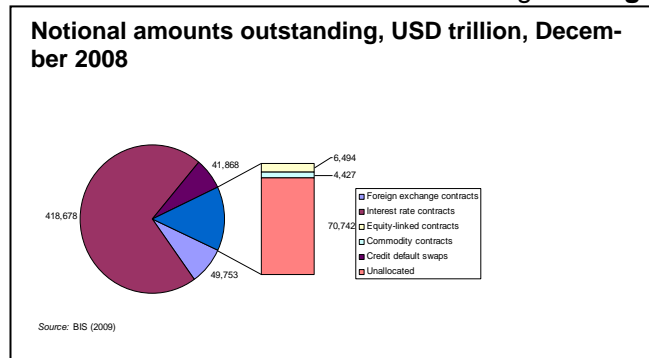
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obligation) to buy or sell the underlying asset at a certain point in time at a pre-determined price.

Two ways of trading derivatives can be distinguished. Those contracts that incorporate a high degree of standardisation are typically traded on organised trading venues (for the most part on exchanges, where prices are publicly displayed). Those contracts that are less standardised are traded bilaterally off-exchange or, as commonly called, over-the-counter (OTC).

Over the last decade, the market has registered exponential growth. As it can be seen in the graph below, most of this growth can be attributed to OTC derivatives.

shows the relative importance of each of these segments.



In principle, derivatives can be used for three purposes: hedging, speculation and arbitrage. **Hedging** is in fact

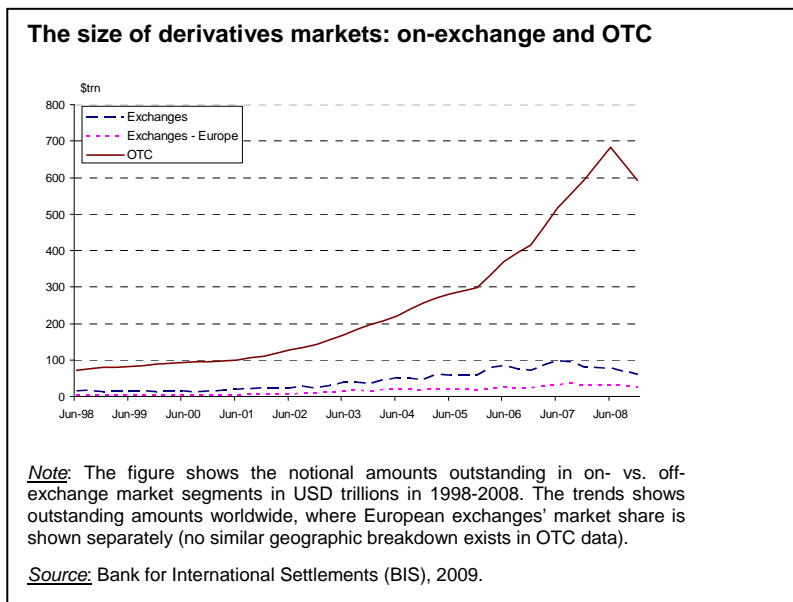
the process described in the paragraph above. Practically, it is a form of insurance. For example, an

Derivatives benefit the economy...

Economic agents are willing to bear different levels of risk. Many investment projects would not be undertaken, if the associated risk could not

exporter, wishing to avoid the risk of revenue losses from an adverse exchange rate movement, can “insure” himself by buying the appropriate derivative, or a producer of final products (e.g. pasta, chocolate) processing imported raw materials (e.g. grain, cacao) may wish to insure herself against price increase of the raw material. The party that has sold the derivative can either remain final risk taker or just an intermediary, transferring the risk further by buying an offsetting derivative from someone else.

When a party has taken on risks, it engages in **speculation**. For example, an investor may take a view on the direction in which the price of a particular share will move (e.g. fall) and buy a derivative that will be able to let it profit from the expected movement. Before condemning this practice, it is important to understand that the counterparty to a hedger is usually a speculator. Without speculators, hedgers would not be able to insure themselves. Remember, derivatives are zero-sum contracts (the gain to one party equals the loss to the counterparty).



