A multiperspective economic analysis*

Why the merger between Deutsche Börse and the London Stock Exchange will strengthen Frankfurt as a financial centre

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Table of contents

1 Introduction – the analysis of exchange mergers ... 6

1.1 Stakeholder groups, analysis criteria and institutional environment ... 6

1.2 Exchanges as network organisations ... 7

1.3 Timing ... 9

2 Exchange mergers from the owner and capital market perspective ... 13

3 Strengthening Frankfurt as a centre for financial market stability and risk management ... 15

4 Potential for cutting capital costs and increasing growth ... 18

4.1 Primary market prospects for equity and debt raising ... 18

4.2 Secondary market prospects ... 22

5 Potential for advancing derivatives market products in Frankfurt ... 24

6 Potential for expanding Frankfurt into a European fintech centre ... 25

7 In retrospect: arguments used during the planned merger in 2011 ... 27

8 Summary and overall assessment ... 28

Sources – daily newspapers ... 29

Sources – specialist literature ... 31

Sources – practical studies ... 33

Executive Summary

This economic analysis shows that the merger between Deutsche Börse (DB) and the London Stock Exchange (LSE) will strengthen Frankfurt as a financial centre and that all major stakeholder groups for the exchanges – such as their shareholders, employees, regulatory bodies but also the two exchanges' clients – will benefit from the merger.

Firstly, this is due to Brexit, which will make Frankfurt the clear European centre for financial market regulation and simultaneously, Frankfurt might indeed become the European centre for supranational risk management. By providing a broad-based financial market infrastructure, DB substantially contributes to transparency and hence to the stability of the financial markets − this applies in particular to its operation of Eurex Clearing, the integrated clearing service, as a central counterparty (CCP). The larger the share of financial transactions cleared internationally via Eurex Clearing and hence the more transparency there is regarding the risks to financial market stability, the easier their supervision and regulation will become. Without a merger, the European Central Bank (ECB) is in danger due to Brexit of losing the ability to supervise interest rate and currency transactions, which at present are largely cleared in London, since it would then have no authority over the most important market for its management instruments. A merger between DB and LSE can help counteract this and substantially increase the current quality of regulation.

Other important factors, which are leading to a radical change in the competitive environment, are the continuous process of digitisation, the rise of new competitors in the financial technology sector, the aggressive approach adopted by North American and Asian competitors and the shift in the weighting of global added value towards Asia. Over the past ten years, Frankfurt's significance as a financial centre has declined and it has fallen from 6th place to 19th place in the Global Financial Centres Index. The resulting danger that Frankfurt will become less important can be countered by a merger with a strong partner.

A functioning capital market is particularly essential in view of the real economy's increasing need to source finance – which entails a certain risk – for the digitisation process leading to Industry 4.0; the sum needed is put at EUR 40 billion per year in the period up to 2020. Since capital provision for middle market companies is considered inadequate throughout Europe, DB in particular offers a natural alternative for meeting the real economy's financing needs. In order to maintain their position in the face of global competition, it makes sense for DB and LSE to take concerted action.

In addition, a merger between DB and LSE offers promising opportunities for Frankfurt's currently weak primary market activities. Since banks now cannot adequately provide capital for middle market companies in particular, a way must be found for enterprises to raise finance on the capital market by issuing corporate bonds. In contrast to Frankfurt, LSE has extensive on-exchange bond trading activities featuring a large number of experienced investors. A merger between DB and LSE would open up the London market to middle market companies and would give them the opportunity to finance investments in Germany using debt. In the longer term, companies which are successfully listed on the debt market in London would also have much stronger prospects of going public in Frankfurt.

In addition to debt finance, the primary market offers ways of obtaining equity finance; in DB's case, through the Deutsche Börse Venture Network and its new growth segment for SMEs, which specialises in early-stage financing for companies. However, the support structures here are far less developed than in London, which has a much more capital-intensive early finance scene. In addition, the number of investors here is still comparatively small, as is their risk appetite. This means that Frankfurt – although it presents itself as well positioned from a national and Continental European perspective as an

investment location for venture capital and FinTechs – is lagging behind London in this area. A merger between DB and LSE would make it easier for German companies, and FinTechs in particular, to access London's venture capital industry offering access to the global market, hence facilitating growth and innovation and so encouraging a greater number of FinTech start-ups and IPOs in Frankfurt in the longer term.

Conversely, particularly after Brexit British FinTechs will find it more difficult to access the European Single Market and, in the wake of the merger between DB and LSE, forming a Frankfurt-based Continental European branch will seem the natural choice. This will result in employment, innovation and growth effects for Frankfurt.

On the secondary market too, companies that are already listed and securities service providers can both benefit from a merger between DB and LSE. Strengthening liquidity on the secondary market in Frankfurt and London will reduce companies' risk and costs of capital. This seems particularly sensible for both financial centres in order to enable them to hold their own against the globally dominant exchanges in North America and Asia. The mergers between the stock exchanges in Amsterdam, Lisbon and Paris that produced Euronext can serve as a positive example here, since they led to substantial increases in liquidity, cost savings and improvements in efficiency, which were passed on to clients in the form of lower fees.

Since Frankfurt is already regarded as a key derivatives trading centre, a merger between DB and LSE also offers benefits in this area. Although hardly any on-exchange derivatives trading takes place on LSE, it has a large over-the-counter (OTC) market for interest rate and currency derivatives. A merger between Deutsche Börse and LSE can lead to structural change here if, in those cases in which there is sufficient market liquidity, contracts that are currently traded OTC can be developed into exchange traded derivatives, thus producing a shift towards regulated market trading.

The merger between DB and LSE produces a wide range of potential opportunities and positive network effects for Frankfurt as a financial centre. Without a merger between DB and LSE, the importance of the German exchange operator and their stakeholder groups, and hence of Frankfurt itself as a financial centre, will decrease substantially in the medium term.

Preliminary remarks

The announced merger between Deutsche Börse and the London Stock Exchange has already produced a divided echo, particularly in Frankfurt, in the short space of time since the plans were revealed. For example, members of the Hesse State Parliament commented that, while they found the business logic behind the planned merger compelling, they also feared that Frankfurt/Eschborn would suffer as a location if the headquarters of the proposed holding company were to be in London (unnamed author 2016f).

The basic arguments advanced in the public discussion of the business logic for the merger are always highly similar. The main driver for exchange consolidation is the intense competitive pressure between exchange operators in the context of a changing environment. Exchanges worldwide are competing for securities transactions, especially from institutional investors. In addition to formal criteria such as speed, reliability and failsafe operations, liquidity is the decisive factor for institutional investors because of the high order volumes involved. In their battle to attract these global capital flows, exchanges are constantly looking for ways to increase their trading volumes and hence their liquidity and settlement quality. Mergers between exchange operators are one instrument for increasing competitiveness, achieving returns to scale and cutting costs by leveraging synergies.

The author of the present study has two objectives. Firstly, the arguments – which are based primarily on the needs of institutional investors – appear plausible but highly one-dimensional, since they only address a single stakeholder group for exchange operators involved and also do so at a cross-locational level. Secondly, the current analysis aims to focus on the specific benefits that the merger could offer for German stakeholders in particular, and hence also for Frankfurt. These challenges can be illustrated using the image of a pie: the first step is to establish how large it can get as a result of the merger, while the second is to ask what Frankfurt's share of the pie is and whether the merger would increase the size of the slice on our plates. This all-round before and after view of the pie can be supplemented by a distribution analysis to determine who gets how much of the larger pie, whether some groups will potentially end up with less on their plates and how they can be compensated for their loss.

However, I do not pursue this last aspect further here. The following study focuses solely on the advantages of the merger for Germany and Frankfurt, based on a broad definition of the stakeholder groups affected. If the merger is highly positive for a majority of the stakeholder groups, a solution can always be found for downstream distribution issues.

Documents and data used

The following documents were used:

1) The special literature given in the list of sources.

2) Studies by a number of consultants, which are documented in a separate list.

3) Sources taken from daily newspapers, which are also documented in a separate list.

4) Information obtained in the course of expert interviews that were conducted on the basis of anonymity.

