Polimi Fintech Journey — From Blockchain&Bitcoin to Distributed Ledger Technologies, Smart Contracts and Cryptocurrencies in Finance

16/05/2018 13:29

Il 9–10 Maggio 2018 si è tenuta al Politecnico di Milano la conferenza

From Blockchain&Bitcoin to Distributed Ledger Technologies, Smart Contracts and Cryptocurrencies in Finance

Di seguito il programma e le slide delle presentazioni.

9 Maggio 2018

IT TUTORIAL

9.00 — 13.30 – Information Technology for DLTs

Daniele Marazzina – **An introduction to DLTs**

Francesco Bruschi e Vincenzo Rana — **Developping Smart Contract**

Stefano Leone — ICOs vs Kryptokitty

CONFERENZA

14.45 — 18.30 — Session 1. DLT and Smart Contracts

Andrea Bracciali - **Decentralised governance?**

Massimo Bartoletti - **Models for Bitcoin smart contracts**

Francesco Bruschi - **Stretching our oracles farther: making smart contract aware of the world**

Andrea Visconti - **On the cryptography of DLT**

Stefano Bistarelli - **An End-to-end Voting-system Based on DLTs**

10 Maggio 2018

9.30 — 13.00 — Session 2. The economics and the Finance of DLT/smart contracts

Davide Grossi - **Incentive Structures behind Consensus in Distributed Ledgers**

Ferdinando Ametrano - **Central bank digital cash and private monies**

Simon Trimborn - **Investing with Cryptocurrencies — A liquidity constrained investment approach**

Gianna Figà Talamanca - **Attention-based dynamics for BitCoin price modeling and applications**

Giancarlo Giudici - **The ICO market**

14.45 — 17.15 – Session 3. Applications of DLT and smart contracts in finance

Giovanni Sartor - **On Legal contracts, Imperative abd Declarative Smart Contracts and Blockchain Systems**

Claudio Impenna - **DLT applications in the financial sector: the regulator's perspective**

Giorgio Gasparri - **Distributed ledger technology and financial markets**

Massimo Morini - **Transforming Banks**

MiFID II: a revolution of trading activity in the capital market landscape

a cura di Deloitte Italia

15/05/2018 18:51

Today's European financial markets hardly look like the ones from 10 years ago. Financial Markets are definitely more complex: high speed of electronic trading, wide range and complexity of financial instruments, explosion in trading volumes, fragmentation of trading venues and proliferation of OTC trading activity.

The impact of the latest financial crisis has forced Regulators globally to take an action and a new set of regulations has been released. MiFID II is, no doubt, the regulation that first springs to mind talking about Capital Markets.

Entered into force on January this year, MiFID II has on one side reinforced the financial market infrastructure, among all: introduction of the OTFs to capture OTC trading activities, trading obligation on equity and standardized derivatives, new transparency régime, a new information package available, strengthening reporting activity to competent authorities. On the other side, and this is the most innovative part, MiFID II has answered the need to discipline technological developments in trading, particularly Algorithmic and High Frequency Trading (HFT).

The new market structure – Key innovations

MiFID II brings important changes in the market structure of European capital markets to basically increase transparency of the trading and to restrict over the counter trading.

A third category of trading venue the Organised Trading Facilities (OTFs) sit now alongside the Regulated Markets (RMs) and Multilateral Trading Facilities (MTFs). OTFs have been introduced to push OTC trading platforms within the regulatory system (as already started in MiFID I with MTFs introduction) and capture the trading in non-equity instruments such as bonds, structured finance products, emissions allowances and derivatives currently not conducted via RMs and MTFs. Organized Trading Facilities are multilateral systems with characteristics that distinguish them from RMs and MTFs. Like RMs and MTFs, OTFs may not execute orders against proprietary capital (except trading in sovereign bonds). In contrast a firm operating on an OTF can exercise discretion when deciding to place or retract an order on the OTF they operate and subject to certain requirements when deciding not to match client orders.

MiFID II increases market transparency by ruling the practice of trading in shares admitted to trading on an RM or traded on an MTF only on an RM, MTF, Systematic Internalizers (SIs) or equivalent third-country trading venue and by forcing derivatives [1] trading on trading venues decreasing the OTC execution.