OTC derivatives are generally divided into five broad segments: foreign exchange derivatives, interest rate derivatives, equity derivatives, commodity derivatives and credit derivatives (of which credit default swaps – CDS – are the most important sub-segment). The graph below

be shared. This is where derivatives can help: they can be used to transfer (all or part of) the risks inherent to economic activity from economic agents who are not willing to bear them to those who are. Spreading individual risk can thus be beneficial.

Derivatives can also be used for **arbitrage**. Arbitrage is the exploitation of price differences between markets and it is generally performed only by professional financial markets participants. Derivatives can be combined to replicate other financial instruments, thus they can be used to "connect" markets by eliminating pricing inefficiencies between them.

Independently of the reason for which they are used, derivatives play a fundamental role in price discovery. For example, they provide the market's view on future developments in market variables. They may also provide a view on the default risk of a company or a sovereign borrower. Thereby, derivatives allow for pricing of risk that might otherwise be difficult to price because the underlying assets are not sufficiently traded.

... and can put it at risk

As illustrated, derivatives can make markets more efficient. However, if used improperly, derivatives can put financial stability at risk. There are three ingredients to this: leverage, intransparency and interconnectedness.

Leverage means the extent to which investments are debt-financed. Per se, leverage is not bad since can spur economic growth (the money multiplier), but it increases the risk of bankruptcy, that's why too much of it creates perverse incentives. Heavily levered firms tend to take excessive risks.

Derivatives allow increasing leverage; with a given amount

of capital, they allow taking a larger position in the market, since derivatives are unfunded; ex ante no principal amount changes hands³. This is why derivatives are so attractive for speculation: the leverage inherent in derivatives allows the speculator to attain very high profits (in case she is right about the direction in which the market will move) with very little investment. Unfortunately, also the reverse is true, so derivatives magnify her losses in case the market moves against her.

The market uses a "safety mechanism" in order to make the transaction partly funded, i.e. to reduce leverage: Derivative contracts often (but not always) require "margin" payments (i.e. the exchange of collateral) over their lifetime.

However, there is one particular feature of derivatives trading, which makes it difficult to

assess the size of amounts at stake when dealing with a particular counterparty: The lack of transparency in OTC markets. Contracts are traded privately and little trade-related information is made publicly available.

The numbers of outstanding derivatives tend to increase over time. Indeed, a contract party wishing to close a position should return to the original counterparty. However, the same economic effect is achieved by entering into an opposite position with a different counterparty. This eliminates the risk that was traded, but now there are two contracts instead of one, and the counterparty default risk has doubled.

When concluding an OTC contract, assessing counterparty credit risk – and hence collateral levels – can thus be difficult. As financial markets are highly interconnected, such an assessment requires good knowledge of the chains of counterparties. But due to the OTC market opacity, such knowledge is incomplete. Therefore, assuming counterparty risk by concluding a contract creates an externality, because it may alter the counterparty risk to other outstanding contracts, of which the other counterparties would not be aware.

The enormous growth of derivatives contributed to tightening the links among financial institutions, thus making contagion more likely in case of failure of one with significant market share. Therefore the risks that derivatives pose to financial stability are related to the well-known "too-big-to-fail" or "too-interconnected-to-

³ For example, buying a bond implies taking a position on the credit risk of a company. This requires an initial outlay (i.e. handing the principal over to the company) against receiving the coupon payment. If the company defaults, the bondholder's principal is partially lost. A similar economic effect can also be achieved by selling a credit default swap, but here no principal changes hands ex ante. In a CDS, the seller receives coupon payments from the buyer, while (abstracting from collateral) his obligation materialises only in event of default, when he has to provide for the credit loss. This applies also for other derivatives: The reader may compare buying currency upfront in the hope of exchange rate appreciation with entering a currency forward, where cash changes hands only at the expiry date.

fail" arguments. The opacity of OTC markets amplifies that because activities of financial institutions cannot be fully observed by regulators and other market participants.

Among all derivatives, CDS pose particular worries in all these aspects. While most derivatives depend on observable market prices (e.g. interest or the exchange rates), CDS are different. The risk they cover – credit risk – is not immediately observable but requires collecting specific information about the borrower and often continuous monitoring. This has been the traditional role of banks. Securitisation and credit derivatives⁴ have made credit risk more tradable, but it seems that the models used widely by the market to predict default probabilities were incomplete. False predictions may go unnoticed for a long while, which may lead to situations where the market all of a sudden faces a significant default event. The obligations that arise from such an event can be extreme⁵.