1 Introduction – the analysis of exchange mergers

The question as to the way in which the merger between Deutsche Börse and the London Stock Exchange strengthens Frankfurt as a financial centre is highly complex and, at least in part, can only be approached subjectively if only for the reason that there is no generally accepted understanding of what this financial centre actually includes. Arriving at a net analysis of this question would be even more difficult, since this would require weighting different groups of financial market participants, something that has not been done here. In general, it should be noted that measures and events that strengthen one group on the financial market may weaken another relevant group. Especially in the analysis of the current transaction, this cannot be ruled out in a number of places. Consequently, the first task that has to be performed is to clarify

a. the standpoint of which stakeholder groups
b. what criteria and
c. which specific institutional environment

should be used as the basis for evaluating the announced merger between Deutsche Börse and the London Stock Exchange.

However, defining the groups belonging to a financial centre is not the only exercise that appears to be partly subjective; the question of when such a financial centre is strengthened also cannot always be answered unambiguously, since such an answer requires a reference point. At first glance, the status quo would seem to be a sensible point of comparison. However, this viewpoint fails to take into account the fact that Frankfurt's environment and global competitive position as a financial centre are extremely dynamic, and hence that merely stabilising the status quo may result in a relative loss of importance. Thus even deterioration in the position of all relevant financial centre groups in Frankfurt as a result of the merger with the London Stock Exchange may still put them in a better position when compared to maintaining the current market situation.

Since such a relative approach entails a speculative forecast, at least to a certain extent, a benchmark of this type has not been used here. However, this has only been done in conjunction with the explicit caution that Deutsche Börse is extremely unlikely to be able to successfully maintain its current competitive position without itself undertaking major steps to consolidate, and that Frankfurt is therefore definitely expected to lose ground as a financial centre if Deutsche Börse does not merge with a very large international exchange partner.

The following study identifies areas in which key participants in Frankfurt's financial centre (can and will) improve their position compared with the status quo as a result of the merger with the London Stock Exchange. It takes as its main starting point the recent impressions and analyses expressed by leading German politicians and financial centre players, which list deficits and weaknesses in the current financial centre structure that can be mitigated or completely remedied as a result of the merger.

1.1 Stakeholder groups, analysis criteria and institutional environment

Even when looked at from a purely economic perspective, the analysis of a merger between financial market infrastructure and exchange operators cannot be restricted to the effects that it has on the shareholders and owners of the exchanges concerned. When analysing exchanges – tightly regulated, state-supervised financial institutions with a natural tendency towards concentration – any competition-monitoring authority must also take the interests of additional (stakeholders) into account. Given

such a comprehensive analysis, it is evident that – as already mentioned above – foreseeable consequences can and will emerge in which some players benefit more than others and in which individual stakeholders may even lose out in absolute terms. However, the possibility that individual groups might suffer absolute losses cannot, on its own, be a reason for rejecting a merger; rather, it is an argument for weighing up the benefits for other stakeholder groups particularly carefully and critically. This study attaches particular importance to this weighing-up process.

The study answers the question of how to define the stakeholder groups that need to be taken into consideration by reference to the key functions performed by financial markets, as explained in standard financial textbooks such as Spremann and Gantenbein (2005). The three basic functions are as follows:

1. Financial markets aim to increase liquidity in secondary trading – in other words, the ability to buy and sell both small and large amounts of securities at any time without a surcharge or discount. The more liquid trading in a financial security can be made, the smaller the risk for traders or investors of having to remain invested in it for longer than they would like. In the case of illiquid securities, investors expect to be compensated for the risk they are running. Liquidity therefore reduces the return on capital required by capital providers and, conversely, cuts the cost of capital of enterprises seeking to raise finance.
2. Liquidity also means lower transaction costs and hence an improved ability to modify securities holdings to reflect optimal portfolio structures. This results in improved risk allocation on the financial markets.
3. The third key role played by financial markets is information processing. The more market participants come together on an exchange and the faster they can react to news via a trading system, the more indicative the prices fixed on the exchanges and the aggregated scarcity signals for financial securities that these express are.

These three functions performed by financial markets and exchanges directly address the needs of exchanges' two most important stakeholder groups – investors and (potential) issuers. Both must be seen as exchange customers. The better an exchange functions, the quicker and easier it is to match the supply and demand of capital and so generate positive effects for the real economy, e.g. in the form of increased investment volumes. Since these effects are key economic policy factors, another stakeholder can be identified at this point. Due to exchanges' role as financial intermediaries, regulators are also core stakeholder groups, and in the case of financial markets this naturally also applies to the Bundesbank and the European Central Bank (ECB).

Other stakeholder groups apart from the owners/shareholders are the exchange operators' employees and the large number of securities trading services providers and other consultants, banks and service providers whose business models revolve around the exchange and who, in contrast to issuers and investors, are highly immobile. Analysing the effects of the merger on all these groups in detail is extremely difficult on the one hand and, on the other, would also not be productive if all that is initially needed is to show the significant positive effects that will be produced by the merger between Deutsche Börse and the London Stock Exchange. Nevertheless, an attempt has been made to at least mention potential adverse impacts on individual groups that could be produced despite positive overall effects.

1.2 Exchanges as network organisations

Like sectors such as telecommunications, aviation and software, the market for exchange services can be characterised as a network industry – in other words, it has positive externalities that are known as

the network effect. This means that the benefit of a network or, to be more precise, the value of a service provided via the network increases with the number of users or consumers involved (Economides 1996).

A distinction can be made here between direct and indirect network effects. In the case of a direct network effect, value is added directly as a result of an increase in the number of users, since each additional participant represents a further potential link for existing users and hence enhances network performance for all participants. An indirect network effect arises when the benefit of a network increases with the number of users, but this added value cannot be directly explained in terms of the existence of additional opportunities for links between users, but rather in relation to complementary goods and services. In this case an increase in the number of users influences the supply of complementary services, which ultimately represent the added value.

In the case of the international market for exchange services in the broader sense of the word, both types of network effect occur. Firstly, the attractiveness of an exchange depends directly on the number of its users or consumers. In the context of an exchange, the users are investors, intermediaries and listed enterprises. Investors in particular benefit from a large number of active players, which facilitate trading at all times and hence generate liquidity. The greater market liquidity is, the lower the transaction costs are. "Liquidity plays a pivotal role in financial exchange markets where order flow attracts order flow", (Hasan, Hasenpusch and Schmiedel 2007, p. 29).

Indirect network effects are achieved in the stock market sector when an exchange does not merely offer a trading venue, but also additional vertical services that are generally associated with clearing and settlement. Specific examples are the services provided by a securities trading services provider or order consolidation. The key beneficiaries here are the exchange operators, which can generate economies of scale or reduce marginal costs if there are a greater number of users participating. Assuming that exchange operators know, as a result of the direct network effect, about the potential benefits of passing through cost savings, the indirect network effect also benefits all other players.

Direct and indirect network effects both further increase the intensity of competition compared with other sectors. Especially when it comes to competing for global investors, exchanges are willing to pass through potential scope for cost savings. In addition, the direct network effect means that there are size advantages associated with exchanges, and hence that exchange operators have a direct incentive to disproportionately increase their revenue base through mergers and acquisitions. However, these network effects also mean that, when analysing mergers, stakeholder groups have to be included on a broader basis than is the case in other sectors.

An initial idea of the expected network effects can already be seen from a look at the potential synergies envisaged. The merger documents reveal that the merger between Deutsche Börse and the London Stock Exchange aims to generate annual cost synergies of €450 million from the third year after the merger has been implemented onwards and a further €250 million in revenue synergies after five years, of which €160 million will be generated from the third year onwards. Roughly 700 jobs will be shed to achieve this (unnamed author 2016m). In a back-of-the-envelope calculation, these figures produce a present value of roughly €10 million of synergies per job to be shed, whereas the present value of all salary payments saved is unlikely to be much more than one-tenth of this sum. In other words, in contrast to many other mergers in other sectors of the economy, the merger being analysed here does not primarily represent a profit for shareholders that will largely be generated on the backs

of the employees who are to be let go.[1] Rather, it is necessary to assess in the following the areas in which positive network effects apply that can be used to validate the expectations for the merger's success, and to what extent these network effects will have a positive impact on Deutsche Börse's stakeholder groups.

1.3 Timing

The advances in digitisation, the emergence of new, innovative competitors in the financial sector (fintechs) and the shift in the weighting of global added value towards Asia should, as broadly accepted indicators, be sufficient to permit the recognition that a planned merger in the exchange sector, which was rejected for good reasons ten years ago, now needs to be looked at from an entirely different perspective and that it may also require a different analysis. Consequently, the changes in the competitive environment for European exchange operators and the current structure of global competition among exchanges will first be outlined briefly, and will be followed by assessments of key European exchange operators against this background.