Pre– and post-trade transparency requirements have been extended to non-equity instruments (i.e. bonds, structured finance products and derivatives) and equity like instruments under MiFID II. As a result of these extended transparency requirements, more information will be available to the public on trading in financial instruments both pre-execution (quotes and pricing) and post-execution. The regulator has also demanded more reporting requirements by expanding the transaction reporting régime, both on the scope of financial instruments captured and on the data fields to include in the report (up to 65 fields).

Algorithmic trading in the new trading landscape: an unavoidable future to be monitored and controlled

There have been many so-called “flash-crashes” during the last decade caused by the activity of algorithmic trading. Michael Lewis in “Flash Boys” describes the father of all these events that occurred in the Dow Jones market on May 6, 2010. The Dow Jones collapsed and rebounded very rapidly losing immediately a thousand points, almost 10%, sending market operators into panic. The movement was caused by a single order of futures on the S&P 500 index that triggered sell algorithms and generated a rapid decline and recovery in the price of financial instruments.

Fostering trading activity on electronic trading venues is a way to spread transparency and financial stability. Regulators are aware that algorithmic trading activity, that limits or excludes human intervention[2], could be a threat for orderly trading conditions as it could generate market abuse and manipulation. For these reasons, MiFID II introduces new requirements to ensure that investment firm will be able to control and monitor their algorithmic trading activity. The Directive considers the benefits of improved trading technology but acknowledges that such strategies, particularly of the HFT variety, give rise to potential risks that could lead to disorderly markets or be used for abusive purposes and therefore must be strictly monitored and regulated.

The algorithmic trading activity could be engaged by an investment firm to generate:

- orders for proprietary trading, including bid-ask quotes published for the market making activity;
- orders on behalf of a client, especially to execute an high size order with TWAP[3] or VWAP[4] functionalities, and implement one or more of the following strategies: market making or liquidity providing, hedging or arbitrage.

The most common trading strategy in scope of algorithmic trading for investment firms is the market making activity, because bid-ask quotes are generated automatically during the trading day and published continuously on trading venues. Moreover, an investment firm sometimes develops proprietary market adapters to generate orders on the trading venues with their own algorithms, other times it uses provider’s platform to pursue trading algorithmic technique and algorithms could be:

- embedded in provider’s trading platform;
- developed by the investment firm in dedicated spaces made available by the supplier;
- elaborated by the supplier according to investment firm’s needs.

Additionally, MiFID II defines high frequency trading (HFT) as a subset of algorithmic trading characterized simultaneously by:

- infrastructure intended to minimize network and other types of latencies, including at least co-location, proximity hosting or high-speed direct electronic access;
- order initiation, generation, routing or execution without human intervention;
- high message intraday rates which constitute orders, quotes or cancellations. The rates are evaluated monthly with a moving average according to all messages sent during the previous year considering only proprietary trading (and including market making quotes).

MiFID II requires firms understand the impact their algorithms will have on the marketplace, including the reaction of other algorithms active in the segment. MiFID II requires all trading firms to certify that their algorithms have been tested to ensure that they do not create or contribute to disorderly trading conditions before being deployed in live markets. New requirements for investment firms engaged in algorithmic trading are:

- general organizational requirements: formalization of specific governance arrangements about trading systems and algorithms proportionate to the nature, scale and complexity of the activity;
- algorithms pre-deployment requirements: investment firms are required to establish a written procedure for developing, modifying, testing and deploying an algorithm in the production environment;
- algorithms post-deployment requirements: investment firms have to structure means and controls to ensure resilience of

trading systems and algorithms during the trading activity. The functionalities an investment firm has to develop are:

1. the kill functionality to ensure the cancellation of any or all of unexecuted orders submitted to any or all trading venues to which the investment firm is connected;
2. the automated surveillance system to detect market abuse;
3. business continuity arrangements;
4. the pre-trade controls on price, message limits, order values and volumes to prevent the transmission of wrong orders or quotes to trading venues;
5. the real time monitoring with real time alerts to assist traders during the trading activity;
6. the post trade controls to identify algorithms or systems which are not working in the correct way;
7. cyber security arrangements;

- periodic requirements: investment firms have to self-assess annually their algorithmic trading activity and consequently the risk management function has to draw up a validation report.

HFTs firms have more strictly requirements because they need the authorization to operate as investment firms and have to store accurate and time sequenced records of all its placed orders and quotes using a defined format (also algo traders have to record all this information, but they are not obliged to use the format set out in the regulation).