Derivatives and the financial crisis

The financial crisis illustrates this well. The trouble of Bear Sterns, Lehman Brothers and

AIG originated outside the OTC derivatives markets, but they were large dealers or users in these markets. Because of the CDS written by them (the case of AIG) or because of their central role in all OTC derivatives markets (the case of Lehman and Bear Sterns), distress spilled over to the global financial market. The opacity of the OTC market prevented other market participants from knowing exactly what the exposures of their counterparties were to these three entities, which resulted in mistrust and in the sudden drying up of liquidity. Moreover, it prevented regulators from identifying early the build-up and concentration of risks and possible repercussions on financial stability. The crisis made evident how derivatives in general, and CDS in particular, created a web of mutual dependence difficult to understand, disentangle and contain in the immediate aftermath of default. It has clearly shown that the characteristics of OTC derivative markets – leverage, the private nature of contracting with limited public information, the complex web of mutual dependences, the difficulties of understanding the nature and level of risks – increase uncertainty in distressed markets, undermining financial stability.

Managing counterparty risks by central clearing of derivatives

The management of counterparty risks depends on the way the market is organised. At present, the derivative market is predominantly char-

acterised by bilateral relationships. Operational risk in the present market organisation has been reduced by some contract standardisation, a move to electronic trade processing and "compression" exercises to reduce the number of outstanding contracts without altering the underlying economic relationships. In addition, a central provider for the electronic storage of trades has made some aggregated market information public.

However, attention must turn to the way derivatives are handled after they have been traded. The process by which the obligations arising from derivatives contract are managed over time is called "clearing".

The main two functions of clearing are the exchange of collateral and the netting of obligations. Collateral payments are advances on the final obligation. They depend on the market value of the contract as well as the creditworthiness of the counterparty. Their frequency is usually contractually specified. As counterparties usually have many trades between them, offsetting obligations can be netted, sometimes across multiple asset classes. In normal circumstances, this is regulated bilaterally; in case of default it depends on insolvency law.

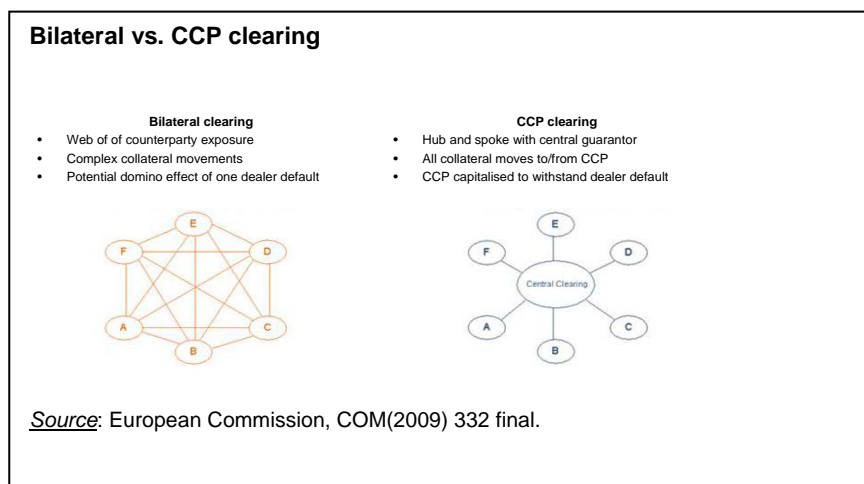
Today, trades are predominantly cleared bilaterally between two parties. But clearing can also be carried out at central market level, through a Central Counterparty (CCP). The CCP steps in the middle of each trade, so as to become the buyer to every seller

⁴ Securitised assets are not derivatives, because the former give the holder an ownership claim on the underlying assets.

⁵ The cash flows related to a CDS are "discontinuous", i.e. in normal times the seller of a CDS earns a steady flow of fees, whereas only in case of default he is obliged to make a payment, namely covering the credit loss to the CDS buyer – which can be very large.

and the seller to every buyer. This is sketched in the graph below.