If one accepts that – as explained in section 1.1 – an analysis of the merger between Deutsche Börse and the London Stock Exchange that is restricted to the shareholder viewpoint is too one-dimensional and that a broader perspective that incorporates all key stakeholder groups must be therefore adopted, then this broad-based analysis should also be maintained in the following for reasons of consistency. Consequently, a financial centre analysis that is based solely on the market capitalisation of the exchange operators concerned can be ruled out – regardless of the results. However, in the current discussion as elsewhere, almost the only place in which such a focus is being adopted is in relation to the debate on the future headquarters of the joint exchange holding company, which is not examined in greater detail here.[2] In making this omission, the author is following the example of Germany's Federal Minister of Finance, Wolfgang Schäuble, who refused to influence the question of where the company should be headquartered: "*The companies are the ones that decide and that must also take responsibility for the merger" (unnamed author 2016w).*

According to data from Helaba, which adopts a relatively narrow definition of the size criteria for financial centres, London is roughly 25%–75% larger than Frankfurt, measured in terms of the total number of banks active and the number of foreign banks based there, the number of bank employees and value added per employee (unnamed author 2016r). In contrast, compared with Paris Frankfurt is now clearly the more important financial centre, making it the most important financial centre on the European continent. In a ten-year comparison against 2006, there was only one criterion where Frankfurt experienced a devaluation: exchanges (unnamed author 2016s). Frankfurt's position also declined in another assessment. The Global Financial Centres Index (GFCI), which is produced twice a year by the Z/Yen Group on behalf of the Qatar Financial Centre Authority, features more than 100 criteria and is based on roughly 29,000 expert questionnaires. It currently ranks London as number one – as it was in 16 of the last 20 surveys – ahead of New York. Frankfurt, which was in 6th place in 2007 and 2008,

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1 IT costs savings also outstripped potential human resources savings in the case of the Euronext merger in the period between 2000 and 2003. See Pagano and Padilla (2005).

2 However, for reasons of completeness only it should it be noted that Deutsche Börse AG's market capitalisation at the end of 2015 was almost €16 billion, clearly larger than the London Stock Exchange's figure of approximately €13 billion (unnamed author 2016t).

has now slid back to 19th and clearly trails amongst others Singapore, Hong Kong, Tokyo, Zurich, Boston, Toronto, Seoul, and Luxembourg.

Prevailing academic opinion is that the danger expressed in these studies – that Frankfurt will become less important as a financial centre – can be combated by merging with a stronger competitor. In this context, Hasan, Hasenpusch and Schmiedel (2007, p. 38) note that: "*M&A among exchanges not only become popular and beneficial among issuers, as an alternative to multiple listings across markets, but are equally important to exchanges, allowing them to avoid direct competition from stronger markets and the fragmentation of liquidity*".

If it is becoming clear that Frankfurt will benefit as a financial centre from the merger, it is to be expected that Paris – its most important Continental European competitor and home of exchange operator Euronext – will voice criticism of the move and at the same time will attempt to copy its competitor's strategy. The statements in Euronext's new strategy plan should be interpreted in this light and as a further indicator of the inherent logic behind the need for scale. The press release introducing this plan emphasised that "*In a changing exchange environment Euronext will carefully examine all potential opportunities leading to a transforming transaction and adding value for clients and shareholders*". A budget of up to €150 million has been set aside for acquisitions and new developments (unnamed author 2016a). At the same time, an attempt is being made to exert pressure on the partners to the merger via the European Commission by drawing attention to a potentially dominant market position (unnamed author 2016n; unnamed author 2016x). This move seems logical not least because of the expected increase in network effects.

In addition to the change in the competitive environment, there are two other key aspects that are changing over time and that must be borne in mind when analysing the merger: the German real economy's financing needs, which have become immeasurably larger and riskier as a result of the developments known by the catchphrase "Industry 4.0", and of Brexit. With respect to the first aspect, Paul (2015) provides an extremely compelling explanation of the trend away from traditional corporate finance and towards increased capital raising, using forms that are highly similar to project finance. The question as to which capital providers and forms of finance seem suitable for these characteristics remains unanswered.

However, a recent study by Germany's Federal Ministry for Economic Affairs and Energy (BMWi) (undated) casts doubt on the suitability of bank loans as a source of finance by emphasising that in particular the question of the economic feasibility of the investments to be made is emerging as the largest stumbling block. Furthermore, it states that the very few studies that examine not only the economic growth potential but also the necessary capital expenditure clearly reveal that most German enterprises currently believe that capital expenditure will significantly outstrip expected revenue growth in the medium term. This makes purely internal financing from operating cash flow difficult if not impossible. Without providers of finance that are willing to take on risk, the link – which is generally seen as negative – between the higher capital expenditure requirements expected on the one hand and the resulting revenue growth on the other is leading many enterprises, and especially SMEs, to adopt a cautious approach. However, according to the recent BMWi study the anticipated revenue will exceed the costs after approximately six years, leading the Ministry to conclude that we can expect to see increased investment in Industry 4.0 in the near future.

Whereas the positive effects of digitisation on the German real economy are supported among other things by a recent study by McKinsey & Company (2015), the question of how this is to be financed unfortunately remains open, with it being expected that sufficient investments will be available to implement the transformation. PwC (2014) puts the volume of capital expenditure needed by German

industry as a whole at €40 billion per annum in the period up to 2020. In other words, approximately €200 billion will be needed in the coming years solely to make the investments in digitisation considered necessary for what is known as "Industry 4.0", despite the fact that even the BMWi is not convinced of the economic feasibility of some such investments at an individual level. If the banks with their risk profiles can only play an extremely limited role here as lenders, if debt is also not the best form of finance and if existing owners probably do not have the resources to strengthen their companies' capital base to extent required, then new capital providers will be needed. Given the reservations (which are also politically motivated) with respect to new major foreign shareholders from China, for example – as discussed in summer 2016 in relation to Kuka AG – the exchange is a natural alternative. However, the extent to which one should place such hopes in the German capital market in view of its historical development and current situation is discussed in more detail in chapter 4.

Nevertheless, it can already be said that Deutsche Börse's global competitive situation in the last five years has deteriorated as a result among other things of the aggressive approach taken by its competitors ICE and Shanghai, and that, in parallel, the need for a functioning capital market has increased significantly as a result of the digitisation process leading to Industry 4.0. These two aspects represent a new, topical assessment of the merger between Deutsche Börse and the London Stock Exchange and as such must also be taken into account in the European Commission's analysis. The decision by the United Kingdom to leave the EU also needs to be considered at short notice.

Although a large number of observers and the Frankfurt Main Finance initiative basically see the consequences of the Brexit vote as positive for Frankfurt's future as a financial centre, prominent qualifying voices can also be heard. For example, Helaba emphasises that London will remain the most important financial centre in Europe even after Brexit and in fact sees a possibility – albeit a remote one – that if the British negotiate well London's role may even improve, assuming it is possible to achieve regulatory arbitrage plus free access to the financial markets in Continental Europe. Equally, Christine Bortenlänger, Executive Member of the Board of the Deutsches Aktieninstitut, warns that Frankfurt will have to make a major effort to benefit from Brexit in view of the rigid, overly bureaucratic framework here and because the German capital markets are not competitive enough (unnamed author 2016r).

Deutsche Börse adopted a clear position immediately after the Brexit referendum. The Chairman of Deutsche Börse's Supervisory Board said in the immediate aftermath of the vote that "*We are convinced that the planned merger between Deutsche Börse and the London Stock Exchange has become even more significant for our clients in view of the result of the vote, and that it will offer both our shareholders and other stakeholders additional benefits*" (unnamed author 2016q).

Thus a picture is emerging in which Frankfurt can profit as a financial centre from Brexit regardless of the merger between the exchange operators provided that existing major weaknesses in the capital market structure (which we shall examine in detail in chapter 4) are remedied in the short term and that the negotiations with the European Commission rule out the opportunity for regulatory arbitrage. Anyone who is not convinced that the weaknesses of the German capital market, which have existed for decades, will now disappear in the short term as a result of concerted action by politicians and local financial market players and that the European Commission will not make any compromises in return for a rapid, mutually agreed divorce between the EU and the United Kingdom might start to worry at this point. In particular, the potential loss of the ability for regulatory intervention with respect to London – which will still be the leading European financial centre in the future – cannot be ignored when analysing the merger between Deutsche Börse and the London Stock Exchange.

