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Recent Evolution in Securities Market Price Formation  
Mechanisms

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**Panel 3**

**“Recent evolution in Securities Market Prices Formation Mechanisms”**

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**Introduction**

- The IOSCO Objectives and Principles of Securities Regulation lists as core objectives of securities regulation: (a) the protection of investors; (b) ensuring that markets are fair, efficient and transparent; and (c) the reduction of systemic risk.

In general terms, prices of securities should fully reflect available information. Where there is a continuous flow of information to the market, the faster is the adjustment of prices to new signals (information) the more a market is efficient.

- The rapid advances in information technology has determined important changes and innovations in the operation of securities markets and, in particular, on securities market price formation mechanisms.
- Securities markets were characterised by the presence of “pure” order-driven or quote-driven systems. Innovations in information technology required regulators and market authorities to adapt regulatory frameworks and market rules to the new trading platforms. As a result, *“pure” systems have left space to “hybrid” forms of order-driven and quote-driven markets.*
- *Some changes have been a direct consequence of the abandon of the physical presence implied by floor-based trading systems.* Among these changes, it can certainly be included the increase in the number of traders (not only intermediaries) having access, even indirectly, to electronic trading systems (as a result of no physical space limitation to market participation), the reduced role of brokers in the implementation of investment strategies (as a result of the reduction in the information privilege induced by the physical presence on a floor-based

trading system), the increasing number of new financial products that might be traded on electronic trading systems and, last but not least, the development of new electronic systems and other mechanisms providing trading facilities.

- ***Some other changes have been the result of new risks and opportunities that technology developments on trading mechanisms pose and make available to market participants and the market as a whole.*** Among these changes: the development of new and almost unpredictable trading strategies and the risks involved by the innovations induced by technological developments on trading mechanisms, such as human errors or system malfunctions<sup>1</sup>.

## **1. Main changes and effects**

- ***The above changes, as a reflection of technology innovations, have proved to have a substantial impact on prices and price formation processes.*** Innovation and new trading opportunities, in terms of products and investment strategies, are far from being undesirable.
- ***Electronic trading technology have offered many advantages<sup>2</sup>. At the same time, information and technology advances have produced, and continue to determine, important changes also in way trading activity is carried out, thereby affecting market dynamics, price formation mechanisms and price volatility.***
- The ***main changes in intermediaries' investment and trading strategies behaviours*** can be identified in:
  - a) The dramatic drop of profitability of traditional brokerage business, based on commissions earned by executing customers orders, forced intermediaries to operate a diversification of their activities. This effort led to an increasing weight of services, such as private banking, structured finance and financial engineering;

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<sup>1</sup> As an example, regulators and market authorities had to face issues related to transactions executed in error (either due to the actions of a market participant or through malfunction of a trading system) on electronic trading platforms. The occurrence of error trades, strictly related to trading occurring on electronic platforms, required the analysis and adoption of regulatory measures (error trade policies) in order to prevent traders from taking actions based on erroneous or misleading information arising from error trades.

<sup>2</sup> It allows: expediting transactions in securities and derivatives by enhancing the capacity, accuracy and speed of order transmission and execution; facilitating linkages with clearing houses, back-office systems, and automated routing systems, quotation systems and other electronic trading systems; linking of traders in remote locations and facilitating the extension of trading hours in different time zones; facilitating the real-time disclosure of transaction-related information on the system as well as through linked trading and quotation systems and enhancing opportunities to reduce and monitor risk through the ability to program trading limits.

