

# CHAPTER 1: REENGINEERING A MARKETPLACE

Moderator: Paul Arlman<sup>3</sup>,

Reto Francioni, *CEO, Deutsche Börse*<sup>4</sup>

David Krell, *President & CEO, International Securities Exchange*

Michael Pagano, *Associate Professor of Finance, Villanova University*

PAUL ARLMAN: Before I introduce my very distinguished panel, let me make a few remarks about how we see things in Europe. When it comes to restructuring exchanges, Europe is a very different place. One difference has to do with jurisdictions. If you do not take account of the fact that this is a multi-jurisdictional region, you have lost before you have started. The second big difference is that we have so many languages. Reto Francioni's Switzerland has four within that single country.

In 1990, when I joined the Amsterdam Stock Exchange, the main Dutch newspaper had an item under the heading, "Requiem for the Stock Exchange."

In 1990, competition did not exist in Europe. You had the jurisdictions, you had the exchanges, everybody had a nice monopoly, and nobody was complaining. And all of the exchanges were mutual organizations.

Then competition hit. The exchanges de-mutualized and became companies. The major ones became listed companies, they all became electronic, and some included the call mechanisms that Bob Schwartz has been advising about. Many of them integrated clearing, settlement, data, funding, the derivative markets, and so on and so forth.

I am proud to say that in Amsterdam we introduced remote membership in 1993 before it was approved by all the regulators. Everybody else in Europe did it when it was legal in 1996. I read in *The Wall Street Journal*

<sup>3</sup> At the time of the conference, Mr. Arlman was Secretary General of the Federation of European Securities Exchanges.

<sup>4</sup> At the time of the conference, Dr. Francioni was Chairman of SWX Swiss Exchange.

that one of the exchanges here in America has recently introduced remote market membership – this was an extremely proud and excessively important decision. But it dates back to 1993 in Amsterdam.

All of these changes had a major effect on European markets. Bob Schwartz has asked me to explain how we did it. I will give a very Dutch answer. The larger members bribed the smaller members. The larger members had the strategic view to see that an international market like Amsterdam could survive only as a full-service exchange if it was a company run for the benefit of the market, and not for the benefit of the owners. And that is exactly what we did. Bob also asked me if these changes in Europe were successful. Yes, they were quite successful.

The regulatory scene in Europe changed as dramatically as any changes that you are now contemplating here in the U.S. We had a total change in the legislation and regulation for securities markets in Europe. Now this is all being done at the EU level, and no longer at the national level. We also had a major change in terms of supervision. The European regulators got together and started a major debate about what, 20 years down the road, would become a European SEC-type organization.

Other areas are currently being intensely debated in Europe. Competition between exchanges, takeovers among exchanges, consolidation, and so on and so forth. Direct access for investors is an issue that will not go away. Internalization, clearing and settlement, data storage and vending, are obviously big issues that are being discussed. Then there is the issue of placing our trading screens in the United States.

If you do not know it yet, ladies and gentlemen, the SEC is a highly protectionist body. When we started to talk with the commission about having our electronic trading screens in the U.S. market, the SEC said, “Well, we are very busy with Y2K coming down the road.” My suggestion was to postpone Y2K and do this first, but that did not work (laughter). Then they said that they were dealing with the national market structure, and could not be bothered. Then they were too busy discussing self-regulation.

Three weeks ago, I thought this issue must be settled by now, so I sent an e-mail to SEC Chairman William Donaldson, saying, “You have not got terribly much to do anymore, so how about discussing trading screens?” But then you had your two big merger announcements, and now they tell us they have to discuss major consolidation issues. Once again, trading screens are on the back burner.

Now I would like to introduce my panel. Firstly, Reto Francioni has already been mentioned. He was the co-CEO of Consors Discount Broker. Before that he played a very crucial role in the modernization of the Deutsche Börse AG, a powerhouse in its own right. He is currently the

chairman of the board of SWX Group. And he wrote the book *Equity Markets in Action* together with Bob Schwartz. Reto, you have the floor.<sup>5</sup>

RETO FRANCIONI: Thank you Paul. Bob, congratulations on how you timed this conference.

On the topic of reengineering a marketplace, the key issue involves optimizing the value chain. Every issue concerning market architecture must involve optimizing this value chain. The big reasons for making changes in the marketplace include strengthening investor protection, enhancing price discovery, and lowering costs. These are the goals that every change in market structure must advance.

