BM&FBOVESPA

Validation of fees model and commentary on settlement fees

29 March 2017

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Thomas Murray and its expertise in market infrastructures

The sole subject matter of this company is the analysis of the operations of the world's post-trade capital market infrastructures and related asset custody services. Thomas Murray was founded 23 years ago as a private limited company registered in the United Kingdom. It is owned by 90 individual investors; with no institutional ties of any kind, the ownership and business purpose assures the independence of viewpoint that is essential for credible analytical and advisory services.

The firm's analyses cover 430+ various types of infrastructures in more than 100 marketplaces. Importantly for this expert engagement, Thomas Murray has teams assessing risks for members of these market infrastructures, and their clients, in 145 central securities depositories and 30 central counterparty clearing houses. The topics reviewed include operational and liquidity management, financial structure, governance, and the like. The firm's flow-chart administrative process reviews consider how these market infrastructures are linked to payment systems run by central banks and others; and to financial institutions providing for asset custody services.

The question that truly launched the business of Thomas Murray was global custody as the United States Securities and Exchange Commission established safekeeping standards for American portfolio assets diversifying across more and more jurisdictions[1], and from there the business coverage spread by geography and line of business. Today, the firm's analytical coverage also includes hundreds of transfer agents, payment systems, cash correspondents, as well as registrars.

Thomas Murray is a recognized External Expert for IOSCO for its market infrastructure assessments. The IOSCO annual "Risk Outlook" has cited this firm's studies, often extensively, since the publication was first launched. Management believes that its knowledge of financial market infrastructures, nationally and globally, may give weight to the comments to be shared with the CVM and CADE.

In my prior position leading the World Federation of Exchanges ("WFE"), I edited the global exchange "Cost and Revenue Survey" from 1998-2012, and so have considerable experience in working with these figures, both for their headline value and the limitations when trying to get into the details.

Thomas Murray and the Brazilian market

Finally, on the question of BM&FBOVESPA's settlement fees, in December 2015 Thomas Murray was asked by an international research and advisory firm to prepare a chart showing top-line fees for trading, clearing and settlement at a number of exchanges around the world. Thomas Murray was not asked to explain in any detail why these total trade transaction fees

[1] Regulations 17f5 and 17f7 under the Investment Company Act of 1940.

appear to be so different, nor to go into detail about the varying local market structures and regulatory requirements they support and reflect.

That same information note request involved finding the key regulatory phrases from IOSCO and the European Union concerning financial market infrastructures allowing fair and open access to other infrastructures, based on reasonable risk-related participation requirements. Article 53 of the European Union's CSD Regulation stipulates that access should be granted on a non-discriminatory and transparent basis, while charging "a reasonable commercial fee for such access on a cost-plus basis, unless otherwise agreed by both parties."

The conclusion written then was that these top-line figures are of some value as a basis of initial reflection, with considerable limitations given the very real problems of direct cross-market comparisons which do not yield like-for-like data. We wrote that, ultimately, a judgment for a fair fee will have to be made for a market infrastructure in any jurisdiction being asked to offer access to another. Looking back at that short assignment on this topic more than a year ago, the conclusions given today are the same.

The current question

BM&FBOVESPA has been asked to review and present its settlement fee figures, in order to demonstrate the fairness of the fee it would apply in opening its CSD to a competing exchange group.

BM&FBOVESPA has worked through its figures in great detail, and has benchmarked itself against a number of competitors. In particular, it looks at EuroCCP's fee schedule, because other infrastructures send transactions to it for settlement. According to the EuroCCP website, those settlements are processed nearly at or at the actual cost of settlement. The thought of BM&FBOVESPA managers in choosing to focus on this unusually direct piece of information was that angle would yield a more directly comparable calculation for the question under consideration, which is just how much does settling a securities transaction cost anyway, if its cost could be determined in isolation? That is indeed a useful piece of information as far as it goes.

Yet Thomas Murray would urge some caution, or at least give considerable context to the value of the EuroCCP information: like every other cost or revenue item for exchanges, the EuroCCP figures have to be caveated to be understood. Whilst its parent company in the United States has for years been commercially underpinned by receiving the settlement flow from American cash equity exchanges, EuroCCP is without any such natural feed for settlement via a parent exchange in a vertical exchange silo business structure. Following that logic, it has been well understood in European capital markets that the EuroCCP settlement fee was set at a level that was judged to be very commercially competitive (indeed, aggressive) in order to attract business that would more usually have flowed almost automatically within the exchange group where the trade was transacted. Equally, for years, EuroCCP was given a financial lifeline from its parent in order progressively to make its way into the European capital market. That implicit subsidy over long periods of time leads us to wonder about the true cost of access figures as EuroCCP has publicized them.