- b) Many investors, either professional or retail, engage in strategies with a very short time horizon (one day or less). This phenomenon has been made possible by the development of trading programmes and on-line trading platforms; in other words, the dissemination of information is more and more global and affordable<sup>3</sup>;
  - c) The introduction of new contracts as well as the progress made by the finance theory in the last years allowed investors to develop new trading strategies based on arbitrage, with the aim of exploiting market inefficiencies (e.g. index arbitrage). On the other hand, recent market trends made passive strategies (such as index tracking and trading in volatility) and benchmarking very popular;
  - d) Markets appears to be segmented among investors trading with high frequency (therefore, trying to take advantage of the opportunities offered by arbitrages or trying to take advantage of the shorter predictability of returns) and those being indifferent to short term noises (therefore, trying to be mark-to-market in order to profit from the long-memory of assets returns).
- In other words, the above *changes can be summarised in: (a) a decreased relevance of brokerage trading services; (b) a decrease in investors' holding periods; and (c) an increased importance of trading strategies indifferent to prices reflecting fundamentals.*
  - As a result of these changes:
    - intermediaries have increased the size of their portfolios, either for hedging or trading purposes, thereby increasing the risk of potential conflicts of interest;
    - the number of market players with a short term horizon as well as their heterogeneity has increased with an impact on the signalling function played by traditional indicators (such as prices, volumes and volatility); and
    - new trading strategies are gaining in importance so that it is not always possible to be sure that prices provide an efficient estimate of a company's true value (as it should be in a competitive market), which in turn means that such strategies can cause greater uncertainty and volatility.

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<sup>3</sup> By definition, higher markets' informational efficiency decreases the forecast ability of returns from the medium-short to the extreme short term: securities autocorrelations and lead-lag relationships among different securities tend to vanish after a few minutes. Consequently trading profitability is pushed toward the intra-daily domain, reducing progressively intermediaries' and investors' holding periods.

- Beside such changes, information technology has permitted the development of alternative trading systems, electronic communications networks and other mechanisms to internalise orders. Although these changes represent market responses to investors' and intermediaries' needs and trading preferences, they operate a fragmentation of information and market liquidity.

## 2. Regulatory concerns and measures

- Questions to be posed and, possibly, answered are:
  - (a) *whether, and in what ways, such changes could be a source of regulatory concern,* therefore requiring to be fully understood in order to verify the presence of any signals indicating that the quality of the market is deteriorating and retail investors are facing increasing risks; and
  - (b) *whether the regulatory measures and surveillance systems in place are to be considered sufficient and reliable* to cope with the new challenges or the new trends specifically require the provision of additional regulatory tools.
- The evidence suggests that the new trading strategies have determined a change in the way prices are affected suggesting that the traditional factors affecting prices may not always capture and explain changes in the prices of financial instruments.
- *Fundamentals continue to represent crucial factors affecting securities prices. However, recent markets developments in terms of trading strategies and inter-relationship between cash and derivatives markets have made the content of information affecting prices wider. As a result, factors other than fundamentals appear to play an increased role in the explanation of price dynamics.*
- Needless to say that when substantial changes affecting price dynamics and price formation processes are faced, the regulatory concern has a name: **volatility**. Volatility is usually measured by daily price changes and many theoretic and empirical models explaining the relationship between price efficiency and volatility are now available. Nevertheless, it is very difficult to reach and agree on a definition of the correct level of volatility.

- In other words, there is no theory which informs on how much volatility should be considered optimal. Analysis in this field have tried to provide an estimation of what is called “excess volatility” in terms of deviations from market efficiency. As a matter of fact, we can state that all regulators have established and implemented measures to cope with excess volatility, measures that now represent well known and consolidated tools.
- In general terms, prices of securities should fully reflect available information and investors buying securities should expect to obtain an equilibrium rate of return. Where there is a continuous flow of information to the market, the faster is the adjustment of prices to new signals (information) the more a market is efficient.
- Even though the “quality” of the price sensitive information disclosed to the market has improved, the increased role played by factors other than fundamentals in determining securities prices appears to make the speed of prices adjustment slower and volatility shocks highly persistent, so that prices take a longer period of time with respect to the past to absorb such shocks<sup>4</sup>.
- ***Changes in market volatility and the impact of trading strategies and intermediaries’ behaviours on volatility persistence do not appear to pose in itself any specific and additional regulatory concerns that cannot be managed through traditional regulatory tools.*** Regulatory measures to cope with price variations exceeding certain limits are still in place in all jurisdictions (e.g. circuit breakers, trading halts, tick rules, margin requirements)<sup>5</sup>. In this area, changes in the existing regulatory measures could be pursued by making them more flexible, able to be adequately and timely adapted to a new changed environment. As an example, trading halts could be designed in a way that capture the differences among financial instruments, in terms of liquidity, presence in market indices, etc.
- ***More issues arise if we look at the problem from a different perspective: the identification of new factors affecting price dynamics.*** In the new environment - characterised by an increased number of proprietary trades (which, in turn raises issues with respect to conflicts of interest), an increased number of market players (in some cases, a dominant part of them