- risk that occurs in a web of bilateral relationships.
- Second, a CCP may have



Moving from bilateral clearing to central clearing by using one or several CCPs has five advantages:

- First, in case a CCP participant becomes insolvent, the CCP reduces the probability of immediate propagation to solvent members. This is done by different layers of protection. Collateral is requested daily ("variation margin"). In addition, participants must provide collateral as a function of their trade activity ("initial margin"). Finally, in order to be allowed in for participation, a contribution has to be made into a "default fund". In case of a significant default, these protection layers are successively depleted, until finally the non-defaulting members' default fund contribution is used. At this point, losses are mutualised. A CCP therefore concentrates the risk in the market, as its sole purpose is risk management. In addition, it internalises the externality on counterparty

a positive effect on market liquidity. While a CCP may ask for higher margins than its members might do in bilateral clearing, the CCP can net obligations multilaterally between all its members. Provided that the CCP clears a sufficient number of asset classes, setting margins on a portfolio of assets may become possible.

- Third, a CCP solves disruptive information problems. When a major player in bilaterally-cleared derivatives markets fails, it is not immediately apparent to the remaining market participants, who is absorbing the losses and how large they are. The effects of this uncertainty can be devastating on market confidence, as illustrated by Bear Sterns, Lehman and AIG. This uncertainty is mitigated by a CCP that has effective means of allocating losses and no incentive to withhold information for its own benefit.
- Fourth, using a CCP increases operational efficiency. As the counterparty

to all trades a CCP centralises the necessary calculations of the current value of obligations due for payment, thus reducing bilateral disputes.

- Fifth, under the EU rules for capital regulation, clearing derivative contracts through a CCP lifts the requirement from banks to retain capital for counterparty risk.

Despite the CCP, market participants continue to search trading partners bilaterally, so the market remains OTC. A CCP only steps in after two sides agreed to trade. Risk management could be strengthened by moving trading to an organised market such as a derivatives exchange, which centralizes the search process and improves price transparency. Such a move could come at a cost in terms of satisfying the wide diversity in hedging needs for companies, which of course is a profitable business for the large dealer banks.

Policy options to organise derivative markets

The European Commission's work on derivatives began in October 2008⁶ and is embedded in a comprehensive programme on reform of the financial system⁷. In view of

⁶ C. McCreevy, *Time for regulators to get a better view of derivatives*, 17 October 2008, SPEECH/08/538.

⁷ European Commission Communication, *Driving European recovery*, COM(2009) 114 final (4 March 2009). For an overview, see: http://ec.europa.eu/financial-crisis/index_en.htm.

credit default swaps posing a significant threat to financial stability, the short-term objective has been to move CDS clearing to one or more CCPs located in Europe. For the medium-term, focus is on a broad review of all OTC derivative markets.

In the short run, following discussions with the EU authorities, CDS dealers committed to start clearing eligible CDS on European reference entities and indices on these entities through one or more European CCPs by 31 July 2009. Progress is being closely monitored by the Commission.

In the medium-term, the Commission Communication of 3 July set out four policy goals. Derivative markets should be reformed so as to «a) *allow regulators and supervisors to have full knowledge about the transactions that take place in OTC derivatives markets as well as the positions that are building in those markets, b) increase the transparency of OTC derivatives markets vis-à-vis their users; in particular more and better information about prices and volumes should be available; c) strengthen the operational efficiency of derivatives markets so as to ensure that OTC derivatives do not harm financial stability and d) mitigate counterparty risks and promote centralised structures*». A consultation process has been launched along the following four policy tools:

- Further standardisation: For bilateral OTC derivatives, operational efficiency would be strengthened, and operational risks reduced, by further standardisation, e.g. of

the legal terms and economic parameters of contracts and through take-up of electronic services. Standardisation is a premise for the following options, but might require an upfront investment. It may therefore be necessary to impose or incentivise standardisation.

- Central data repository: A central data repository collects data – such as number of transactions, size of outstanding positions – for all trades. This would contribute not only to transparency, but also improves the operational efficiency. A repository could also provide ancillary services.
- CCP clearing: As discussed, this would improve risk management for the whole range of cleared products and address financial stability. Market efficiency would improve, the wider the scope of a CCP. Incentives, e.g. through regulatory capital requirements, might be needed to achieve this.
- Trade execution: Standardised derivatives cleared by a CCP could in principle be traded on organised markets. The market-making function of the current large dealer banks would be centralised. This may come at a cost in terms of satisfying the wide diversity in hedging needs for companies.