I was lucky to start my career at a time when SOFEX, the first options and futures exchange, was being built. SOFEX was the basis for Eurex, which is now one of the bigger derivative trading platforms. I also have had the opportunity to build up from scratch the Swiss electronic trading platform. This was basically a transformation from floor trading to electronic trading. Then, in Frankfurt, I had the opportunity to convert the floor into an electronic platform. We improved transparency in terms of open order books, so that you could track almost every move within the trading platform.

I will focus in a few minutes on the German market, but first I want to say something about IT. IT is a tool. It is a necessity. But it is not sufficient by itself to implement market changes and get an overall advantage. For instance, in 1992, London had about 30 percent of the German market. Then the German market introduced IBIS.<sup>6</sup> IBIS was an overly complicated and inefficient system. You had to press a lot of buttons just to get the match. But the effect of IBIS was crucial. The German market got back most of the 30 percent even though they were using a clumsy system. On the other hand, you could have a brilliant system and still not be able to conquer or acquire another market in terms of getting the order flow.

For instance, with the Xetra system in Europe, we wanted to attack one rather famous security, Nokia. By just using IT, we could have spoken directly to Nokia and offered a deal, such as a fee-free period of half a year in exchange for its listing. But it does not work that way. More components than just IT are necessary. With IT, you have a lot of advantages. You can go international. You can develop an international strategy because you do not depend on a physical location for trading. You can achieve greater

<sup>5</sup> See Francioni, R. and Schwartz, R., "Equity Markets In Action: The Fundamentals of Liquidity, Market Structure and Trading," John Wiley & Sons, 2004, 468 pages.

<sup>6</sup> Germany's IBIS was introduced in 1991. It was replaced in 1997 by the Xetra (Exchange Electronic Trading) system.

economies of scale. With IT, you can easily add additional functionality to a system as the need arises. But if IT becomes too complex, it becomes very difficult to handle. It becomes very, very costly, and this can happen very, very fast. Accordingly, one major task is to control the complexity of the IT.

I have some remarks about implementing change in the marketplace itself. We have several constituents including participants and inter-mediaries. As a market architect, you have to come in with a tailor-made, customized solution that is feasible and which fits the needs of the different constituents. If a solution is not feasible, a lot of difficulties will be encountered during implementation. For the exchange as a market, the solution must be functionally feasible. For the exchange as a business, the solution must generate acceptable returns on investment. Will a solution have political implications? If so, what is the power structure in the market? What are the legal ramifications? What are the technical requirements? These are very heavy feasibility issues.

In Germany, as mentioned, we had floor trading on the one hand, and the electronic platform, IBIS, on the other. The question was, "What are we going to do with the specialists"? It was very difficult to find a solution for this because the issue involved repackaging risk and return in a new structure. The Xetra system was designed as a fully-fledged, integrated electronic platform. It is an order-driven, open-order book facility. The money was made, and is made, by realizing economies of scale.

For most of the liquid stocks, the order-driven is the better system. With the blue chips, you will never have a problem getting tight spreads. It is a liquid market. You see depth and breadth. As a big institutional investor, you can calculate exactly what your price will be. Therefore, you can define your trading strategy, and so on. However, for the less liquid side, you need market makers, or market maker functionality.

In every country in the world, the markets grow from the bottom to the top, not vice versa. You have small companies, and you have big companies that have a very small free float. You need a market that is comprised of not just one type of trading or another, but that is a hybrid, which comprises more than one type of trading mechanism. This is very important. Do not exclude one type of trading outright. Instead, consider what would be an optimum solution. To find the optimum, there is an absolute need to talk to all of the involved and committed parties in the market.

We succeeded in Frankfurt. We came up with a platform that seemed to work. This is the case for the liquid stocks. But it proved not to be the best platform for the less liquid or illiquid stocks. For those stocks, we have market makers. To find the optimum solution for a market, never forget the supra-ordinate goals – investor protection, quality of trading, enhanced price discovery and lower costs.

ARLMAN: Reto, thanks very much. We will move right on to David Krell who, as you all know, is founder, President, and CEO of ISE. David has been with the New York Stock Exchange, he has been with the Chicago Board Options Exchange, and he has served with a number of financial firms. I am very pleased that he is here, and very interested to hear what he is going to say. David.

DAVID KRELL: Thank you very much Paul. I would like to frame the discussion for today by talking about change. Starting this summer, I will have been on Wall Street for 35 years. In those 35 years, the one thing that has been constant is resistance to change. Let me tell you about some of my experiences with Wall Street's resistance to change.