Finally – regardless of day-to-day politics – another extremely important regulatory change since the last major attempts at a merger cannot be ignored when it comes to evaluating mergers among exchange operators: the amendments to the European Markets in Financial Instruments Directive (MiFID II) and the introduction of an accompanying Regulation (MiFIR) in 2014 (Gomber and Nassauer, 2015). Exchanges are now competing more and more not only with new trading platforms but also with unregulated OTC trading (Gomber, Sagade, Theissen, Weber and Westheide, 2015).

At this point it must be expressly noted that the present analysis aims to answer the questions posed from an economic perspective only and that therefore a legal assessment cannot and will not be given.

2 Exchange mergers from the owner and capital market perspective

Since the mid-1990s, exchange operators' organisations throughout the world have changed. They have been transformed from non-profitmaking companies with public-sector organisational structures into profit-driven enterprises with private shareholders. This was generally accompanied – at least implicitly – by an acceptance of the fact that the new private-sector owners would adopt different objectives and targets than their predecessors. This acceptance was not long in coming in view of the recognition that the old structures had outlived their efficiency and that innovations entailing major investments in the automation of trading and settlement and in more advanced data management were necessary, but also expensive and risky. In the course of what was known as "demutualisation", the exchanges and exchange operators themselves often went public and used the funds raised during their IPOs not only to fund major investments but also to expand in order to generate economies of scale for their IT investments and to improve the liquidity of their trading platforms (Serifsoy and Tyrell 2006). This means that exchanges, which were previously limited to their national borders, were subjected to increasing competitive pressure, which manifested itself in particular in the competition for global institutional investors' securities orders. The rise of alternative trading platforms associated with electronic trading further exacerbated the pressure on established exchange operators.

The last decade has seen a series of mergers and acquisitions in response to the technological challenges and more intense competition, and these have radically changed the exchange environment. Whereas capital market participants are relatively critical of consolidation and takeovers in many sectors,[3] many of them see the general trend towards consolidation on the market for exchange operators as primarily a positive development, including in relation to the exchanges' customers. However, in view of the complex structure of stakeholder groups explained above and the considerable opportunities for political influence to be exerted, it is not clear up front to what extent integration activities between individual exchanges also add value not only for the shareholders of the direct partners to the transaction but also for the merging exchanges' competitors and hence for the financial sector as a whole. This question will be examined later on in more detail, since capital market reactions to the announcements of exchange mergers can be taken to be directly observable, unfalsified reflections of what the owners think.

Schiereck, Meinshausen and Karkew (2012) conducted an event study that initially investigated 27 bidders in international exchange mergers to determine the value effects produced for the shareholders of the enterprise that was directly affected. Then, in a second step, share price reactions for the exchange operators' competitors were also investigated; these enterprises can also be indirectly affected by the announcement of the transactions and their share price reactions express the effects of acquisitions on the stability of the entire sector. The results of this study show that the value effects in the case of the stock market valuations of the bidders concerned were consistently positive and – with price jumps of up to 5.01% – comparatively pronounced, even though these values are not statistically significant at normal significance levels. Nevertheless, this result can at least be interpreted as indicating that the announcement of a merger or takeover in the international stock market sector clearly does not have a negative impact on the bidder's shareholders.

Consequently, consolidation moves among international exchange operators tend to be viewed as adding value and associated with an improved competitive position, among other things because of the network effects described above. In a next step, the survey documented the empirical evidence

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3 See for example, Jope, Schiereck and Zeidler (2010) for the telecommunications industry.

for the effects that the M&A announcements had on the stock market valuations of the bidders' competitors. Despite the commonly held expectations that acquisitions negatively impact competitors because they improve the bidders' competitive position, the analysis shows significant positive value effects for the rivals and hence for the sector as a whole. These results are also economically relevant, with an average return of 4.48%. In other words, the capital market does not consider announcements of M&A transactions to be unambiguously positive for bidders, but it does think this is the case for competitors that are only indirectly affected. Typically, these positive value effects are particularly pronounced in markets that exhibit clear network effects and are a direct consequence of the sector logic in the market for exchange services.

Against this background, a political approach policy that rejects consolidation must be aware – regardless of the concrete individual case in question – that it is preserving what are considered to be inefficient market structures. In a next step, thought should be given as to how a company that operates using inefficient structures can maintain its position over the long term in the face of global competition, or how a politically motivated rejection of efficiency-enhancing structures can be offset in order to maintain competitiveness. A third aspect that is particularly important for network sectors is the question of what negative effects inefficient structures have on exchange operators' customer groups, since any switch by them to alternative stock exchanges abroad entails substantial costs.

The planned merger between Deutsche Börse and the London Stock Exchange is taking place in a period of extreme political uncertainty and significant volatility – factors that make a direct capital market analysis as described above more difficult and that limit the informative value of stock price movements. For this reason these have not been included here; instead, the study concentrates solely on the statements made by well-known providers of shareholder services. Such shareholder services providers, the largest of which – with a market share of 61% – is ISS (Institutional Shareholder Services), are considered to have a particularly strong influence on institutional investors in the USA. According to a study by Copeland, Feyman and O'Keefe (2012), recommendations from ISS are so important that a vote by it in favour of a measure can increase the overall shareholder approval rate by 15%. ISS recently judged the present merger to be extremely positive for the shareholders of the companies involved. The ISS report stated that the merger was a "compelling opportunity to create a leading global market infrastructure operator domiciled in Europe". Another shareholder adviser, Glass Lewis, voiced similar comments. It said that the synergy effects and lack of alternatives were reason enough to approve the merger (unnamed author 2016c). It should be noted in this context that the approval by the shareholder services providers is not restricted to only one of the participants in the transaction, but rather extends to both exchange operators.

Consequently, the situation can be summed up by saying that a merger seems to be positive from the owners' perspective, both from the perspective of a fundamental examination of the moves among exchange operators towards consolidation and in the current concrete case. Equally, there are no indications that top management at the partners to the transaction has taken advantage of shareholders – something that would in theory be conceivable.

3 Strengthening Frankfurt as a centre for financial market stability and risk management

There is a broad consensus that the referendum on 23 June 2016 and the United Kingdom's resulting exit from the EU (Brexit) will further increase the concentration of central banks, supervisory authorities and regulators in Frankfurt and make Frankfurt the clear European centre for financial market regulation; simultaneously, Frankfurt might become the European centre for supranational risk management. Thus the head of the European Banking Authority (EBA), Andrea Enria, had already said in the run-up to the vote that if the British voted for Brexit, the authority would leave London. "*If the British were to decide to leave the EU, we really would have to move to another European capital"*, the Italian bank supervisor said (unnamed author 2016d). Frankfurt is a natural alternative location. Back in April, a survey by the Center for Financial Studies revealed that 69% of the German financial institutions and financial services providers polled saw Frankfurt as a major beneficiary of a potential Brexit (unnamed author 2016e).

However, even without Brexit and without a merger between Deutsche Börse and the London Stock Exchange, Frankfurt already has a dominant position as the Eurozone's control centre and rule-giver, and the seat of central banks, financial supervisory authorities and regulatory bodies. This is because all measures taken to increase financial market stability are based on transparency. And Deutsche Börse has made a major contribution to financial market transparency by providing a broad-based financial market infrastructure. The transparency of transactions and holdings of financial instruments – which was one of the main lessons learned from the collapse of the investment bank Lehman Brothers and the global financial crisis – has become critical to financial market regulation. This is why the European Market Infrastructure Regulation (EMIR) – a European regulation governing off-exchange trading of financial derivatives – was adopted. The regulation revolves around the obligation by market participants to settle standard off-exchange derivatives transactions via a central counterparty (CCP) and to report such OTC transactions to a trade repository. EMIR acquired direct legal force for EU member states as a result of Regulation (EU) No 648/2012 on OTC derivatives, central counterparties and trade repositories.

With Eurex Clearing, among other things, Deutsche Börse has an integrated clearing house that acts as a central counterparty (CCP) for both the cash market and the derivatives market. As such, it assumes the risk of default by a partner to a transaction cleared via the CCP and in return requires its member institutions to deposit collateral with it. According to information provided by Eurex Clearing itself, the clearing house offers services in the areas of stocks, bonds and derivatives. The clearing house has 190 clearing members in 17 countries and cleared 1.7 billion transactions last year. It manages a collateral pool worth €57 billion and handles gross credit risks of almost €17 trillion per month. The larger the share of international financial transactions cleared via Eurex Clearing, the more transparently the risks to financial market stability are reflected here, and the better the supervisory and regulatory authorities in Frankfurt can do their jobs.