Every infrastructure's fee table is a product of its own history and market circumstances; none is easily compared directly to any other.

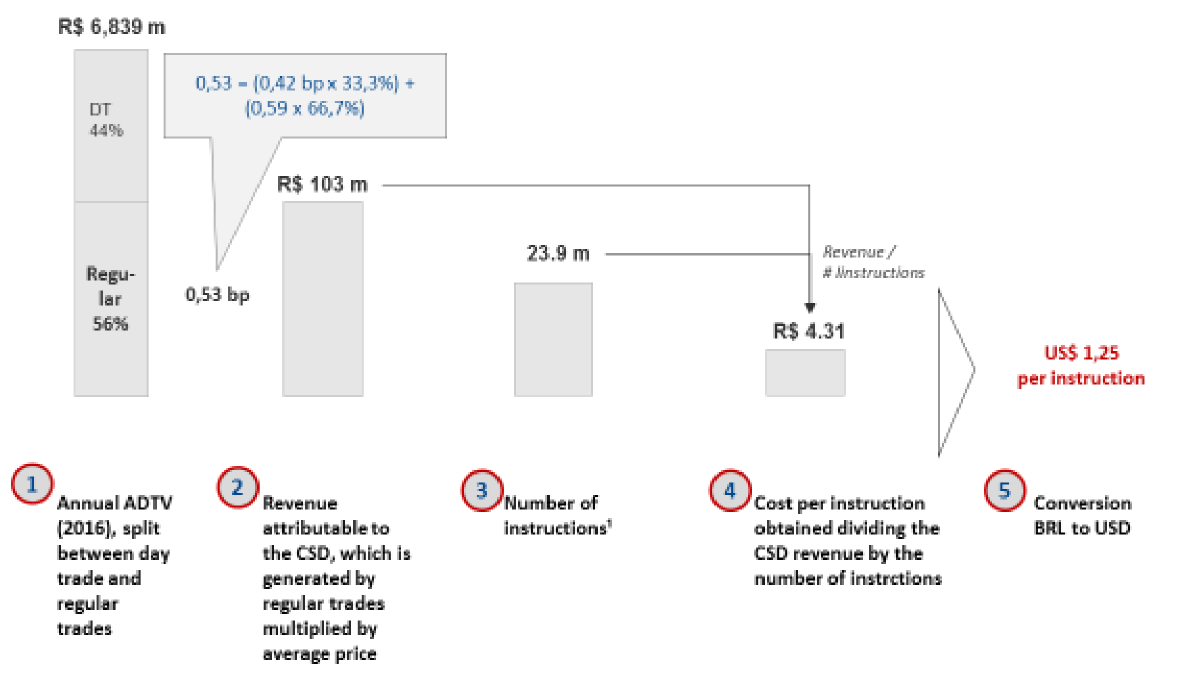
A further point on the cost of settlement in Europe is that fees have not changed much in the past decade. Once they reached a certain level, there was little room left for reductions. In the European Union after the implementation of the Markets in Financial Instruments Directive ("MiFID") reform, the cost-reduction drive was in central clearing, hopefully with viable risk management strategies as gains in collateral efficiency were introduced.

Reflections on BM&FBOVESPA calculations

Thomas Murray was asked to review, validate, and correct if necessary BF&M's tables as it reviewed the CSD settlement fees charged elsewhere.   The two summary tables only are as presented here:

The proposed price was converted into USD/instruction to compare BVMF's price against other exchanges

BM&FBOVESPA A Nova Bolsa



Note: BRL/USD: 3,45 | [1] Average number of daily settlement instrucions considering "subida" and "descida" YTD Ago/16, annualized
Source: BM&FBOVESPA