Final conclusions

One of MiFID II aim is to create more efficient financial instruments order execution in price-competitive, transparent and stable markets. The innovations in trading venues is a mechanism to strengthen also investor protections. From this perspective, not only where but also how investment firms carry on the trading activity needs to have appropriate organizational and IT arrangements. The MiFID II framework regulates algorithmic trading activity because freedom could create damages to the economic system just because an automated mechanism could go crazy for distressed information. All investment firms have to understand and copy with technological challenge to ensure their algo trading activity is sound, efficient and secure. Will the new requirements prevent algorithmic trading, especially HFT, to generate other cases of flash crash? How many algo traders will qualify their activity as high frequency trading? We will find out soon.

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Notes

[1] ESMA's Final report (ESMA70-156–227) provides details to derivatives subject to new trading obligations (intragroup transactions are exempt from this trading obligation)

[2] MiFID II defines algorithmic trading as "the trading activity in financial instruments on a trading venue where a computer algorithm automatically determines individual parameters of orders (including quotes) such as whether to initiate the order, the timing, price or quantity of the order or how to manage the order after its submission, with limited or no human intervention"

[3] Time weighted average price (TWAP) strategy breaks up a large order into child orders and execute them close to the average price between the start and end times.

[4] Volume weighted average price (VWAP) strategy breaks up a large order into child orders and execute them close to the average price weighted by volume between the start and end times.

Fintech and banking: today and tomorrow

14/05/2018 16:44

The deputy governor of the Bank of Italy Fabio Panetta spoke about Fintech developement in the European Union. The definition of "Fintech" comes from the Financial Stability Board: Fintech refers to any "technologically enabled financial innovation that could result in new business models, applications, processes or products with an associated material effect on financial markets and institutions and the provision of financial services.

We observe at the same time Fintech start-ups gaining market shares in specific business lines thanks to aggressive pricing policies, many banks have either established strategic partnerships with them or have taken them over. This way, banks are integrating fintech services into their value chains in order to support their digital plans.

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Together with Fintech, it comes cyber risk, which can cause enormous damages. In 2017, the spread of two pieces of malicious software called WannaCry and NotPetya led to losses in the hundreds of millions of dollars for their high-profile victims, which include the British National Health Service and shipping giant Moller-Maersk of Denmark.

First, it should guarantee a level playing field, in order to avoid regulatory arbitrage and distortions. Regulation should remain tech-neutral, treating the intermediaries that deliver the same services in the same way. Second, given the rapid change that will affect the fintech sector in the future as well, regulation and supervision should be flexible, in order to encourage innovative projects and to avoid any obstacles to the changes that are also likely to affect the supply of technology-intensive services in the future. Third, a true level playing field would require financial sector authorities within each country – such as bank and

insurance supervisors, market authorities, etc. – to cooperate with one another and with regulators in other fields such as data protection, cyber risk, and antitrust. But the spread of these new technologies and the availability of ever more comprehensive information on individuals raises broader and more fundamental questions.

Technology is creating the "technological unemployment" that had been foreseen by Keynes already and is one of the factors further exacerbating income and wealth inequality in both advanced countries and emerging market economies. It also raises the issue of how to guarantee confidentiality in relation to Big Data, how to use it within the limits imposed both by the rules and by the will of our citizens, whose right to privacy must in any case be upheld. We must better define both the legal and ethical limits on the use of Big Data: recent events in connection with Cambridge Analytica and Facebook have sounded the alarm.

Fintech and banking: today and tomorrow (PDF)

Basel Committee: Capital treatment for short-term securitisations

14/05/2018 16:25

The Basel Committee on Banking Supervision today issued the *Capital treatment for simple, transparent and comparable short-term securitisations*. This standard supplements the *Criteria for identifying simple, transparent and comparable short-term securitisations* issued jointly with the International Organization of Securities Commissions (IOSCO).

The standard sets out additional guidance and requirements for the purpose of applying preferential regulatory capital treatment for banks acting as investors in or as sponsors of simple, transparent and comparable (STC) short-term securitisations, typically in asset-backed commercial paper (ABCP) structures. The additional guidance and requirements in this standard are consistent with those for STC term securitisations set out in the Committee's July 2016 revisions of the securitization framework. Provided that the expanded set of STC short-term criteria are met, STC short-term securitisations will receive the same modest reduction in capital requirements as other STC term securitisations.