However, Brexit does not offer only advantages for the financial market players based in Frankfurt. It is to be expected that it will also significantly restrict the range of instruments that a centre for financial market stability requires under all circumstances, and hence also weaken the value of the supervisory and management institutions based in Frankfurt and hence of Frankfurt as a financial centre itself.

Döring (2016b) rightly – and pointedly – asks: "*Does anyone on the Executive Board or Supervisory Board of Deutsche Börse really believe that German politicians and in particular the State of Hesse's Exchange Supervisory Authority could, in the light of the experiences gained in the financial crisis, permit the operator of the largest EU economy's financial market infrastructure to become the subsidiary of an offshore holding company that is not subject to European financial market supervision and regulation*?"

Indeed, the question as to Frankfurt's importance as a centre for European financial market supervision ultimately revolves squarely around precisely those interest rate and currency transactions that are currently cleared in London and that might possibly no longer be under EU supervision after the UK leaves. Therefore, the question of EU supervision is not so much about the location of the holding as about where those transactions are cleared. In relation to currency trading, Döring (2016b) makes a striking reference to the worries within the European System of Central Banks that the euro is largely traded outside the Eurozone and outside the ECB's control, and that ECB Vice President Christian Noyer has already declared that he is no longer willing to tolerate this. London's position in interest rate trading is even more outstanding, since more than half of all global interest rate derivatives are cleared via LCH.Clearnet in London (see also chapter 5).

Without a merger, following Brexit Frankfurt would be home to a European Central Bank with no authority over the most important market for its management instruments of interest rates and currencies. Whether the ECB can tolerate this will depend on whether it can do anything about it and what measures it is prepared to take to do so. Controls on capital movements and other similar instruments can certainly be used to exert considerable pressure for trading to be moved from London to Frankfurt. However, the side-effects of such measures would undoubtedly be significant.

The importance of regulatory bodies and financial market infrastructures is expected to continue increasing substantially in the coming years, and with it the ability to access the data from leading global financial centres and hence to identify and mitigate systemic risk at an earlier stage. The technological innovations seen in recent years are facilitating the rise of electronic trading platforms, while stricter capital requirements for bank also ultimately lead to more previously OTC financial transactions moving to exchanges and/or similar platforms with central counterparties. According to a study by Greenwich Associates, currency trading is currently experiencing such a change, with electronic trading now settling 73% of transactions and with the proportion of transactions conducted by phone having more than halved in recent years. Thomson Reuters is the market leader among the providers of electronic currency trading platforms with a market share of 37%, followed by State Street with 16% and 360T with 15% (Brächer, 2015). The drivers for this trend correspond to the benefits offered by a well-organised exchange as discussed in section 1.1. Trading becomes more liquid, more transparent and more efficient, something that is of particular benefit to the real economy companies that hedge their international business here (unnamed author 2016u). Like currency trading, bond trading – which traditionally has been dominated by OTC transactions – is also about to experience far-reaching computerisation according to the International Capital Market Association (ICMA) (unnamed author 2016v). This market also plays an important role in interest rate management by the central banks.

On 26 July 2015, Deutsche Börse announced the takeover of 360T for a purchase price of €725 million, beating CME from the US to the post. Among other things, 360T is used in 29 out of the 30 companies included in DAX and had a daily turnover last year of €90 billion (Brächer, 2015). Thanks to its in general

extremely advanced technology and its farsighted acquisition of 360T, Deutsche Börse has a good chance of winning significant long-term market share in the areas of interest rate and currency trading and of relocating trading from London to Frankfurt if the market participants in London are given unrestricted access to superior trading platforms in Frankfurt. The migration of Bund futures trading from London to Frankfurt in the 1990s can serve as an example here (Franke and Hess, 2000).

4 Potential for cutting capital costs and increasing growth

To enable capital seekers and capital providers to find each other on the financial markets and in particular on stock exchanges, a compelling solution to the problems of lot size transformation and maturity transformation. The first issue refers to the differences in the amounts of capital that enterprises in the real economy need to make investments on the one hand and that individual investors are prepared to make available in a single exposure on the other. This relates to the capital market's primary market function. Maturity transformation focuses primarily on the fungibility of financial instruments in the period following the original investment decision. The need here is to ensure on the one hand that the real economy has access to capital over the very long term, but on the other that investors with short-term investment horizons are able to take part in financing because they can pass on their investments at any time. In other words this relates to the capital market's secondary market function.

It is clear that the features of lot size transformation and maturity transformation are closely related. The following section examines both aspects in greater detail with reference to the merger between Deutsche Börse and the London Stock Exchange.

4.1 Primary market prospects for equity and debt raising

In general terms, Engels and Thießen (1994) already drew attention more than 20 years ago to how little the German Mittelstand was integrated with the capital market. However, this traditionally weak primary market function was for a long time largely regarded as not being critical, since a strong banking system was able to service those financing needs that were not internally generated from companies' operating cash flows quite well by extending long-term loans. This is no longer the case, and not just in Germany. The provision of capital to middle market companies is considered to be inadequate throughout Europe, a fact that is being underscored again at present by key political entities. For example, most recently in mid-June the European Parliament's Committee for Economic and Monetary Affairs again demanded permanent improvements in access to funding in a remarkably clear form in its own-initiative report on "Access to finance for SMEs" (unnamed author 2016b). Although the focus for solutions here is primarily on loan finance by banks, it clearly shows the deficit being addressed. The widespread lack of capital is tackled more extensively in the EU's Capital Markets Union initiative, which has been given maximum priority by the European Commission and which represents a core component of the Investment Offensive for Europe. The goal of the Capital Markets Union is to diversify and expand the sources of funding for enterprises and large projects and to ensure the free cross-border flow of capital within the Single Market. This spring, the EU reported for the first time on the progress made towards creating a Capital Markets Union since the Action Plan was adopted in September 2015.

The need to diversify and broaden the various sources of finance is also a particularly German requirement. As was already mentioned in section 1.3, German companies' financing needs are increasing substantially as a result of the digital transformation of the real economy known by the catchphrase "Industry 4.0". Leading bankers are of the opinion that the German banking industry cannot afford this. For example, at KfW's press conference announcing the bank's annual results, which was held the beginning of May, the bank's CEO Ulrich Schröder adopted a clear – and for a development bank relatively unusual – position specifically in relation to German corporate finance, saying that: "*We need an alternative to bank finance in the interests of capital-seekers, too*" (unnamed author 2016j).

If the calls to improve corporate finance are currently so vehement, the first question that arises is how the capital markets are discharging this role in Germany at present, what deficits can be observed and where these deficits might be reduced in the context of a merger between Deutsche Börse and the London Stock Exchange. In other words, the analysis focuses on the primary market.

The form of capital market finance that most resembles bank finance is the issuance of corporate bonds. This form of finance is traditionally comparatively well developed in the Anglo-Saxon economies of the USA and the United Kingdom, where it also was a factor behind the establishment of today's leading global rating agencies, as well as in Scandinavia, where more than 1,500 bonds have been issued by middle-market companies in the last ten years, boosting financing of the real economy.

In Germany, it also seemed in the period up to 2013 that a capital market segment devoted to bond emissions by middle-market companies, known as "Mittelstand bonds", was becoming established. In that year, 46 bonds with an issuing volume of almost €2.4 billion were placed with investors, a clear increase on 2012, which saw 34 issues and a volume of €1.2 billion. After this, however, the market largely collapsed; headlines announcing insolvencies and waivers of receivables dominated the business press as has been documented by Mausbach and Simmert (2016); and in 2015 just 21 bonds with a volume of €737 million were issued. Since fall 2016, investors have been focused on the insolvency and delisting of KTG Agrar AG, another issuer with outstanding bonds totalling several hundreds of millions of euros.

Christoph Lammersdorf, the former head of Börse Stuttgart – which for a long time was the German market leader for listings of such bonds – announced back in 2015 that the Mittelstand bonds segment was dead as far as his exchange was concerned. The number of issues and listings on the Frankfurt Stock Exchange has also declined sharply, while "Mittelstand bonds" are to be rebranded as "mini bonds" in order to avoid any further negative spillover to corporate bonds issued by middle-market companies. However, the near-term outlook for this primary market area and hence for publicly traded debt finance for the German Mittelstand is bleak. Given the need for finance that has already been mentioned several times, this must be viewed critically and the question naturally arises as to the reasons for the failure. Mausbach and Simmert (2016) see it as being due in particular to the use of obligatory issuer ratings instead of a product-based bond rating, which gave a distorted picture of the specific risks for retail investors, who frequently invested in these bonds in large numbers. Mietzner, Proelss and Schweizer (2016) go a step further and see clear evidence of failings by the local rating agencies who were almost the only ones active in this segment – quite simply, their ratings were too good. Ultimately, it was a combination of institutional errors when structuring the segment and a certain short-sightedness in particular on the part of the German regional exchanges and an undue lack of care on the part of experienced financial centre participants who, while they may have identified some undesirable developments at an early stage, nevertheless underestimated the far-reaching consequences for the German exchanges' primary market function.