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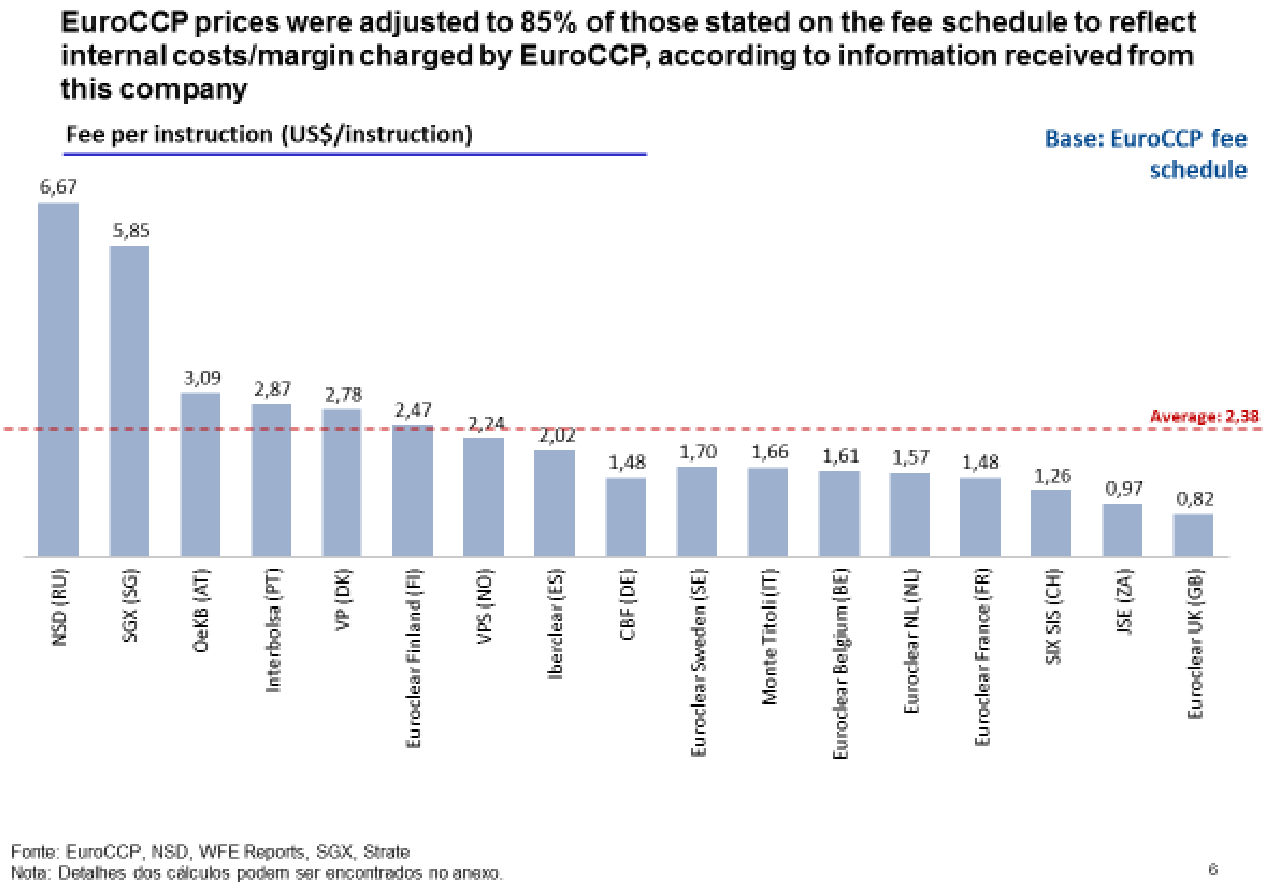

The purpose of the exercise as Thomas Murray understands it was to watch the competition in foreign markets, and to learn from it for BM&FBOVESPA's own fee tables, so the prices it charges is fair.

We will write most about the EuroCCP fee table. Here we note that BM&FBOVESPA also looked at length at what LCH in London charges a variety of markets per instruction, the National Settlement Depository in Moscow, Strate in Johannesburg, and the settlement charges applied in Singapore and Hong Kong. The point of looking so widely was to deepen the statistic base for the averages that follow. Given the information limitations on the subject, this breadth seemed logical to Thomas Murray for the establishment of the most solid statistical base possible.