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<sup>4</sup> The technological bubble is a clear example of the significant degree of persistence of price volatility.

<sup>5</sup> Trading interruptions are utilized in all jurisdictions, most commonly in one of two sets of circumstances. In the first, the trading interruption is designed (principally) to facilitate the orderly absorption by market users of new information material to the valuation placed on an issuer’s securities. The second main set of circumstances in which trading interruptions are used occurs when there is an order imbalance, excessive volatility or when there is some other indication of disorderly trading. In these cases, the trading halt generally provides time for supply and demand to rebalance at a new trading price. IOSCO has carried out extensive work on market disruption and the role of trading halts (such as circuit breakers, price limits) in preventing and handling it. The issue has been analysed from the different perspectives of vertical integration (derivatives and cash markets), horizontal integration (multiple listing) and products integration, trying to address the issues of coordination and information sharing both domestically and cross-border.

being indifferent in the fundamentals) as well as by an increased number of transactions occurring OTC on financial instruments linked to listed securities - concerns arise with respect to the deterioration of market quality and the negative impacts on price formation mechanisms. In this respect, ***a core objective to be pursued should be identified more on the analysis of market conditions - aiming at verifying whether market integrity can still be ensured in presence of substantial price changes not determined by disclosure of price sensitive information - rather than on the identification of a correct measure of volatility or excess volatility.***

- In other words, it is essential to:
  - (i) understand how different behaviours in the marketplace affect price formation mechanisms and, consequently; and
  - (ii) identify the measures able to ensure that changes in price dynamics are the results of correct behaviours.
- ***The reduced signalling role played by prices suggests the opportunity of greater efforts in the understanding of market dynamics and additional regulatory measures to avoid market quality deterioration in terms of price efficiency as well as market integrity.***

(a) Reporting and surveillance activity continue to represent regulators' core measures.

A reporting regime, also on transactions occurring on OTC markets, allows regulators to assess the adequacy of any regulatory measures in place, the opportunity to implement additional regulatory tools and, where introduced, the continuing adequacy of new regulatory measures as well as the impact they have on financial markets. In other words, the information acquired through market supervision and enforcement activities represent a crucial factor to adapt and, eventually, develop regulatory measures<sup>6</sup>. At the same time, a continuous market surveillance activity has to take into consideration the new and changed market signals and, consequently, develop new and additional

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<sup>6</sup> Reporting and enforcement may help to design different market microstructure measures that can affect and/or counterbalance any adverse effect arising from price dynamics, such as: (i) quote driven markets where liquidity is provided by a specialist or a limited number of market makers; (ii) existence of opening end/or closing auctions; (iii) rules limiting short sales, buys on margin, program trading and intra-day trading; (iv) regulations concerning intermediaries and investors access to the market by means of interconnections; (v) size of trading lots and procedures set to trade even lots; (vi) size of the minimum tick. Again, any attempt to promote innovations in market microstructures should be based on regulators' preventive and deep knowledge of market conditions and developments in trading strategies.

indicators (such as highest and lowest prices during a trading day). The new financial markets developments certainly make it more difficult for regulators to identify ex-ante the proper regulatory regime. In this respect, it is essential that the synergies between the market regulation and the market surveillance activities are enhanced so that any regulatory regime is the result of an interactive process in which regulators carefully and continuously monitor the impact of the rules on market conditions. Where financial markets move towards new products and new investment strategies carried out by traders, regulatory authorities should be able to promptly react by a preventive and deep knowledge of market conditions and developments.