The merger between Deutsche Börse and the London Stock Exchange can offer a way out here. According to figures from the World Federation of Exchanges, the on-exchange bond trading activities on the London Stock Exchange are much more extensive than is the case with Deutsche Börse, and feature a large number of experienced investors. The merger and the opening of the market for German Mittelstand bond issuers in London offers a new way of raising debt finance for German investments in the process of digital transformation. Issuers could initially build up a successful history of issuance in London (possibly with issuance support from Frankfurt), allowing this stakeholder group to benefit directly in this case. Exchange trading volumes are hardly like to shift from Frankfurt to London, since no significant trading activities currently take place in this area in Frankfurt anyway. However, if the

market can be consolidated and establish itself in London and if it then proceeds to grow significantly, suitably priced securities listings in Frankfurt will undoubtedly be possible. As a result, in the longer term it will also be possible to generate new turnover in German Mittelstand bonds in Frankfurt.

However, given the risk profiles associated among other things with capital expenditure on Industry 4.0, debt capital is not the most suitable source of finance in many cases. This is where the primary market for equity has a particularly important role to play. One feature of a strong financial centre is that it offers instruments that can strengthen corporate equity across all phases of a company's life. This starts with early-stage finance for start-ups (see also chapter 6) and ends with the provision of capital for large, established companies via IPOs.

The role of exchange operators here is to help capital supply and demand meet by ensuring clever institutional marketplace design. For example, Deutsche Börse Venture Network provides support for start-ups in the pre-IPO development stage that are seeking growth finance in Frankfurt; in particular, this takes the form of a special process that facilitates networking and matches them with investors. The programme offers structured access to national and international investors. These qualified investors are venture capitalists and private equity investors, although there are also a few very high net worth individuals among them (Leupold, 2016). Deutsche Börse Venture Network aims to improve the efficiency of the primary market function between capital-seeking high-growth companies and their current and future investors. This is primarily achieved using a transaction service that is integrated with the online platform and that helps companies implement financing rounds. Companies can use the platform to make contact with investors, communicate with each other and obtain information.

Although this service has met with an extremely positive reception, its existence in itself points to a considerable deficit in existing structures for early-stage equity finance in Germany. What is still missing for the competitiveness of Germany and Frankfurt as financial locations are focused investors that provide equity for the growth phase in the lives of young companies that follows their formation and initial establishment. In particular, this affects those start-ups with revenues of up to €10 million that are also targeted by Deutsche Börse Venture Network and that need capital to lift them into the €50 to €100 million bracket in order to become IPO-ready. In this area the quality of the primary market in Germany is capable of considerable improvement; only one fund from Digital+ focuses specifically on this critical growth area and hence in fact more or less represents a new investment class in Germany (Paravicini 2016).

The merger between Deutsche Börse and the London Stock Exchange provides these young companies – which are viewed as highly important for Germany as a centre of innovation – with easier and broader access to the considerably more mature and very much more capital-intensive early-phase financing scene in London. This should initially have a positive impact on the German real economy's innovative ability and growth and may also lead later on to additional IPOs in Frankfurt as well. For example, this could be achieved by linking Deutsche Börse Venture Network with the similar but larger and older ELITE programme run by the London Stock Exchange, which in turn represents a successful adaption of a Borsa Italiana scheme following the latter's merger with the London Stock Exchange in 2012.

Nevertheless, other changes to the institutional design of Frankfurt's exchange facilities would also help smooth the way from venture capital finance to a stock exchange listing. In particular, Schefczyk (2009) thinks that Deutsche Börse's Entry Standard segment does not offer much help in developing a functional VC market. In 2015, the Federal Minister for Economic Affairs made a number of suggestions that could potentially be revisited in the case of enhanced early-phase equity finance in Germany. At any rate, the Federal Ministry for Economic Affairs and Deutsche Börse's explicitly formulated common

goal is to mobilise more IPOs (Machnig, 2016). Stéphane Boujnah, CEO and Chairman of the pan-European stock exchange Euronext, recently said in this context in an interview with the "Börsen-Zeitung" newspaper: "*We want to add value for European issuers and build a platform for technology SMEs because taking such companies public is no longer a priority for many exchanges*" (Boujnah 2016).

In November 2016, Deutsche Börse announced to launch exchange segment in March 2017, designed to enhance access to investors and growth capital for SMEs and aimed at supporting the endeavours of the German Federal government as well as of the EU Commission to promote early stage equity financing in Germany and Europe. As a segment of the open market, on the exchange-regulated market, it will replace the Entry Standard for equities and corporate bonds. The target group for the new segment encompasses companies which have already established their track record with investors. The introduction of the new segments starts with around 40 companies, that will mostly stem from the Entry Standard. As a next step, Deutsche Börse plans to launch an index displaying the segment's constituents. The new growth segment builds on the premarket Deutsche Börse Venture Network. Deutsche Börse's objective is to establish a working ecosystem for growth companies in Germany and Europe, which closely supports companies throughout all growth phases up to an IPO – hence, also generating more exchange listings. This ecosystem for equity financing is the response of Deutsche Börse to the massive investment needs arising from digitalisation and Industry 4.0 (Mohr 2016).

The importance of listings for established enterprises in terms of growth and profitability was recently impressively demonstrated once again. A recent analysis of listed family businesses by audit and advisory firm EY shows that the stock exchange clearly has a positive effect on the development of family businesses. The survey looked at a total of 678 firms in Germany in which a family holds at least 30% of the shares and which generate at least €300 million per year. It found that recently the 72 listed companies clearly outperformed the 602 closely-held companies. In the 2014 financial year, revenues for listed groups subject to family influence increased by 4.9% to €630 billion, whereas that for closely-held firms grew roughly only half as fast – by 2.6% to just under €853 billion (unnamed author 2016aa).

In view of the opportunities for companies to strengthen their capital base in the course of an IPO and the greater revenue momentum of listed companies, the level of actual primary market activity in Frankfurt must be seen as disappointing. Gaar and Schiereck (2013) document long-term trends in the number of listings on the regulated market of German securities exchanges. Whereas in 1958 there were 488 listed German companies, the number had declined by 2011 to 284 and has not recovered since then. Although other international financial centres are also faced with the challenge of declining listings, the situation in Germany is special for two reasons. Firstly, the drop here is especially extreme, and secondly the number of listed companies in Germany was never particularly high to start with compared to the size of the economy.

This weak primary market activity is also remarkable because a series of studies show that the costs of an IPO and of maintaining a listing in Frankfurt are definitely low compared to Paris and London. In addition, a global comparison of the institutional environment for equity raising via the stock exchange forms a subcategory of the Venture Capital and Private Equity Country Attractiveness Index (see chapter 6). Germany has improved substantially here recently and is in 12th place internationally, while the United Kingdom is ranked 5th.

The weak primary market activity is often contrasted with the Alternative Investment Market (AIM), the London Stock Exchange's entry-level segment. This listing platform, which was founded in 1995, is also dealing with a clear decline in the number of listings, although it can still point to a total of 1,044 as at the 2015 year-end (845 from the UK and 199 international listings). Kolaric, Schiereck and Stolz (nd) document a poor secondary market performance for AIM for the period from 2005 to 2014 due

to illiquidity, low trading activity, short listing duration and high level of information asymmetry, while on the primary market AIM had indeed been successful in attracting a high number of new companies, exceeding other venues in terms of listing numbers. A direct comparison to the German Entry Standard, for example, is highly misleading and the British government offers a number of tax breaks for listing on AIM. Nevertheless, even after adjusting for all these aspects, the extraordinary primary market success of this entry-level exchange segment, which has raised approximately £95 billion of fresh equity for the companies listed on it over 20 years, cannot be denied. Opening up AIM directly for German issuers – for example via a dedicated German subsegment on AIM International – could make a lasting contribution towards facilitating public equity raising for the German Mittelstand, in addition to Deutsche Börse's new growth segment.