As slide 2 on this page shows, EuroCCP states that there is no profit margin in the table; it writes that it provides its services at cost[2]. Thomas Murray went onto the EuroCCP website and found that that this statement could be verified, but only indirectly. It is odd that there is no profit "margem." Since this is the only CCP that affirms it offers settlement without a profit margin attached, BM&FBOVESPA was right to go deeper in its thinking about the EuroCCP numbers, thinking that they would be the closest to reflecting the CSD's own real costs. The other CSD tables do not state the bases of establishing their fees in respect to cost or margin.

At the top of the detailed EuroCCP settlement fee sheet, it states for example that the settlement fee for Austria per net settlement instruction, including funding costs, is € 3.45. Using publicly available information, we can work backwards to cross-check and verify the Austrian numbers and several others presented. It would appear that for this one service, EuroCCP is working without a profit margin. We have not audited every line, but suppose that the other numbers are also exact. Here is how Thomas Murray has validated the arithmetic logic of what might be considered "pure settlement fees" to be charged to clients:

The table confirms the statement that where EuroCCP has been given direct costs for settling in a given market, its explicit settlement fees are identical to those of the local CSD, or very nearly so. Where it has not been given direct access, it charges an above-market fee. Four comparisons are noted below. We have intentionally left aside larger markets such as the UK and France, for the reason that the calculations rapidly get more complicated with discounts due to monthly volumes or yearly membership fees. These do impact the actual settlement fee.

The number of instructions is either 2 or 4, depending on the market specificities. Our understanding is that the standard procedure is to charge for 4 instructions: 1 for the buyer, 1 for the seller, and because the CCP sits in the middle and acts as the buyer to the seller and as the seller to the buyer, this multiplies the instructions by 2.

For Hungary, there are only 2, because the CCP does not charge a settlement fee; the CSD charges the participant directly. This makes sense, because the CCP is part of the CSD. This is also the case for markets like Australia and Canada, where the CCP and the CSD are within the same entity/silo and have commingled transactions fees.

Thomas Murray does not find a correlation between "pure" settlement fees per transaction for marketplaces with omnibus or segregated, end-investor account structures.

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[222] Even though the pricing table states that services are provided at cost, BM7FBOVESPA's management contacted EuroCCP management to check that information and EuroCCP declared that right now the costs represent 85% of the charged cost.

Access	Market	Fee per instruction	Number of instructions	Market Fee	EuroCCP Fee
Indirect	Czech republic	2.95	4	11.80	15.10
	Hungary	2.9	2	5.80	7.95
Direct	Belgium	0.45*	4	1.80	1.80
	Norway	0.65	4	2.60	2.50

*assumes that the CCP would have a discounted fee due to large monthly volumes. The Norwegians do not apply volume discounts.

If CVM or CADE wish to retrace this audit, the website references are footnoted.[3]

Given the logic of BM&FBOVESPA looking at the EuroCCP numbers with particular attention, Thomas Murray then asked itself these further questions about the EuroCCP numbers as presented to the public:

- Do the settlement fees published by EuroCCP truly reflect the settlement fees (and thus income) charged by European CSDs?

  This would not be entirely true, because there are settlement-related costs (as mentioned in the fifth bullet point below), discounts which are calculated based on monthly volumes, and possibly further netting done by the CSD itself as takes place in the UK, for example.

- Is it true and precise that EuroCCP's settlement fees are charged "at cost?" By this we mean that EuroCCP makes a profit from its CCP fees but not from the settlement fees, which are passed to the CSDs.

[3] Hungary: https://english.keler.hu/Key%20documents/Regulatory%20documents/Fee%20Schedules/

Czech Republic: http://www.centraldepository.cz/images/dokumenty/cenik_cdcp/CDCP_price_list_01012017.pdf

Norway: http://www.vps.no/pub/vps/uploads/VPS-Fee-Schedule-pr-2017.01.01-1.pdf

Belgium: only available through the private domain of the website, to which we have subscription access.

This question seems to be true, because the fees charged by EuroCCP for settlement closely reflect the CSD fees. However, the large European CSDs also apply discounts based on volumes, which makes it difficult to identify a single settlement fee, or to determine whether the CCP transmits those discounts to its members. There is also the matter of explicit backing over many years by the American parent company, and the need as ever to consider this one fee in the context of the entire revenue line.

- Is it true that EuroCCP does not add other internal costs related to CSD settlement activity to its settlement fees (for example, internal IT costs)?

  That seems correct.