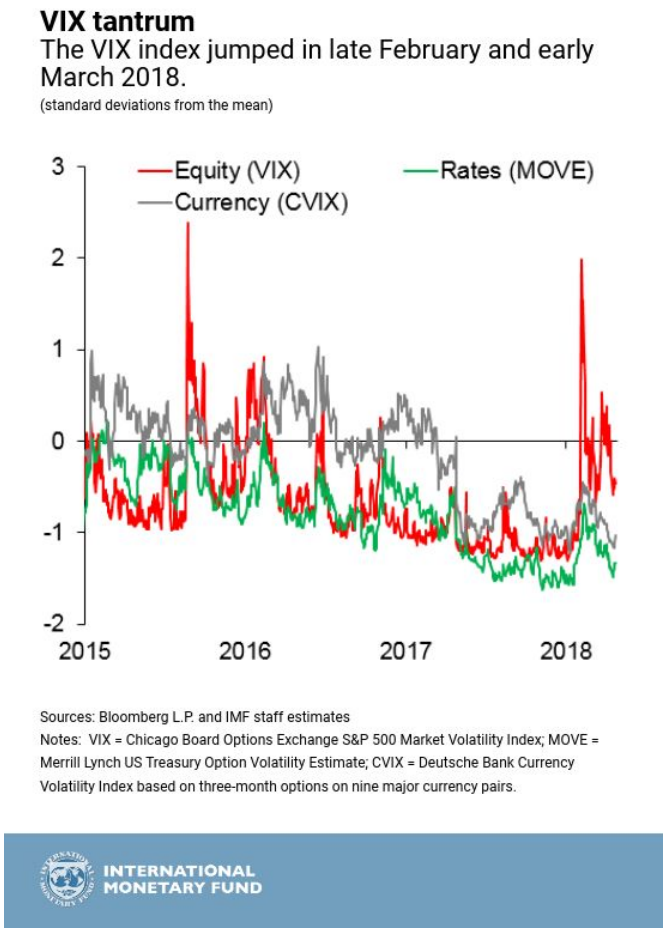
The standard incorporates feedback collected during the public consultation conducted in July 2017. Changes made include setting the minimum performance history for non-retail and retail exposures at five years and three years, respectively, and clarifying that the provision of credit and liquidity support to the ABCP structure can be performed by more than one entity, subject to certain conditions.

Capital treatment for simple, transparent and comparable short-term securitisations (PDF)

IMF: Volatility Strikes Back

14/05/2018 15:59

The bouts of volatility in early February and late March that spooked investors were confined to equity markets. Nevertheless, they illustrate the potential for sudden market moves to expose fragilities in the financial system more broadly. With central banks in advanced economies set to normalize their monetary policies just as trade and geopolitical tensions flare up, economic and policy uncertainty may rise and financial conditions may tighten abruptly. All this could lead to a period of renewed volatility. The burst of turbulence early this year was preceded by a long period of calm marked by low economic uncertainty, low interest rates, easy funding conditions, and improving corporate performance, as shown in the October 2017 *Global Stability Report*.



This extended period of calm led to the increasing popularity of volatility index-linked investment products. One example: investment strategies that involved selling VIX futures in the Chicago Board Options Exchange (CBOE) equity volatility index with the aim of profiting from declines in the index, known as the VIX. The VIX shows the expected level of price fluctuations in the Standard & Poor's 500 Index of stocks over the next month.

These so-called short VIX strategies were profitable before the early February spike because, although the VIX index was near historic lows, realized volatility in equity markets was even lower. This premium in implied over-realized equity volatility provided steady returns for those selling VIX futures over the past year. But since the period of volatility that has come to be known as the VIX tantrum, this premium has turned negative, suggesting some of these strategies are

Quiet times

The premium in implied over realized equity volatility provided steady returns for investors selling VIX futures for the year prior to February.

(percentage points, 30-day moving averages)

Sources: Bloomberg L.P. and IMF staff estimates.

Note: Premium is measured as the VIX minus the 30-day realized volatility of the S&P 500.

INTERNATIONAL MONETARY FUND

Reversing course

Investors who bet on continued low volatility, as measured by short positions on the VIX index, suffered steep losses in February. Many were forced to reverse their positions by taking bets on higher volatility, shown in the blue area.

(net asset value of representative ETP, thousands of contracts)

Sources: Bloomberg L.P. and IMF staff estimates.