The positive consequences of having a strong equity base have just been confirmed by an empirical study for German middle-market companies. Peters, Roberts and Vuong (2015) document the links between the innovation success rate, productivity growth, a strong capital base and long-term profits. For example, the enterprise value of companies with a strong capital base increases by 11.6% due to investments in research and development, that of companies with a moderately strong capital base by 5.5% and that of companies with a weak capital base by a mere 2.3%.

Therefore, there are numerous reasons for permanently strengthening German companies' capital base by going public and a whole series of promising ways in which the merger between the two exchanges could enhance primary market activities by German companies in the area of both debt and equity and in which the resulting strong capital base could be used to fund new investments – including in Industry 4.0 – offering clear growth prospects for the German real economy.

4.2 Secondary market prospects

A merger between Deutsche Börse and the London Stock Exchange could do more than influence the financing options for companies that have not previously raised capital on the stock exchange. Companies that are already listed and the securities trading services providers active on the exchange could also benefit from this. An exchange trading platform is especially attractive to its regular users if they can source the transaction service offered there particularly cheaply (see also section 1.1). Although the precise definition, delimitation and measurement of these costs is a matter for considerable debate (Freyre-Sanders, Guobuzaite and Byrne, 2004), there is a large degree of unanimity that trading liquidity is extremely important, especially for institutional traders (Schiereck, 1996; Averdiek-Bolwin, 1998; Kempf, 1999).[4]

In line with this, Christine Bortenlänger, Executive Member of the Board of the Deutsches Aktieninstitut, notes that the largest competitors of regulated exchange trading are alternative trading platforms and OTC trading, and that issuers want liquidity on the regulated exchanges to be strengthened (unnamed author 2016y). This wish on the part of issuers is due to the fact that investors require to be compensated, in the form of higher expected returns, for the risk that they may not always be able to liquidate their positions in illiquid securities at any time and that, among other things, they may therefore run a price risk until the transaction is executed. In other words, higher liquidity means lower risk,

4 Generally, it is assumed that liquidity and valuation efficiency are highly positively correlated with each other, i.e. that a high degree of valuation efficiency is achieved through a high level of liquidity, and that there is therefore no conflict between the target criteria discussed in section 1.1. For a critical discussion of this point, see Bienert (1996), p. 208ff. and Feld and Köhler (2015).

which leads to lower costs of capital for issuers. To illustrate this point further: the value of an investment that generates annual cash flows of €1,000 increases by over €50 as a result of a 5 basis point reduction in the cost of capital (0.05%).

Traders on the exchanges also benefit from the lower liquidity risk resulting from more intensive trading, which is why Carsten Bokelmann, a member of the Management Board at Steubing, says of the Frankfurt-based securities trading services provider: "*In principle, we would welcome such a merger, since Frankfurt's importance as a financial centre would increase again further in addition to London*" (unnamed author 2016y). Strengthening liquidity and hence the quality of secondary market activities on exchanges in this way therefore seems imperative both for Frankfurt as a financial centre and for London. As Cetorelli and Peristiani (2009, p. 30) conclude: "*We find no evidence that secondary stock markets in the United States have lost any significant volume of business to competing locations, such as London Stock Exchange, Euronext, or the Deutsche Börse. Not only do U.S. exchanges control the largest share of global trading overall, but that trend is increasing over time*."

Therefore, in order for the two exchanges to be able to hold their own in the competition against the dominant global exchanges in North America and Asia and to regain market share in international exchange trading, it would seem to make sense for them to work together. However, aside from general and theoretical considerations as to the consequences of the merger of two exchange operators for the quality of secondary trading, the question still arises as to how the advantages of the merger are distributed across the two exchanges. The image of the liquidity bridge that has been used repeatedly in discussions about the merger between Deutsche Börse and the London Stock Exchange might suggest that there are major imbalances here and that only London, as the substantially more liquid trading venue today, would benefit from the merger. In order to throw more light on this aspect, it seems sensible in particular to compare this with the insights from recent exchange mergers in Europe. Above all, the merger of the Amsterdam, Brussels, Lisbon and Paris exchanges to form Euronext, which took place between September 2000 and November 2003, would seem to offer a model.

Pagano and Padilla (2005) analyse this natural experiment and find advantages for all stakeholder groups. The merger led to substantial efficiency increases and cost savings, e.g. in the area of IT. Some of these were passed through in the form of lower fees, thus benefiting securities traders. Above all, the increase in liquidity benefited the largest exchange – Paris – where the liquidity costs for the shares included in the CAC 40 index fell by over 40%. However, liquidity on the exchanges in Brussels and Amsterdam also rose significantly, even though the effect here was considerably weaker. The recent study by Hüther and Demary (2016) also sees the merger between Deutsche Börse and the London Stock Exchange as resulting in a clear liquidity gain for secondary market activities in Frankfurt and hence reducing the cost of capital for German issuers.

5 Potential for advancing derivatives market products in Frankfurt

Whereas for issuers and investors in equities maturity transformation and lot size transformation on the exchange's cash market are particularly important, the derivatives markets primarily address capital market participants' wishes for risk transformation. At the beginning of the 1990s, as has already been mentioned (see chapter 3), listed futures on German government bonds (Bund futures) were still largely traded in London, before the balance of power shifted by the support of stakeholders from the German banking industry and Frankfurt became the centre of this form of derivatives trading. In other words, there is a history of derivatives trading shifting from London to Frankfurt. Although no significant trading in listed derivatives takes place in London[5], there is an extremely large market for OTC interest rate risk and currency risk.

A merger between Deutsche Börse and the London Stock Exchange could even offer the prospect of structural change here if, in those cases in which market liquidity is sufficient, contracts that are currently traded as OTC products can be developed into exchange traded derivatives (ETDs), thus converting OTC trading into regulated market trading. Regulatory impetus for this comes from the amendments to the European Markets in Financial Instruments Directive (MiFID II) and the introduction of an accompanying Regulation (MiFIR) in 2014.

Intercontinental Exchange in Atlanta, USA, which was expected in May to be a potential competitor for the London Stock Exchange, also had no interest in direct cash trading. The LCH.Clearnet clearing house seems to be particularly interesting here. In particular, the clearing business just mentioned is considered to be an integral part of ICE's global growth strategy for derivatives (unnamed author 2016p). Should the merger between Deutsche Börse and the London Stock Exchange fail, it is expected that ICE will launch a rival takeover bid in short order. However, this has not materialised to date in view of the less compelling industry logic and the fact that London would then be in a weaker position, especially following Brexit.

5 Of course, London's financial centre does also conduct on-exchange derivatives trading; this was largely based on the London International Financial Futures Exchange (LIFFE), which used to belong to Euronext. After Euronext was hived off in 2013, LIFFE remained in the ICE NYSE Group's portfolio, where it was known as ICE Futures Europe.

6 Potential for expanding Frankfurt into a European FinTech centre

In recent years, established financial sector enterprises throughout the world have been attacked at numerous points along their value chains by a large number of young, technology-driven start-ups with digital business concepts, which have challenged their innovation management. The term “fintechs” has been coined to describe these start-ups. After initial hesitation, fintechs are now also regarded positively by politicians across the political spectrum in Germany, since it is hoped that their creativity, innovative strength and digital business models will help future-proof the German financial sector. However, whereas other financial centres throughout the world such as Hong Kong or Europe’s most important FinTech location, London,[6] launched official development programmes years ago in an attempt to gain an advantage in the international innovation contest by becoming the leading global FinTech location, in Germany this role was, for a long time, left to a very large extent to private initiatives. This is despite the fact that FinTech founders are also calling for Frankfurt to do more to help the emerging FinTech scene here to become established (unnamed author 2016l).

After providing largely moral political support until the end of last year, Hesse’s state government took the initiative in December 2015 by putting a FinTech centre in Frankfurt out to public tender. Its goal is to offer an attractive environment for state-of-the financial technologies in Frankfurt. The aim is to help new FinTech companies to set up there and established ones retained for the long term. This will allow Frankfurt to present itself even more forcefully than before – including in an international comparison – as a remarkably well-positioned location, both in general terms as a location for venture capital investment and with regard to the FinTech segment in particular. The annual Venture Capital and Private Equity Country Attractiveness Index provides a global comparison in general terms of the institutional framework for and general availability of venture capital (Groh, Liechtensteiner and Lieser, 2011). Although Germany slipped one place to finish ninth in the current 2016 survey, it still recorded the best result in Continental Europe, finishing ahead of Switzerland but well behind the United Kingdom, which came second. However, in a longer-term study Schefczyk (2009) complains that financial investors are focused too strongly on buyouts, and that this reduces the contribution made to financing innovations. Additionally, the Press continues to complain about the lack of a courageous investment culture in Germany in general (unnamed author 2016o).