- The key assumption of the BM&FBOVESPA benchmark is that the EuroCCP settlement fees are free of a profit "margin" and of other EuroCCP internal costs." If these two assumptions are valid, then EuroCCP settlement fees should be a good proxy for how much European CSDs charge for settlement-related services. Are those assumptions valid?

  These assumptions appear to be true in cases where EuroCCP has direct access to the market, which it now does for the main European markets.

- When looking at CSD websites, "transfer of security fees" are substantially lower than the settlement fees charged by EuroCCP for settlement using such CSDs. However, on top of the "transfer of security fees", there are other settlement-related fees, such as query fees, change of settlement instruction fees, cancelation of settlement instruction fees, fail fees, T2S reimbursement of costs fees, etc. How is it possible to reconcile the CSDs fee schedules with EuroCCP settlement fees?

  When Thomas Murray asked itself this question, it determined that it is almost impossible to make that reconciliation. Fees are typically charged monthly, taking into consideration discounts based on volumes and including all the "settlement-related" fees which are not necessarily charged on all transactions (i.e. fails, cancellation, change of instructions, collateralization, and the like).

- Finally, is it right to say that EuroCCP settlement fees for a given CSD bundle all settlement-related fees of such CSD into a single average fee?

  This question is also hard to answer with exactitude. EuroCCP seems to have a single fee per transaction. Whether there are further discounts or extra costs related to settlement, we assume that EuroCCP will pass them on to their members on a case-by-case basis rather than making an average figure.

What Thomas Murray understands from this exercise is that the range of fees varies considerably for historic real cost as well as cost accounting reasons. BM&FBOVESPA have demonstrated what the range is across different kinds of markets. Too fine an analysis rapidly becomes, in our view, a very sterile exercise in looking for hundredths of centimes of differences for a fee that is taken in isolation, away from its business context. For this reason, we believe that BM&FBOVESPA made the right choice by opting to benchmark its fees using a settlement fee per instruction based on their current settlement revenue. This is why:

1. *Fees cannot be compared directly across markets on a like-for-like basis.*

Central securities depositories offer a diversity of services and thereby earn multiple revenue streams: safekeeping, settlement, membership, registration, corporate action instructions, reporting, and sometimes tax filings. Some are charged monthly, some daily, some per volume, some per value, some have rebates based on volumes, some do not, some seem cheap but clearing, especially central counterparty clearing, is very expensive due to risk and commensurately higher capital costs. The one preceding sentence demonstrates the need to look into headline numbers to see what is meant.

There are some broad trends in the comparative table above. European CSDs appear to be cheaper on settlement, but more expensive on fixed fees like safekeeping. The Middle Eastern CSDs appear to be more expensive on settlement / issuer services, but quote little or nothing for safekeeping fees, another critical CSD service area. The numbers for Brazil seem to fit the diagram, with a split of about 50/50 between transaction revenues and safekeeping fees.

If the point was to show that CSD A is cheaper for settlement than CSD B, that would be too facile. A given CSD might be more expensive for safekeeping, or might charge a yearly membership fee. A single component of CSD charges on its own is badly missing context, and certainly does not work when comparing market to market as to how the whole structure has been built up over the years, usually business area by business area. The relative costs paid for clearing and settlement are only visible by looking at a full year and by including ALL the fees paid to the CSD/CCP. Even then, the differences in market structure and the quality of services offered have to be factored in.

2. *Focusing only on the transaction fee gives only an incomplete view*

The investor and brokerage communities have historically been far more focused on the single, grouped figure of what a transaction would cost. Indeed, exchanges were instructed to "keep it simple." Having built that instruction into its services and measurements, it is devilishly hard to try to take apart this package at the granular level.

A figure Thomas Murray sees tossed around is the headline Target2Securities fee of € 0.15 per cross-border settlement, a rather transparent attempt to keep up with the US explicit cost set somewhat below that. But most settlements in Europe are domestic anyway. And again, even if some figure were to be established by forensic accounting, it would be artificially exact given the point about CSDs providing a package of services. No single fee means much in isolation.

3. *Settlement fees based on yearly settlement revenue is the right approach*

In its analysis, BM&FBOVESPA has singled out its potential settlement revenue (R$ 103 m) based on the latest yearly trading value and current estimation of fees per transaction depending on the type of investor (0.53 bp charged on both side of the transaction). To come up with a fee per instruction, this calculation is taking into account the fact that the CSD would keep the same revenue and therefore divide the revenue by the number of instructions within the year (23.9m).