(b) Market authorities and regulators should ensure that adequate arrangements are in place to communicate with each other effectively and to be able to access sufficient information in order to take appropriate decisions in as timely a manner as possible.

(c) An aggressive and continuous enforcement activity is a key regulatory measure to promote market integrity, investor protection and orderly conduct of trading, also considering its signalling function for the minimisation of traders' incentives to carry out aggressive investment strategies.

(d) Since major issues are posed by the increased importance of factors other than fundamentals on price formation processes, it appears crucial the identification of what is, and what is not, a market abuse practise and consequently, the promotion of a market sentiment and a common understanding of "what is good and what is bad" in order to self-enforce market integrity.

- Under a market integrity perspective, it might be useful to have:
  1. Clear identification of market abuse practises. As to the development of a common understanding of fair and unfair conducts, wide consultations with market participants, continuous contacts among regulators as well as the ready perception and identification of new and emerging practices appear to be crucial measures to be carefully considered<sup>7</sup>.
  2. Adequate and specific conduct of business rules. Prevention mechanisms could be implemented in several ways. As already said, exchanges can significantly reduce the

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<sup>7</sup> Main challenges are given by: i) the theoretical and practical identification of the fair price (or bid-ask spread) in situations where an intermediary has a strong market power (typically illiquid markets, new markets and internalised markets) ; ii) the identification of manipulative bubbles or abusive trend creations as opposed to licit trading activities for testing price patterns in liquid markets in a intra-daily domain; iii) the distinction between hedging and manipulative purposes when the two aims would prescribe the same direction of the trades in the underlying markets.



scope for market abuse by enhancing market liquidity and by designing a proper market microstructure architecture. Intermediaries could develop a filter role by applying the principle “knowing your customers”, by setting up fair procedures to handle large orders and by implementing proper internal procedures to adequately check the soundness of their Chinese Walls.

3. Intermediaries’ responsibility to report regulators any transactions that might be deemed of being unfair and detrimental to market integrity. Mandatory (or facultative) notifications of suspicious transactions<sup>8</sup> to competent authorities allow intermediaries to improve virtuously their reputation in the long run. Intermediaries’ short term reluctance in this area – basically due to the relationship with current and potential customers – could be overcome by providing them with a set of incentives (such as notification anonymity and reduction of the sanctions in case of unintentional notification failures). Furthermore, such notifications might represent a valuable source of information when referred to OTC transactions, since the latter usually fall outside the scope of markets’ and regulators’ monitoring activities.
- Finally, *the above mentioned concerns and, in particular, the risk that prices may have a reduced signalling role increase where regulators, market participants and investors have to cope with a fragmentation of information and liquidity induced by the presence of multiple trading venues providing for similar trading facilities<sup>9</sup>.*
  - The increasing number of trading venues can be considered a result of technological developments as well as a response to the additional and different traders’ needs and preferences. In this respect, *it can certainly be argued that competition among trading services providers improves markets’ efficiency. However, the regulatory concerns implied by the changes, and notably by fragmentation, in the industry of trade execution services cannot be undervalued.*

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<sup>8</sup> Suspicious transactions could be defined on a case by case basis, taking into account a set of factors indicated by regulators and quantified by intermediaries who are in a better position to select the most serious cases. Such approach would allow to avoid overwhelming and not significant flow of notifications.

<sup>9</sup> Accurate information in respect of market volumes and prices of completed trades is central to both the fairness and efficiency of a market, and in particular to its liquidity and quality of price-formation. Information in relation to volume and prices of completed trades enables market participants and their customers not only to take into account the most recent information, but also to monitor the quality of executions they have obtained compared with other market users. In general, where trading information is complete and widely available, the price discovery process is more efficient and the public’s confidence in the market is greater.

