

Krahen, Jan Pieter; Noth, Felix; Schüwer, Ulrich

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Jan-Pieter Krahen, Felix Noth, Ulrich Schüwer

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White Paper No. 33

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A cooperation of the Center for Financial Studies and Goethe University Frankfurt

House of Finance | Goethe University
Theodor-W.-Adorno-Platz 3 | 60323 Frankfurt

Tel. +49 69 798 33684 | Fax +49 69 798 33910
policy_center@safe.uni-frankfurt.de | www.safe-frankfurt.de

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Structural Reforms in Banking: the role of trading¹

Jan-Pieter Krahn², Felix Noth³, Ulrich Schüwer⁴

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Abstract

In the wake of the recent financial crisis, significant regulatory actions have been taken aimed at limiting risks emanating from trading in bank business models. Prominent reform proposals are the Volcker Rule in the U.S., the Vickers Report in the UK, and, based on the Liikanen proposal, the Barnier proposal in the EU. A major element of these reforms is to separate “classical” commercial banking activities from securities trading activities, notably from proprietary trading. While the reforms are at different stages of implementation, there is a strong ongoing discussion on what possible economic consequences are to be expected. The goal of this paper is to look at the alternative approaches of these reform proposals and to assess their likely consequences for bank business models, risk-taking and financial stability. Our conclusions can be summarized as follows: First, the focus on a prohibition of only proprietary trading, as envisaged in the current EU proposal, is inadequate. It does not necessarily reduce risk-taking and it likely crowds out desired trading activities, thereby negatively affecting financial stability. Second, there is potentially a better solution to limit excessive trading risk at banks in terms of potential welfare consequences: Trading separation into legally distinct or ring-fenced entities within the existing banking organizations. This kind of separation limits cross-subsidies between banking and proprietary trading and diminishes contagion risk, while still allowing for synergies across banking, non-proprietary trading and proprietary trading.

JEL Codes: G21; G28

Keywords: banking; structural reforms; prohibition of proprietary trading; banking separation

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² Goethe University Frankfurt, Center for Financial Studies and Research Center SAFE, Email: Krahn@finance.uni-frankfurt.de. Corresponding author.

³ Otto von Guericke University Magdeburg and Halle Institute for Economic Research (IWH), Email: felix.noth@iwh-halle.de.

⁴ Johannes Gutenberg University Mainz and Research Center SAFE, Email: ulrich.schuewer@uni-mainz.de.

1. Introduction

Following the global financial crisis that began in 2007, immense efforts have been undertaken to reform the regulatory and institutional framework for financial institutions and markets. These efforts are only imperfectly coordinated on the international scale. In the U.S., the Dodd-Frank Act forms the basis of a new legislation for banks and markets. In the UK, the Banking Act was adopted. In the EU, finally, the Banking Union project encompasses a set of regulatory reforms related to supervision and resolution of banks. These rules are underpinned by a comprehensive reform of the Basel rules for capital adequacy and liquidity standards, as well as substantial reforms of supervisory agencies.

We focus on the proposals for reforming the structure of the banking industry: the Volcker-rule in the U.S., the Vickers report in the UK, and the Liikanen and Barnier proposals for the EU. All structural proposals aim, in one way or another, for a reduction of risks believed to emanate from bank trading activities. We analyze and compare the different separation approaches and their likely consequences. Our focus is on one major element of these regulatory proposals that has played, and continues to play, a prominent role in the public debate: the separation of trading activities from the more classical banking activities such as deposit-taking and lending.

The separation of banking activities is an intricate exercise. It is not only difficult to assess the intended consequences of structural interventions in banking, it is even more difficult to anticipate the unintended consequences – of both there are plenty, as we will see. Because the separation of banking activities constitutes a major infringement on the business model of modern day banks, it should be well understood before legislation to its effect is introduced.