Outlook and Conclusions

Our view is that the above tools are not mutually exclusive. Standardisation is desirable irrespective of the other options. A market for tailor-made ("bespoke") products not centrally cleared would

possibly always exist to cater for unusual hedging needs. However, whenever a CCP offers to clear a type of contract, this type should be CCP-cleared as a rule. The difficulty lies in detecting trades designed to evade this rule as opposed to trades for which there is a reason to remain bespoke. Indeed, sticks and carrots may be needed to drive the market towards less risky and complex instruments. Also, since there is a network externality to participating in a CCP: The more participants and contracts cleared, the larger the economic capital savings from applying margins to the participant's portfolio.

In this regard, regulatory arbitrage should be avoided. The EU and the US are now shaping up their policy approaches, and it is important that they remain consistent as they seem to be at present.

An important, but thorny issue is the supervision of these market infrastructures. Whether a European CCP – with systemic importance for all Member States – should remain to be regulated by the host country, or should rather be subject to some form of harmonised regulation is also an open question. Host countries seeking reassurance by insisting on own supervisory discretion might not be the most effective solution in the single market.

It would be too easy to argue that safeguarding financial stability might come at a cost in terms of market efficiency. This Policy Brief has demonstrated the contrary: government intervention can improve market efficiency. Financial

stability is a public good. To secure the socially optimal level of provision of this good is the overarching task of policy makers over the coming months. Efficient, safe and sound derivative markets will be an important part in this.

Bibliography

Acharya, V. and M. Richardson (eds) (2009), *Restoring Financial Stability: How to Repair a Failed System*, Wiley.

Bliss, R. and C. Papathanassiou (2006), *Derivatives clearing, central counterparties and novation: The economic implications*, for download at:

http://www.ecb.int/events/pdf/conferences/ccp/BlissPapathanassiou_final.pdf

BIS (2009a), *Semi-annual OTC derivatives statistics at end-December 2008*, <http://www.bis.org/statistics/derstats.htm>

BIS (2009b), *BIS Quarterly Review*, March 2009.

BIS (2007), *Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity*.

Committee on Payment and Settlement Systems (1998), *OTC derivatives: settlement procedures and counterparty risk management*.

www.bis.org/cpss/index.htm

Committee on Payment and Settlement Systems (2007), *New developments in clearing and settlement arrangements for OTC derivatives*.

www.bis.org/cpss/index.htm

de Larosière Group (2009), *Report from the High-level Group on Financial Supervision chaired by Jacques de Larosière*.

Duffie, D. and H. Zhu (2009), *Does a Central Clearing Counterparty Reduce Counterparty Risk?*, Stanford University, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1348343

European Commission (2009a), *Driving European Recovery*, Communication from the European Commission, 4 March 2009 – COM(2009) 114.

European Commission (2009b), *Ensuring efficient, safe and sound derivatives markets*, Communication from the European Commission, COM(2009) 332.

European Commission (2009c), Staff Working Paper accompanying the Communication SEC(2009) 905.

European Commission (2009d), *Consultation document: possible initiatives to enhance the resilience of derivatives markets*, Commission Staff Working Paper, SEC(2009) 914.

Financial Times (2009), *AIG saga shows how dangerous credit default swaps can be*, 7 March 2009.

<http://www.ft.com/cms/s/0/52bb328a-0ab9-11de-95ed-0000779fd2ac.html>

G20 (2009), *Declaration on strengthening the financial system* – London summit, 2 April 2009,

<http://www.londonsummit.gov.uk/resources/en/PDF/annex-strengthening-fin-sysm>

Gerken, A. and H. Karseras (2004), *The real risks of credit derivatives*, The McKinsey Quarterly, No. 4 2004.

Hrovatin, S., M. Levin, M. Nava and F. Planta (2009), *Financial regulation and financial crisis: Lessons learned and the way forward*, Swiss Derivatives Review – Issue 39.

McCreevy, C. (2008), *Time for regulators to get a better view of derivatives*, 17 October 2008, SPEECH/08/538.

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