The key, concluding calculation is shown in the first table in this section of the fee assessment. It would seem to Thomas Murray that that BM&FBOVESPA would be well within its rights to maintain at least the same amount of settlement revenue for a given number of transactions. The ratio proposed seems to be a logical and fair approach, which is to say that settlement revenue / number of instructions = $ 1.25 per instruction.

The question of settlement fees on their own

Post-trade infrastructures offer a variety of services. As national markets developed, infrastructures were often called upon to fill in gaps in services at the request of one party or another, simply because they happened to have a strong and neutral local position lending them credibility, together with the backing of banks/brokers at a time when exchanges were still established legally as mutuals. In the years of many bourses switching from mutuals to self-listed, public limited companies post-1998, the historic legacy of these many services and their tariffs / costs has proven devilishly hard to examine at the granular level.

As bourse transactions switched to electronic format in the 1980s and 1990s, their broker-owners most often instructed "give us a single fee for trading, clearing, and settlement. We do not care how you sort that out internally." And so was set in motion the basis for exchanges not having exact, transaction-level historic costs for specific services built up over time.[4] In any case, each of these components of that one transaction fee evolved in complexity or costs, making the initial back-of-the envelope split a progressively less exact reflection of precise costs. In exchanges as in other businesses, often fee negotiations began with a rough calculation and ended up with some other number at the end of the bargaining process, a figure even further away from that first cost calculation.

[4] In this management cost accounting question, exchanges are hardly the only ones to face this question. This accounting matter affects any business offering bundled, volume services. Once set in motion, each business service incurs changing costs in its provision in the years that follow. It would be unusual for any company to rework its management information accounting systems to reflect that on a frequent basis.

There is only a small population of central securities depositories offering settlement services across segregated, end-investor accounts. This makes looking across borders for rough ideas of costs that much harder.

A “pure” settlement fee in an environment of segregated, end-investor accounts will, ultimately, be a judgment and the result of some compromise negotiation, within the framework of the numbers provided by BM&FBOVESPA.

The table below shows the diversity of services provided / not provided by a selection of central securities depositories, and so the difficulty of comparing the different bundles that together finance the whole entity.

	CCP Fee	CSD Fee					
	Central Clearing	Settlement	Safekeeping	Corporate Actions	Account Maintenance	Membership	Registration
Brazil	% of value		% of value - Monthly	N/A	Yes	N/A	N/A
Canada	Fee per transaction	Fee per transaction	Fee per 100,000 shares - Daily	Yes	N/A	N/A	N/A
Germany	Fee per transaction + Value based fee with monthly discounts	Fee per transaction with monthly discounts	% of value - Monthly	N/A	N/A	N/A	N/A
Italy	Fee per transaction with monthly discounts	Fee per transaction	% of value - Monthly	Yes	Yes - Monthly	N/A	N/A
UK	Fee per transaction with monthly tiers	Fee per transaction with daily discounts	% of value + lines of stock with tiers - Monthly	N/A	N/A	Yes - Yearly	N/A
Norway	Fee per transaction with monthly tiers	Fee per transaction	Fee per account - Yearly	Yes	N/A	Yes - Monthly	Fee per shareholder + per value with tiers (6)
South Africa	% of value	Fee per transaction	N/A	Yes	N/A	Yes - Yearly	N/A
Saudi Arabia	N/A	Part of trading	N/A	N/A	N/A	N/A	Fee based on value with tiers (7)
Turkey	% of value	Fee per transaction	% of value - Yearly	Yes	Yes - Daily	Yes - One off	N/A

Volume Based Fee

Volume Based with tiers/discounts Fee

Value Based Fee

Volume and Value Based Fee

Exchanges and CSDs are businesses which adjust their offer and adapt their revenue streams over time. Developed-country CSDs have modified their fee strategy to reduce as much as possible reliance on trading turnover, which proved to be a wise decision since the financial crises of 2007-2009 and the modifications in public market trading behaviour. Settlement revenues rely on trading volumes whereas safekeeping fees do not, unless charged per value rather than per volume. That would be unusual, however, in the world’s larger markets.