As regards the FinTech segment in particular, there are currently several centres in Germany with a large number of start-ups, although Frankfurt – thanks among other things to the initiative by the Hesse state government – gradually seems to be developing into a prominent location. More than 50 fintechs are already active here. This trend can be explained firstly by institutional advantages such as the closeness to regulatory bodies – a necessity that is appreciated by more and more start-ups. The proximity to the largest financial institutions in Germany and their venture capital initiatives for fintechs is also relevant (Leupold, 2016). Additionally, Deutsche Börse is itself a player on this venture capital market thanks to its DB 1 Ventures corporate venture capital platform, which was announced on 21 June 2016. This aims to invest primarily in FinTech enterprises that are of strategic interest to Deutsche Börse (unnamed author 2016g).

In addition, Deutsche Börse has a FinTech centre in Frankfurt’s Nordend district, among other things. This houses a number of employees of Deutsche Börse Venture Network (see chapter 4), which Deutsche Börse uses to try and match later-stage start-ups with capital providers, and co-working

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[6] According to advisory firm EY, fintechs in the United Kingdom 2015 generated revenues of €8.5 billion in 2015, outstripping California and New York. The Bank of England is setting up a dedicated department aimed at working together with fintechs to develop solutions to central bank problems (unnamed author 2016i).

spaces (unnamed author 2016h). Deutsche Börse was able to persuade three out of the four start-ups that now occupy its FinTech centre to relocate to Frankfurt. It would therefore seem that Frankfurt has a certain attractiveness as a location.

While BaFin consistently emphasises that promising business models for fintechs are also possible and desirable beyond the supervisory threshold (unnamed author 2016k), it is now extending its information programme in detail and its website gives extremely precise information on when a business model requires a licence from BaFin. It is evidently in the supervisory authority's own interests to approach fintechs and provide them with user-friendly regulatory access (Lorenz, 2016). At all events, BaFin has received 150 applications for licenses from fintechs since 2015 (unnamed author 2016k).

However, even with all these favourable conditions there are still two main stumbling blocks. Firstly, despite the attractive environment the local investor base is small compared to other financial centres (such as London) and its risk appetite is comparatively weaker. Secondly, an analysis of the critical success factors for fintechs reveals that especially those business models that focus on innovative digital infrastructures and for which Frankfurt has established itself as the location can only prevail on the market in the long term if they focus on the international market from the beginning and not just on their home market. The merger between Deutsche Börse and the London Stock Exchange opens up direct access to the venture capital industry in London for these Frankfurt-based fintechs. Not only can this be used to raise new, additional equity to support the start-ups' continued growth, but also and above all it can greatly facilitate access to the global market for innovative financial services.

Conversely, following the Brexit referendum all fintechs subject to the British regulatory regime will find that access to the European Single Market is more difficult and that having a Continental European branch appears sensible. Following the merger the natural location for this is in Frankfurt – with all the resulting effects on employment, innovation and growth.

7 In retrospect: arguments used during the planned merger in 2011

In January 2011, Deutsche Börse and NYSE Euronext announced that they wanted to merge, after a first attempt by Deutsche Börse and Euronext in 2006 had been abandoned. In the course of the renewed attempt a bidding war then developed with Nasdaq OMX and Intercontinental Exchange, from which Deutsche Börse emerged victorious (unnamed author 2011c). Whereas the business logic for the planned merger met with broad approval and the potential synergies that were expected and announced were in fact somewhat greater than those for the merger now being examined (unnamed author 2011a, unnamed author 2011b), Deutsche Börse's Works Council was extremely critical of the plans and rejected them. The Works Council was of the opinion that Deutsche Börse was more likely to achieve all its medium-term goals alone than with a US partner (Kuckelkorn und Witt, 2011). The discussions in the context of the current merger between Deutsche Börse and the London Stock Exchange show that the position adopted then clearly underestimated the strategic momentum of the global competition between exchanges.

Ultimately, the merger failed not because of the will of the two exchange operators' shareholders, but because of the objections raised by the competition authorities. The latter did not accept the definition of the relevant market for financial derivatives adopted by the partners to the merger and saw the market as considerably more restricted, and hence the partners' market position as much more dominant. After the European Commission prohibited the merger by Deutsche Börse and NYSE Euronext with reference to their monopoly position in the derivatives business, the Hesse Ministry of Economics – as the body with oversight over Deutsche Börse – abstained from issuing its own public assessment of the planned merger at the time (unnamed author 2016z).

The antitrust risks associated with a merger between Deutsche Börse and the London Stock Exchange are hardly comparable with the failed merger with NYSE Euronext, since in 2011 the European Commission took exception to the transaction partners' market shares in the derivatives business and thought that it represented a dominant market position that could not be approved (Kalbhenn 2016). The merger between Deutsche Börse and NYSE Euronext would have created the largest exchange in the world with trading venues in seven major cities, while the enterprises listed on it would have had a total market capitalisation of USD 15 trillion; in addition, it would have had a 40% share of the US options market and would have been the clear market leader in Europe (Buchter, 2011).

In retrospect, while the arguments for rejecting the transaction appear plausible, alternative solutions could surely have been found that would not have resulted in the rejection of the merger as a whole but merely in significant conditions being attached. However, there seems to be a fundamental problem in this context with respect to the static view of competition adopted, which either ignores obvious longer-term trends in global competition or only takes them into account to a very limited extent. Under certain circumstances this may not only negatively impact the investments made by the owners of the directly affected partners to the transaction but may also permanently undermine the entire balance of global competition between exchanges.

8 Summary and overall assessment

Claus Döring (2016c) already summed up the situation in February 2016: “*If Deutsche Börse does not make use of the opportunity to merge with LSE, it will slide further down the league table of international exchanges and will then only be suitable as a junior partner for a more powerful US or Asian exchange operator – if at all. This is a real danger. If Deutsche Börse were to be cut off from global financial flows, Frankfurt would soon be as insignificant as a financial centre in the international rankings as the Hanover regional exchange is today at a national level*.” If anything, the United Kingdom’s decision to exit the EU has exacerbated this danger.

Döring (2016c) then asks the following: “*Will Deutsche Börse pay for the deal with London in part by becoming less important? Will there be a sell-out of Frankfurt as a financial centre?*” He goes on to provide a clear answer to this question: “*Without a merger with London, the decline in importance compared with its international rivals that Deutsche Börse has already been experiencing for years would accelerate. Since the merger does not change the legal and supervisory structures, the Frankfurt Stock Exchange, which is operated by Deutsche Börse, will not be affected*.”

The arguments advanced in this study support the assessments quoted here, but adopt a much broader perspective in order to show that it is not only the owners and shareholders who will benefit from the merger, but also a majority of the major stakeholder groups. Clear improvements in the conditions for issuers and investors can be expected in the primary and secondary market, and the supervisory and regulatory bodies will retain their ability to intervene in London’s financial centre, with its outstanding position in currency and interest rate derivatives trading, especially if clearing and settlement processes were to be integrated in Frankfurt. Additionally, the ability to integrate the still delicate green shoots of Frankfurt’s FinTech and start-up centres with the financial centre in London with its massive global pool of investors is also likely to boost these young companies’ prospects.

And if, following Brexit, a large number of financial and supervisory institutions relocates from London to Frankfurt, staff that initially lose their jobs as a result of the merger between Deutsche Börse and the London Stock Exchange will have extremely good prospects of finding new, highly qualified positions. Moreover, the long-term viability and security of the remaining employees’ jobs will improve considerably as a result of the merger.

Critics of this analysis, who see the merger as selling out Germany as a financial location, should be reminded of Horst Bertram’s rebukes (2016) regarding the occasional inconsistency between words and deeds: “*The financial location’s occasional supporters from the German banking industry forget all too readily that it was they who unloaded their equity interests in Deutsche Börse and that the major German banks are now hardly interested in the Frankfurt Stock Exchange on whose Advisory Council they sit*”.

Naturally, there are no guarantees as to where and to what extent Frankfurt will profit as a financial centre from the merger with London, but there is a great deal of potential which, if exploited judiciously, can benefit Deutsche Börse’s stakeholder groups and there is broad consensus that, without the merger, Deutsche Börse and all its stakeholder groups will decline significantly in importance in the medium term.

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