I entered the options business in 1973.<sup>7</sup> The CBOE opened its doors, and every market maker opposed it. They did not think that it was going to succeed. Within less than two years, 90 percent of those market makers were out of business. In 1983, index options started to trade. These options were very much opposed by the market makers on the CBOE floor. I was at the CBOE at the time, and I launched trading and index options. The market makers did not like cash settlement of index options and they threatened not to trade options on indexes.

Despite their opposition, the CBOE 100 was launched, and within six months it became the most popular, most active options product in the world. It then changed its name to the S&P 100 Index. In 1990, the SEC proposed an options linkage. The linkage was opposed by all the largest options marketplaces. In 2002, Chairman Pitt invited the five CEOs of the options markets to his office and basically read us the riot act. Pitt said, "You will create a linkage," and that was that. Within 18 months, an option linkage between the markets was created.

In 1998, I announced, together with three other founders, the formation of the ISE. Nobody believed that it would succeed. Why? Because the generally accepted view was that the option market in the U.S. was different.

<sup>7</sup> Until 1973, the U.S. options industry was relatively parochial, small and it was concentrated in New York. That came to an end with the launch in April 1973 of the Chicago Board Options Exchange (CBOE). Trading began in humble circumstances, a former smoking lounge at the Chicago Board of Trade. Soon, however, market volume exploded, encouraged by the popular application of an options pricing model by finance economists, Fischer Black and Myron Scholes. This provided investors a better understanding of risk and reward. Later, another landmark event had even more profound consequences when the all-electronic International Securities Exchange (ISE) was launched in 1997. It was followed by some copycat activity, including the introduction of more technology at the CBOE. As of early 2006, there were six U.S. options exchanges. Despite garnering a huge portion of the options volume in a short period, ISE's advance may have leveled off. As of this writing, the ISE and CBOE each control about 30 percent of all options volume in the U.S.A.

Everyone thought that face-to-face trading was the only way it could occur in a large market like the U.S. We started to trade in May of 2000, and within three years we became the largest equity options market in the United States. So, why is there so much resistance to change?

I postulate that there is much resistance, not because people do not like new products or because they do not like new systems, or because they are fearful of new strategies. Rather, Wall Street carries a lot of baggage. That baggage is mostly anachronistic thinking. It must be jettisoned. Change is with us. We have to adapt to change. Whether we like it or not, things will continue to change. The last couple of months are just another indicator of the change that is occurring.

We have reengineered the options markets in the United States. We introduced electronic trading. We introduced tighter quotes, greater efficiency, and lower costs. But I submit to you that the ISE did not become successful simply because we introduced electronic trading. There was a lot more to it than that. We created a new market structure in the United States. We took the best features of electronic trading, and melded them into an agency auction market, and the specialist system of trading. We wanted to introduce the benefits of both the electronic and the agency auction facilities. We wanted the speed, transparency, anonymity, and accessibility of electronic trading together with the customer priority, continuous quoting, and accountability that the agency auction market provides.

For the first time in the U.S. options market, we also introduced firm quotes, quotes that you could actually interact with. We displayed accessible size. We introduced WYSIWYG, “what you see is what you get.” ISE was revolutionary when we launched in 2002. But it was very important to grow this market. We also brought in new liquidity providers – groups that were not in the options market at the time. We went to the existing large market makers, Timber Hill and Hull Trading. We also went to new liquidity providers – Morgan Stanley, Deutsche Bank, Knight, Merrill Lynch, Lehman, CSFB, and the newest one, Citadel, which is now one of the largest options market makers in the world.

Our philosophy was to go after the liquidity providers that had the expertise, that had the technology, and that had the capital to grow this market. This was key in our thinking. We wanted to grow the options market, not just take market share from one market or the other. We also wanted to reduce cost. All of this led to a tighter, more efficient, and far lower-cost market. The result? Trading volumes have soared.

So, what is happening now? Paul, you talked about remote market making taking place. The CBOE hybrid system is rolling out remote market makers. They also rolled out eDPMs, electronic designated primary market

makers, some time ago. AMEX is introducing ANTE<sup>8</sup>, Philadelphia, the PHLX-XL<sup>9</sup>, and the Pacific PCX Plus. Now they all believe in electronic trading. The Boston Options Exchange, BOX, started trading in February of last year. We now have six options markets moving towards electronic trading. What is the result? There is more competition. Also, public investors are now getting the best deal ever in the options business.

What has happened to volume? In 2003, as an industry, the equity options business totaled 830 million contracts. Last year, it totaled over one billion contracts, a new record for this industry. So far, in 2005, we are tracking an even higher level than in the comparable period in 2004. Competition is good for the business, it is good for volume, and it is good for the investor. That is what we stand for. We welcome more electronic trading in the U.S. options markets.