Limitations of World Federation of Exchanges Cost and Revenue Surveys

In the mid-1990s, the WFE established a research function with two objectives: establish market data sets to capture and communicate the pricing capacity of regulated exchanges on a comparable basis, and to begin to have a look at exchanges' own financial statements in order to help bourse chief financial officers. For most of the world, there was only one exchange per market; without such an industry-wide initiative, it was therefore difficult for managers to get even a vague sense of how their business was performing relative to others.

The annual cost and revenue analyses were always weighted to the revenue side; there was little information that could be disclosed that made sense in a small statistical population with widely divergent market structures, laws and regulations, and economic histories. Some exchanges were centuries old, others only a few decades. It was not even apples and oranges.

To make the point yet more firmly, the last such cost and revenue survey of WFE members was 40-pages long, of which only two were devoted to costs.[5] The surveys were dropped in 2012, because the information generated was too vague and general to provide useful comparisons.

Safety and high standards / new entrants

If ever there were a permanent question for conversations between existing exchanges, their users, and their supervisors, this might be the one.

Like other utilities, exchanges tend to perform better as enterprises when business is concentrated. That is hardly new in business economics. The CVM and BM&FBOVESPA leaders have long been aware of the balancing the positives of trade transaction concentration for the clarity and fairness of price discovery that concentration affords - and more effective market surveillance with it - versus the potential cost of not having competitors for these services who might drive down costs. In other words, can this same good work be done more cheaply by multiple providers, or would the quality of the combined market structure drop?

Together with its authorities, BM&FBOVESPA pioneered some of the highest standards in the world for listings. To do so, there were costs in researching a question that any pioneer has to incur. There were also costs in market education, money largely paid for by the exchange. In the area of post-trade, BM&FBOVESPA was one of the few to pioneer segregated, end-investor accounts, with the attendant complexity of settling trade transactions individually versus in grouped, omnibus accounts. This was done for reasons of market safety, at the behest of the

[5] "2012 Cost and Revenue Survey," as posted on https://www.world-exchanges.org/home/index.php/research/wfe-research.

authorities, and is considered the better, if more expensive model. It multiplies exponentially the work of the CSD, but brings with it a public good element. For Thomas Murray, segregated client accounts are the preferred structure.

So the Brazilian regulated exchange market in at least these two critical quality areas has been a world leader, and borne the costs for it. Yet the question of competing globally never left the regulatory and business conversation. This author had a private conversation with the president of CVM some years ago on the topic of how to be sure an economic rent was not being extracted by the single operator. It is a question that must be addressed and carefully considered. But it is a question which, like justice and fairness, is never satisfactorily answered.

Since the mid-2000s, the frequently repeated statement of the World Federation of Exchanges board of directors on the question of competition was that new entrants are to be welcomed, provided only that the established market quality and regulatory standards are not compromised. They should be more efficient: new entrants tend to have lower costs, because they have not paid for the existing market developments to date; there is no legacy to continue to pay for, or weight of that past.

The question of competition

Brazil is a continental country, but its exchange does not operate in splendid isolation. We know that BM&FBOVESPA has a long history of comparing all its fees with other exchanges around the world. Although for many years it has been the single exchange group operator in Brazil, it has had both to compete for the trading business with depository receipts in New York and London for its blue chip shares.

Two examples can be cited to demonstrate the point. There may well be others of which we are not aware.

In 2006, Bovespa led a global survey on listing fees across exchanges in WFE membership.[6] In prior years, it had set up the Novo Mercado with world-leading listing standards for blue chip companies, standards that attracted the attention of the Organization of Economic Cooperation and Development as it was writing its Corporate Governance Principles, amongst others. The standards had a cost in terms of rigorous initial and ongoing disclosures, which, on the one hand, were always understood to be a public good. On the other hand, Bovespa still needed to be sure that the market would remain commercially attractive – it could not risk harming liquidity. No exchange can ever risk the liquidity its operations create, or its reputation. By definition, Bovespa it had to look abroad to set its cost compass. The listing survey results were presented to WFE membership at the 2006 annual meeting.

[6] This report does not appear on the Federation’s website, but might be available upon request at the secretariat. https://www.world-exchanges.org/home/index.php/research/wfe-research.

Also in the mid-2000s, Bovespa ran some inquiries abroad on bank payment system taxes. The problem at the time was that domestic cash movements between Brazilian banks incurred a tax that was not paid in New York or London when trades were transacted, making it harder for the Brazilian exchange to compete with share depository receipts traded in those two foreign markets, and so drawing considerable liquidity and price discovery away from the Sao Paulo market. In this case, the real total costs were not of Bovespa's making or to its benefit; quite to the contrary. We raise this point to demonstrate the sensitivity the exchange has long displayed to its global competitive position.