Note: The Short VIX ETP used is the Credit Suisse VelocityShares Inverse VIX exchange-traded note.

INTERNATIONAL MONETARY FUND

The April 2018 *Global Financial Stability Report* discusses how some of these short VIX strategies contributed to the February volatility spike. Among them, exchange-traded products that had built up significant bets on low volatility, and which were often sold to retail investors, incurred steep losses. More broadly, investors who expected low volatility to persist were forced to reverse their positions and cover losses by taking bets on higher volatility going forward. This sharp shift in positioning may have exacerbated the surge in the VIX.

The good news is that some of these short-VIX strategies, in particular those marketed to retail investors, appear to have been unwound. The bad news is that other strategies predicated on low volatility reportedly remain widespread, particularly among institutional investors. As a result, a more sustained rise in volatility across asset classes may force a broader class of investors to rebalance their portfolios, which could exacerbate declines in prices, especially if those positions employ financial leverage.

Volatility-targeting strategies are still popular and could be vulnerable. These strategies aim to keep the expected volatility of their investment portfolios at a certain target and use leverage to achieve that. However, their size and flexibility to deviate from their targets can vary significantly. Variable annuities and funds that use trading algorithms are apparently more likely to react to a spike in volatility by selling assets, which could exacerbate turbulence, although the exact extent and speed of such rebalancing are unclear.

Volatility-Targeting Investors

Investment Strategy	Volatility Target (percent)	Flexibility to Deviate from Volatility Target	AUM at End-2017 (billion USD)
Variable Annuities	8–12	Low (frequent use of trading algorithms)	500
CTA/Systematic Trading	15	Medium	220
Risk Parity Funds	10–15	Medium–High	150-175

Sources: Annuity Insights; Barclays Capital; BarclayHedge; and IMF staff calculations.
Note: AUM = assets under management; CTA = Commodity Trading Advisor; VIX = Chicago Board Options Exchange Volatility Index. See Chapter 1 of the October 2017 Global Financial Stability Report for further discussion on volatility-targeting investment strategies.

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Regulators and market participants should remain attuned to the risks associated with higher interest rates and greater volatility. They should ensure that financial institutions maintain robust risk management, including through the close monitoring of exposures to asset classes with valuations judged to be stretched.

Policymakers should develop tools to discourage excessive build-up of leverage that could increase market fragility. They should also be mindful of a migration of activities and risks to more opaque segments of the financial system. To address risks related to investment funds' activities, regulators should endorse a common definition of financial leverage and strengthen supervision of liquidity risk.

(The original article is available at the IMF Blog here*).*

Risk-reducing and risk-sharing in the EMU

14/05/2018 15:43

The President of The European Central Bank (ECB) Mario Draghi, hosted at the European University Institute in Florence, tackled the topic of monetary union and its central role in reducing and sharing risks across European countries. The crisis revealed some specific fragilities in the euro area's construction that so far have not been resolved.

In addressing such issues, Draghi splits the history of the Great Financial Crisis into five different phases. The first phase took place quite homogeneously across all advanced economies, as all of them had a financial sector characterised by a poor risk management and an excessive optimism in the self-repairing power of markets. When the Lehman shock hit, banks exposed to toxic US assets ran into difficulties and some institutions, most of them located in Germany, France and the Netherlands, and were bailed out by their governments. These bailouts did not greatly affect these sovereign borrowers costs, however, thanks largely to the relatively strong fiscal positions of the governments implementing them.

In the second phase, the crisis spread to banks in Spain and Ireland that had similar weaknesses, but were instead overexposed to the collapsing domestic real estate market. The third phase, began when the Greek crisis shattered the impression that public debt was risk-free, triggering a rapid repricing of sovereign risk. These events spread contagion to all sovereigns now perceived as vulnerable by financial markets. Sovereign risk was then transmitted into the domestic banking sector through two channels, namely, banks' direct exposures to their own governments' bonds and negative confidence effects.

The fear of possible sovereign defaults had a dramatic effect on confidence in the domestic private sector. Any distinction between firms and banks, and between banks with and without high sovereign exposures, disappeared. In this way, the crisis spreaded to banks that did not have significant exposures either to US sub-prime assets or to domestic real estate, and therefore had not until then needed to be bailed out.