The structural reform projects currently discussed or implemented in the U.S., the UK, and the EU differ substantially in at least two dimensions: which activities are to be separated, and how separation is to be implemented, i.e., what legal, organizational and financial restrictions will be imposed on separated activities. The Volcker-rule draws the ‘magic’ line dividing prohibited and permitted trading activities between proprietary trading (shorthand ‘prop trading’) and non-proprietary transactions.⁵ The Liikanen proposal, in contrast to Volcker, does not single out

⁵ Prop trading represents bank investment in capital markets using a bank’s own money, with the intention of profit making for the bank’s own account. It is defined in Section 13(h)(4) of the BHC Act, as „engaging as principal for the trading account of the banking entity in any transaction to purchase or sell, or otherwise acquire or dispose of, a security, derivative, contract of sale of a commodity for future delivery, or other

proprietary trading for special treatment, but instead requires that all trading business, be it proprietary or client-oriented, is either prepared for separation in a crisis situation (avenue 1), or effectively separated from retail banking (avenue 2). Finally, Vickers distinguishes between core retail banking, including deposit taking, lending, and the provision of payment services, and all other banking services, in particular market related activities and investment banking. Within Vickers, proprietary trading (“dealing in investments as principal”) is not forbidden, it must however be practiced in a separated segment of the bank.

For all reform proposals, the difficulties of classifying securities transactions as being either client business, treasury business, or proprietary trading is a key element. Clear-cut dividing lines between these activities are very difficult to observe and supervise because of the high complexity characterizing today’s bank business models. This is very different from how it used to be only twenty years ago. One important reason for this is the integration of trading activities into classical banking activities. Today, major commercial banks are typically closely connected to investment banking lines of business. They thus benefit from large flow of customer business from retail, corporate and institutional clients. We will discuss how a ban on prop trading or a separation of trading activities will likely affect bank risk-taking, and more generally bank business models.

Eventually we will conclude that an outright prop trading ban, as envisaged in much of today’s structural reforms in banking, is unlikely to fulfill its purpose. Our analysis suggests that a separation of all trading business, including hedging, market making and proprietary trading, into a separately capitalized unit may be a superior solution.

This paper is organized as follows: Section 2 discusses modern banking business models and bank risk. In Section 3, we present an overview of the different proposals for structural reforms in banking, including crisis narratives, separation approaches and recent developments. Section 4 provides a discussion of the different proposals, focusing on intended and unintended consequences. Section 5 concludes.

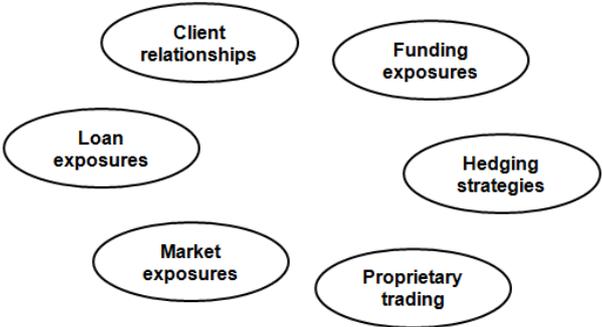
2. Modern Banking Business Models and Bank Risk

It is a widely shared impression that complexity at large, international banks has risen significantly over the past 20 years. One important reason for this is the addition of trading activities to classical

financial instrument that the Agencies include by rule” (US Department of Treasury, 2013, p. 29) . The definition excludes „acting solely as agent, broker, or custodian for an unaffiliated third party“ (ibid., p. 30).

banking activities (Boot 2011; Boot 2014). There has been an increase in maturity transformation and, on the funding side, an increased reliance on a continuous access to short-term market funding. In a recent study, Langfield and Pagano (2016) estimate that total bank assets in Europe increased from around 170% of GDP in 1980 to more than 350% in 2007, and that most if not all of this impressive growth of Europe’s aggregate bank balance sheet was due to the expansion of Europe’s largest 20 banks over the years 1995-2007. These 20 institutions are large even by global standards. Their balance sheet growth is mainly driven by securities holdings, derivatives positions, and interbank exposures. Moreover, almost all of these large banks are universal banks, which through their business models combine commercial banking and investment banking activities under one roof, with one capital base. It is the linking of relationship-oriented, longer-term banking business with shorter-term market transactions that creates a network of claims, all centered on a particular financial institution, and involving a large number of counterparties, as illustrated in Figure 1. Such a network of claims, including derivative contracts, is never static. Rather, many of the exposures defining the network are constantly changing their character, their contractual terms, their counterparties, their collateral status and their collateral value. It is therefore safe to say, that at any given moment, knowing the exact network of claims – both assets and liabilities – is difficult.