The competitiveness of the Brazilian market's fees

There is another way to demonstrate that BM&FBOVESPA is running a fair, competitive marketplace with the fees table it has set. Simply enough, if the market were too expensive, it would lose activity and liquidity. Has this been happening?

Unlike comparisons of exchange group profit and loss statements and balance sheet figures, market trading data have been standardized over the past two decades. The closest commonly accepted approximation of liquidity is the market velocity figure, the number that indicates how many times the shares turn over during the course of a financial year. The calculation is the value of shares traded / market capitalization. The figure is given as a percentage, and all the data come from WFE:

- 2012: BM&FBOVESPABOVESPA was 67.8%, the highest figure in the Latin American region. For some reason, the US exchange figures were missing, and no approximate global average was calculated. In the absence of an average or statistical mean, we must refer to the range of the velocity figures. The Bourse de Luxembourg registered the global low of 0.2%[7], and the world-wide highest figure was 208.5% recorded on the Shenzhen Exchange.

- 2013: BM&FBOVESPA BOVESPA was 72.9%, again the highest figure for the region. As for the year before, readers of these tables can only cite the range: the lowest velocity was again 0.2% for Luxembourg, and the highest was 269.3% on the Shenzhen Exchange.

- 2014: BM&FBOVESPABOVESPA was at 72.0%, once again the highest figure for Latin America. Luxembourg registered 0.3% velocity, and the highest number was Shenzhen Exchange at 341.7%.

- 2015: the velocity ratio for Brazil was 75.3%, for Luxembourg 0.2%, and for Shenzhen once again 593.0%.

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[7] The Luxembourg number is not as worrisome as it may appear, since there are only a few local companies listed. The bourse earns its living through listing fees for funds.

- 2016: the figure for BM&FBOVESPA was 79.5%, for Luxembourg 0.1%, and for Shenzhen Exchange 374%.

The Brazilian figures are remarkably stable, showing that it is maintaining very nearly the same liquidity year on year, irrespective of economic or political conditions over the period. There is nothing to be found in the market data that would indicate that trading activity is being unduly hampered by BM&FBOVESPA's fee structure.

Indeed, the story gets better: cash market trading both supports and is underpinned by world-leading derivatives volumes on equities. In 2015, the last year for which there is complete reporting by the International Options Market Association ("IOMA"), single-stock options were more heavily traded in Sao Paulo than on any other bourse in the world, a total of 792 598 845 contracts.[8] Trading and market-making in options requires frequent position offsets in the underlying cash market, and hence use of the settlement services. The cost of market infrastructure would not appear to be so onerous as to be damping down traders' and investors' spirits and activities.

Conclusion

Thomas Murray has reviewed and commented on the BM&FBOVESPA settlement fee estimates, and placed them in the highly complex context in which they must be understood. We do not believe that any other calculation would, in the end, provide a more exact estimate or a fairer way of presenting the numbers. We have explained why this is the case.

- *Posted, explicit settlement fees are not easily isolated from other services rendered by market infrastructures.*
- *Market circumstances in their details do not match up exactly one-to-one, and either do their costs.*
- *Settlement in the detail of segregated, end-client accounts results in a very different risk and cost environment.*
- *Trading activity on the Brazilian cash equities exchange demonstrates that the overall fee schedule is not weighing unduly on the market.*
- *Ostensibly isolated within the country, the history of BM&FBOVESPA's constant referencing its business line costs with the outside world in fact demonstrates its competitiveness.*

In a private conversation last month with an IOSCO official, unrelated to this advisory engagement, the off-handed remark was "Brazil offers the gold standard for post-trade risk management." Gold is more expensive than base metals, but undeniably brings with it other

[8] Annual IOMA reports are posted on https://www.world-exchanges.org/home/index.php/research/wfe-research#d

quality criteria: clearly, the market appears to support these extra costs of the gold standard, and perhaps it indeed welcomes the attendant safety features.

Thomas Murray believes the settlement fee as explained by BM&FBOVESPA, and as charged to its clients currently should be considered "fair" by the authorities, ATS, and the clients of both exchanges.