The fourth stage of the crisis was triggered by investors in both Europe and the rest of the world. Faced with a downward growth spiral, many investors reached the conclusion that the only way out for crisis-hit countries, given the institutional design of the euro area, was for them to exit from it. This would, it was believed, allow them to depreciate their currencies and regain monetary sovereignty. The fifth stage of the crisis then followed: the breakdown in monetary policy transmission across the euro area. Interest rates faced by firms and households in vulnerable countries became increasingly divorced from short-term central bank rates, and this posed a profound threat to price stability.

The unfolding of the euro area crisis yielded lessons for the financial sector, for individual countries and for the union as a whole. But the unifying theme was the inability of each of these actors to effectively absorb shocks. In some cases, because of their weaknesses, they even amplified those shocks. And the euro area as a whole was shown to have no public and very little private risk-sharing.

What makes membership of a monetary union work for all its members is a trade-off: what they lose in terms of national stabilisation tools is counterbalanced by new adjustment mechanisms within the currency area. In the United States, which is a relatively well-functioning monetary union, ex post adjustment plays an important role.

Where the euro area and the US differ more is in terms of ex ante risk-sharing – that is, insuring against shocks through financial markets, which plays two key roles in stabilising local economies in a monetary union. The first is by de-linking consumption and income at the local level, which happens through integrated capital markets. The second is by de-linking the capital of local banks from the volume of local credit supply, which happens through retail banking integration. Overall, it is estimated that around 70% of local shocks are smoothed through financial markets in the US, with capital markets absorbing around 45% and credit markets 25%. In the euro area, by contrast, the total figure is just 25%.

This calls for ad-hoc adressed policies: first of all, we need policies that make the financial system more stable, both by increasing the resilience of banks and by completing the banking union and the capital markets union. Secondly, an incomplete framework for bank resolution also deters cross-border

integration. When resolution is not fully credible, it can create incentives for national authorities to limit capital and liquidity flows so as to advantage their depositors in the event of a bank failing. But when the new EU resolution framework is completed and working properly, such concerns about depositors should be quietened down.

Furthermore, public sector policies can complement private risk-sharing by increasing economic convergence and thereby building trust among cross-border investors. The crisis showed clearly the potential of some euro area economies to become trapped in bad equilibria. And plainly, as long as this risk exists, it will act as a deterrent to cross-border integration, especially for retail banks that cannot “cut and run” as soon as a recession hits. So, if we are to deepen private risk-sharing, the tail risk of bad equilibria needs to be removed, and replaced by policies that lead to sustainable convergence. This requires action at both the national and euro area levels.

We know that structural reforms boost growth: looking at the last 15 to 20 years, euro area countries with sound economic structures at the outset have shown much higher long-term real growth. However, while sound domestic policies are key to protect countries from market pressure, the crisis showed that, in certain conditions, they may not be enough. Markets tend to be procyclical and can penalise sovereigns that are perceived to be vulnerable, over and above what may be needed to restore a sustainable fiscal path. And this overshooting can harm growth and ultimately worsen fiscal sustainability.

This creates a need for some form of common stabilisation function to prevent countries from diverging too much during crises, as has already been acknowledged with the creation of two European facilities to tackle bad equilibria.One is the ECB’s OMTs, which can be used when there is a threat to euro area price stability and comes with an ESM programme. The other is the ESM itself. But the conditionality attached to its programmes in general also implies procyclical fiscal tightening.

So, we need an additional fiscal instrument to maintain convergence during large shocks, without having to over-burden monetary policy. Its aim would be to provide an extra layer of stabilisation, thereby reinforcing confidence in national policies. It is not conceptually simple to design such an instrument as it should not, among many other complexities, compensate for weaknesses that can and should be addressed by policies and reforms. It is not legally simple because such an instrument should be consistent with the Treaty. It is also certainly not politically simple, regardless of the shape that such an instrument could take: from the provision of supranational public goods – like security, defence or migration – to a fully-fledged fiscal capacity.

But the argument whereby risk-sharing may help to greatly reduce risk, or whereby solidarity, in some specific circumstances, contributes to efficient risk-reduction, is compelling in this case as well, and our work on the design and proper timeframe for such an instrument should continue. The people of Europe have come to know the euro and trust the euro. But they also expect the euro to deliver the stability and prosperity it promised. So our duty, as policymakers, is to return their trust and to address the areas of our union that we all know are incomplete.

Risk-reducing and risk-sharing in our Monetary Union (full speech, HTML)