Figure 1: Selected elements of the platform model (“network of claims”)



The increased complexity makes bank resolution in times of crisis significantly more difficult: To manage the contractual terms of all exposures in a given network within a short period of time is extremely complicated (see Herring and Carmassi 2014, Boot 2011). In fact, it is hard to imagine that re-contracting a large number of intertwined exposures is even possible at all. This fact makes the resolution of a large universal bank, especially at short notice, excessively difficult

The task of renegotiating a dense network of contractual exposures is complicated by the fact that in such a critical situation, the bargaining power among contracting parties shifts and hold-up situations

are possible. Furthermore, as the information about financial difficulties spreads across markets, an institution may face a sudden fall in liquidity and may indeed find it impossible to roll-over its funding. The risk of a run applies to all short-term funding instruments, including callable deposits not covered by a deposit guarantee scheme. For large banks, short-term funding, not covered by deposit guarantees, constitutes a significant part of their liabilities.

2.1 *The evolution and rationale of the platform business model of large universal banks*

To understand the evolution of banking since the 1980s, consider *yesterday's investment banking*. This type of investment bank encompasses a number of broker-dealer services in various markets, including mergers and acquisitions, equity and bond issuance, initial public offerings, syndicated lending, as well as trading services for customers, and for the bank's own bottom line. For such a broker-dealer, trading may also involve market making services, i.e., the provision of liquidity in organized or over-the-counter markets. In most of these activities, relationships and repeated interactions play an important role. Market making services are typically on a transaction-by-transaction basis. For each position, taken in a particular instrument (e.g., stocks or bonds), an off-setting transaction is sought. Some time will typically elapse for the less liquid instruments until the off-setting transaction is closed in, leading to the build-up of an inventory in traded instruments. The inventory of the market maker can be read off its balance sheet. An increase in market making will translate into a certain degree of leverage of the bank. The income of this type of investment bank is derived from brokering deals, and it therefore consists mostly of trading income, fees and commissions rather than interest income.

The large *investment bank of today* has added a set of services that rely on the transformation of basic financial instruments using financial engineering, rather than outright matching in product markets. It has turned into a central counterparty-type of book, absorbing and transforming the underlying customer orders. Banks offering such comprehensive indirect market access, possibly underwriting some of the risks, use their broad customer base to feed their trading platform. The "platform model of investment banking" is therefore ideally suited for the development of large universal banks.

Major commercial banks of today are typically closely connected to investment banking lines of business. The financial engineering platform of investment banking allows these banks to benefit from a large flow of customer business from their retail, corporate and institutional clients. Financial engineering uses a set of basic market products, in particular options, swaps and bonds, and it relies

on activities like structuring, syndication, internalization, netting in electronic crossing networks, and dynamic hedging with factor models. An example is the structuring of a particular set of available assets, a portfolio of loans from the loan book of the commercial bank, say, in order to produce a credit instrument with pre-defined characteristics such as a particular rating quality, duration and currency denomination. In the process, the bank may need to acquire additional assets, inflating its balance sheet.

The market making strategy of a global bank today does not necessarily aim for a limited inventory, as it was customary 20 years ago. The possibility to internalize customer order flows increases exponentially with the size of the bank and the number of independent customer orders coming in each day. The inventory of a global investment bank is therefore not simply waiting for an attractive outside leg,⁶ but can hope for offsetting orders within its own order book.