ARLMAN: David, thanks very much. That was a clear message if I ever heard one. Our third speaker is Michael Pagano. Mike is one of those rare academicians who combine very thorough academic research with real experience in the markets. Michael, you have the floor.

MICHAEL PAGANO: Thank you very much, Paul. I have the opportunity to speak with you today about some of the research that I have been working on principally with Bob Schwartz. Given all the changes that we are hearing about, I am excited because we have only scratched the surface as far as research projects go. There is a whole bunch of things going on here that will be quite interesting to look at.

I would like to review some exhibits that are related to papers that Bob and I have worked on. How does all of this structural change affect market quality? We have answered this important question from both an academic and a practitioner point of view. We focused on Euronext Paris in 1996 and 1998, and on NASDAQ in 2004, years when both markets introduced electronic, closing call trading systems. How did these systems affect trading? How did they affect the quality of the market? The short answer is, "They clearly had a positive impact." But these impacts can be difficult to detect. You have to set controls and tease out exactly what happened.

What brought these changes about in the first place? The closing calls were introduced because of pressure from institutional investors who were trying to get better closing prices for rebalancing their portfolios. Dealers also wanted to close out or square up their positions at the end of the day, and for this they needed better closing prices. There was also a need in the derivatives market. If you have an option that is based on an equity market price, and that market

<sup>8</sup> Amex New Trading Environment (ANTE).

<sup>9</sup> Philadelphia Stock Exchange Extreme Liquidity Platform (PHLX XL).

price is not so reliable at the close, the market for your derivatives positions will be affected.

We looked at the effect of a market structure change – the introduction of a closing call – on market quality. How did we define market quality? We focused on what we call the accuracy of price discovery.<sup>10</sup> We define that accuracy with respect to the co-movement of prices across stocks. For example, how does a stock move relative to a broad market index? Many of you are familiar with the idea of a market model. In brief, you take the return on the stock and regress it on the return on the market index. One can use this basic model and see what is going on with prices at the end of the day. Are they more informative? Are they getting more reliable? Is volatility being reduced at the end of the day?<sup>11</sup>

We conducted two tests of the effects of introducing a closing call in Paris – one in 1996 for small caps, and the other in 1998 for large caps.<sup>12</sup> Then, in 2004, NASDAQ phased in a closing call, which enabled us to run a third test. Here are the data for Paris in 1996 and 1998 (see Exhibit 1).

| Interval | Small<br>Cap | Large<br>Cap |
|----------|--------------|--------------|
| 1-day    | 140.0*       | 18.8         |
| 2-day    | 77.8         | 72.8*        |
| 10-day   | 52.6         | 72.9*        |
| 20-day   | 88.0         | 55.4         |
| Average  | 101.7*       | 59.9*        |

\* Significant at the 99% confidence level.

Exhibit 1. Empirical Results for Euronext Paris, Percent Change of  $R^2$  Market Model

<sup>10</sup> Price discovery is the process of determining the price level for a commodity based on supply and demand conditions. Price discovery may occur in a futures market or cash market.

<sup>11</sup> A market model is used by academicians and market practitioners in portfolio management and empirical analysis.

<sup>12</sup> See Pagano, M., and Schwartz, R., “A Closing Call’s Impact on Market Quality at Euronext Paris,” *Journal of Financial Economics*, 68, 2003, pp. 439-484.



The small cap data are in the first column, and the data for the large caps are in the second. This data reflect the informativeness of the prices at the closing call. We examined how much explanatory power the market model regression equation has, as reflected in its  $R^2$  statistic. What the exhibit shows is the percentage increases in  $R^2$ , whether you use one-day returns or 20-day returns to estimate the market model.<sup>13</sup> At the bottom of Exhibit 1 we list the average percent change in the informativeness of prices. For the small caps, the informativeness of prices doubled.

In 1998, the experiment was replicated with large caps. Again, we found a very large and statistically significant increase in the reliability of closing prices. Accordingly, we conclude that market structure really does have an impact, that it really can improve market quality.

In 2004, Bob and I worked on another paper that focused on NASDAQ's closing call, which was introduced in Spring 2004.<sup>14</sup> A complementary way of assessing the informativeness of prices is to measure the impact of the closing call on pricing errors. To do this, we applied a relative return dispersion (RRD) measure to one of the most stressful trading times for NASDAQ, the Russell 2000 rebalancing which occurs every June. We compared the seven days before and the seven days after that rebalancing in 2003 and 2004. In 2003, NASDAQ had no electronic call at the end of the day. In 2004, NASDAQ did. If this market structure change was beneficial to the market, we would expect to see that the pricing errors were reduced. As you can see in Exhibit 2, the dotted lines that represent 2004 are significantly lower.