- Under a price formation processes perspective, the issues described remain. However, *fragmentation adds a further dimension to the regulatory issues above identified since it can undermine the significance of on-exchanges' prices*, the latter being traditionally used as a reference for the purpose of best execution policies. In other words, fragmentation makes very difficult for investors and market participants to have access to the best available trading opportunities and costly for them to verify the compliance to best execution duties.
- Furthermore, investor protection concerns arise where dealers may execute client orders in-house against their proprietary trading positions. Needless to say that the conflicts of interest implicit in such practises are not only detrimental to single clients but to the market as a whole, since intermediaries internalising orders may, in certain circumstances, not have a preference for deep, broad and resilient markets.
- The fragmentation of information makes investors' investment decisions and regulators' surveillance activity more difficult to implement since the acquisition and collection of information on market dynamics could be time consuming and costly. In this respect, in order to have a full picture of market dynamics, information need to be consolidated.
- The introduction of transparency requirements and the adoption of a level playing field approach represent crucial measures to cope with the issues posed by fragmentation.
- *Although the adoption of a level playing field approach appears straightforward under a single-market perspective, where multiple trading venues (characterised by different trading features and operating in different jurisdictions under different regulatory regimes) are considered, a "one size fits all" approach is unrealistic to introduce and different rules and waiver should reasonably be considered.*
- The identification of a correct balance between rules requiring full transparency and waiver to take into account differences in trading methods and market microstructures is not an easy task. In fact, any failures in this area create the basis for the risk of regulatory arbitrage to arise<sup>10</sup>. How can regulators deal with this?
- There is a shared opinion that fragmentation among multiple trading venues has a substantial impact on price formation processes.

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<sup>10</sup> The risk of regulatory arbitrage should be carefully considered in a world where multiple trading venues allow trading on the same (or similar) financial instruments and derivatives. Regulators and entities providing the same trading facilities should be conscious of the impact that different market microstructures, regulatory arrangements and transparency regimes in cash and derivatives markets may have on the quality of price formation.

- Fragmentation can be considered a new phenomenon and “lessons” based on practical experiences in this area are still not available at a European level<sup>11</sup>. The impact of technology innovations in terms of extent and timing of market fragmentation, differs among jurisdictions. While in the US, financial markets have registered a sharp increase in the number of alternative trading systems in the last years, market fragmentation and competition among stock exchanges and ATSS is a relatively recent phenomenon in European countries.
- It is therefore extremely important to assess the appropriate level of transparency in the market to facilitate price discovery and market integrity, taking into consideration a number of factors, such as the size of the market, the frequency of trading of particular securities or group of securities, the participants in the market, the trading methodology and the potential effects of any disclosure on the liquidity of the market. Any transparency regime, once introduced, should be coupled with a continuous monitoring activity which allows the identification of the issues posed by the transparency regime and the timely reaction to remove any failures in the design of the rules.
- In this respect, three main factors should be carefully considered to make transparency regimes adequate and enforcement and surveillance activity effective:
  - *legal framework should be rendered flexible enough to allow prompt revisions where it is deemed necessary*
  - *adequate information sharing and cooperation arrangements among jurisdictions should be in place in order to be granted the access to the information necessary to ensure the effectiveness of the regulatory measures*
  - *although consolidation of information should be based on market solutions and, therefore, on the activities of market participants and data vendors, information should be consolidatable and any obstacles to consolidation should be promptly identified and removed, if necessary.*

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<sup>11</sup> Corporate bond markets represent a good example of a fragmented market. However, they have historically been characterised by a marginal participation by retail investors, prices basically linked to interest rates and a reduced trading activity on secondary markets, so that neither regulators nor market participants had strong feelings about the introduction of a transparency regime for such markets. The evolution of corporate bond markets has showed significant changes in their characteristics thereby justifying a renewed analysis of the rationale for a transparency regime applying to transactions on corporate bond markets, occurring also on OTC markets. Recently, the IOSCO SC2 on Secondary Markets Regulation has worked on a fact-finding analysis on transparency of corporate bond markets (A Report will be submitted to the IOSCO Technical Committee for approval at its meeting in Amman.