Establishing an investment banking platform requires considerable investments, as financial engineering and modeling expertise need to be built up or acquired from competitors. Once the basic infrastructure for investment banking services has been built, there is a strong incentive for growth to leverage the investment banking platform. The flow of customer business will help to generate earnings. To the extent that the bank provides counterparty services for rather illiquid instruments to customer orders, its balance sheet will grow. Such banks are dubbed “flow monsters” among practitioners. Not surprisingly, and given their role as universal counterparties, flow monsters will eventually turn into stock monsters, exhibiting large balance sheets. The interesting insight is that the high leverage typically found in these universal banks is the almost accidental byproduct of their market making function. Accordingly, it is not the outcome of a subtle high-risk strategy. Put differently, the high leverage of these global universal banks may be a result of their role as market makers, and not necessarily a consequence of moral hazard.⁷

Consistent with a platform business model is a bank risk management strategy which addresses the residual risk of the bank’s consolidated portfolio. Hence, the appropriate risk management strategy will manage the portfolio risk, not the individual risks. Correlations among assets and netting possibilities between positions will all be taken into account. Note that there is no direct or simple correspondence between the individual customer orders entering into the trading book of the bank and the residual risk of the bank’s consolidated trading book.

⁶ An outside leg of a market making transaction is the offsetting market order for a client order already in the bank’s trading book.

Thus, the hedging activities, aiming at the risk of the bank's portfolio, can be unrelated to any particular client order. This discrepancy between a hedge position and the underlying client risk will render any attempt to disentangle client-related trading exposures from proprietary trading difficult for an outsider. Put differently, it is near to impossible for the banking supervisor, under the above circumstances, to tell prop trading from client business. JP Morgan's London Whale of 2012 is a prime example of a loss from a large trading position in one asset class (CDS), at times estimated to be significantly above \$ 2 billion. The public debate has repeatedly cited the London Whale loss as an example of a large bet, part of the bank's prop trading, that failed. According to the bank itself, however, the exposure was a hedge, not a bet.⁸ The failure therefore relates to inappropriate risk models, weak compliance and deficient oversight, but not necessarily to excessive proprietary trading activities.

Still, the public focus on prop trading is closely related to the assumption that banks have an incentive to undertake 'overly risky' trading transactions. In the next subsection, we will therefore review the relationship between trading activities and bank risk.

2.2 *Trading and Bank Risk*

There is only limited theoretical and empirical evidence on whether trading activities increase bank risk. One standard argument why banks engage in excessive risk-taking is the existence of implicit subsidies for trading activities. This idea has been presented most clearly by Boot and Ratnovsky (2012a, 2012b) who show with a theoretical model that securities trading activities (prop trading and market making) can have an adverse effect on the quality of the core banking business (deposit taking and relationship lending). The paper finds a time inconsistency in (non-scalable) long-term banking when combined with (scalable) short-term trading activities. The allocation of scarce funds to trading tends to reduce the availability of credit for relationship lending. As a consequence, there is insufficient relationship building ex-ante. This argument does not rely on a government guarantee for bank liabilities. However, if there is a government guarantee, then funding costs will not fully reflect investment risk, and there is additional incentive to engage in high-risk activities in the interest of shareholder value.

⁸ The bank-internal report states that the strategy was „intended generally to offset some of the credit risk that JPMorgan faces, including in its CIO investment portfolio and in its capacity as a lender“ (JPMorgan 2013, p 2. The report has been published in January 2013: http://files.shareholder.com/downloads/ONE/2272984969x0x628656/4cb574a0-0bf5-4728-9582-625e4519b5ab/Task_Force_Report.pdf.