<sup>13</sup> The market model says that the return on a security depends on the return on the market portfolio and the extent of the security's responsiveness as measured by beta. The return also depends on conditions that are unique to the firm. The market model can be graphed as a line fitted to a plot of asset returns against returns on the market portfolio. The slope of this line is the beta. This relationship is sometimes called the single-index model. Source: The New York Times Dictionary of Money and Investing. Gretchen Morgenson and Campbell R. Harvey, Times Books, 2002

<sup>14</sup> See Chapter 9 in this book or Pagano, M. and Schwartz, R., "NASDAQ's Closing Cross: Has its new call auction given NASDAQ better closing prices? Early Findings," Journal of Portfolio Management, Volume 31, Number 4, Summer 2005, pp. 100-111.

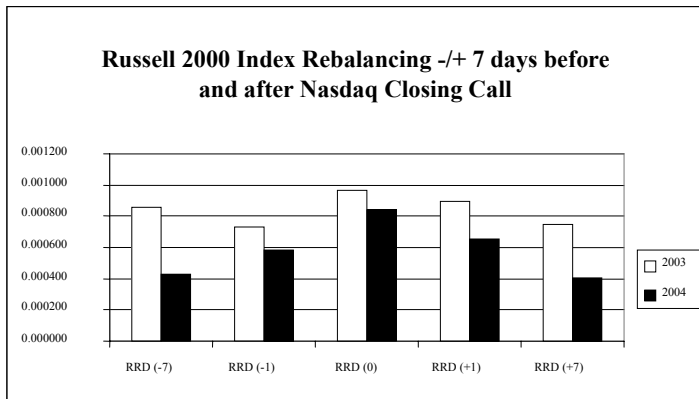


Exhibit 2. Empirical Results for NASDAQ's Closing Call, Change in Relative Return Dispersion (RRD)

We see a reduction of between 10 and 35 percent, depending on which quintile you look at. What does this mean? It means that, if you respond to customer demands and change the market structure in the right way, your prices will become more informative. I cannot show you all the data from these two papers, but I will note that short term price volatility was also reduced as a result of these changes.

ARLMAN: Reto, is it easy to steal somebody else's liquidity?

FRANCIONI: It depends. First of all, there has to be an appropriate analysis of the situation. We had very fragmented markets in Europe. Empirically, we saw that liquidity was very difficult to move away from the home market. When Daimler Chrysler was dual listed in Frankfurt and on the NYSE, everybody asked, "What is going to happen now?" How will the poor guys managing the stock exchange in Frankfurt compete with the New York Stock Exchange?

What happened is the following. Due to a very good marketing job by Daimler Chrysler, as well as shareholder option plans, etc., the overall liquidity was increased. But the executions took place in Frankfurt, because that is where the spreads were narrowest and costs were lowest, not only in trading, but also for settlement. Another example of an attempt to get liquidity from another home market in the blue-chip area is provided by

virt-x/SWX in London.<sup>15</sup> SWX Swiss Exchange had a marvelous idea. The exchange went back to the roots where the flows are. They went back to the biggies, Deutsche Bank, Merrill Lynch, Morgan, etc., and said, “We have an idea. We do a contract with you. You get a share of the stock exchange, and you get, essentially, a waiver of trading fees.” This consortium had two incentives. They owned 40 percent of the stock exchange (now that is called leverage!), and they had fee reductions or waivers resulting in a large savings in trading costs. What happened? It did not work out at all. No meaningful additional liquidity was gained, neither due to the guaranteed fee releases nor to the stake in the stock exchange. In this, and only in this respect, the strategy did not work out. Nevertheless, the virt-x strategy for a cost effective pan-European blue-chip exchange is still, in any case, a necessary strategy for Switzerland, a strategy that requires a market presence in London. That is without question.

ARLMAN: Thank you Reto, and the rest of a panel for a lively discussion.

<sup>15</sup> virt-x Exchange Ltd. (virt-x) was founded in 2001 in an arrangement among Tradepoint Financial Networks plc., TP Group LDC and SWX Swiss Exchange. virt-x is now wholly-owned within the SWX Group. virt-x Exchange Limited is a London-based Recognized Investment Exchange with a single rulebook, supervised by the Financial Services Authority (FSA). It is a regulated market under the Investment Services Directive.



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