Trading by a universal bank may result in excessive risk-taking when average costs rather than stand-alone costs are applied, i.e., when the funding costs used in calculating segment profitability are determined as the average of the bank's overall market funding costs (cost of capital). Average funding costs will reflect a weighted average of (low risk) bank funding costs and (high risk) trade funding costs. For the two segments – the banking segment and the trading segment – cost averaging results in a change in segment profitability: Trading income goes up, and banking income decreases in an off-setting manner. This leads to increased investment and risk-taking in the favored segment (trading) and reduced investment in the disadvantaged segment (banking). Of course, the risk increasing effect of cost averaging in banking and trading can be mitigated by setting a proper internal transfer price which fully reflects the risk differentials inherent in the business segments.⁹

On the empirical side, DeYoung and Torna (2013) show that investment banking activities, such as proprietary trading, M&A advisory, or securities underwriting, increased the probability of default of U.S. commercial banks during the recent financial crisis. As a consequence, these activities had weakened the stability of commercial banks during the crisis years.

Further arguments supporting the view that trading activities entail higher default risk for commercial banks rely on the rise in complexity if banking is combined with trading, rendering ordinary resolution or restructuring in times of crisis increasingly difficult, and therefore making bailout with government money more likely (Herring and Carmassi 2014).

2.3 *The relevance of modern bank business models for structural reforms*

The evolution of the platform model of large universal banks since the 1990s has two important implications: First, the complexity of banks and potential negative effects of trading activities on bank risk give rise to policy reform proposals calling for a separation of banking and trading. Second, the platform model should not be merely viewed as a problem which causes complexity, but also as the result of financial innovation and development. Hence, understanding the modern bank business model is important for an assessment of current reform proposals.

⁹ Why, then, do we observe cost averaging in the first place? The answer is outside the scope of the present study. However, one might speculate that boosting income in one business segment at the expense of a second segment may be associated with differences in income sharing among management, shareholders and the state. For example, if managers have access to a bonus pool in one segment but not in the other, cost averaging may increase income of managers at the expense of shareholders.

3. Review of the Volcker, Vickers and Liikanen/ Barnier proposals

In this section, we review the main structural reform proposals which underlie the policy debate: the proprietary trading prohibition of the Volcker rule (Dodd-Frank Act 2010), the core bank ring-fencing model of the Vickers Group (Banking Reform Act 2013), and the comprehensive trading separation model proposed by the Liikanen Group and reflected in the European Commission proposal (Barnier proposal 2014). We begin each subsection by recounting the crisis narrative underlying the proposals, then outline the separation approach, and conclude with a summary of recent developments.

3.1 Volcker

Crisis narrative. The financial crisis of 2007 to 2009 caused a massive disruption of the U.S. financial system and had significant adverse effects on the economy. A major event during the financial crisis was the fall of Lehman Brothers, an almost pure-play investment bank, which failed due to losses and margin calls related to its large trading book in September 2008. Its default, which was meant to dispense with too-big-to-fail altogether, actually fostered quite the opposite outcome: the Lehman lesson was widely interpreted as strong evidence against the viability of a bail-in strategy in times of crisis. A major federal government intervention program that aimed at supporting and rescuing failing banking institutions, the Troubled Asset Relief Program (TARP), was initially estimated to cost tax-payers 700-800 billion US-Dollars (USD). Although the program turned out to be financially lucrative for the U.S. government *ex-post*, it was received with great criticism at its inception (Calomiris and Khan 2015).

In February 2009, President Obama chose Paul Volcker to act as chairman of the „President's Economic Recovery Advisory Board“. From the start, it was Volcker's main argument that the major source of all instability was the (proprietary-) trading-oriented business model of modern banks. To curb excessive risk-taking behavior of banks, Volcker argued that banks should be prohibited from engaging in proprietary trading and from investing in hedge fund and private equity business. Volcker acknowledged that trading is a vital part of modern capital markets; however, he stated that it does not necessarily have to be linked to other commercial bank activities, such as lending or deposit taking, which are more vital to the functioning of an economy (Volcker, 2010). A slightly adjusted and more detailed version of the original Volcker proposal was finally signed into law as Section 619 of the Dodd-Frank Act of 2010.

Box 1: The Glass-Steagall Act of 1933

The major historical experiences on separation of banking and trading come from the Glass-Steagall Act of 1933 (named after Senator Charter Glass and Congressman Henry B. Steagall). Under the impression of the stock market crash of 1929 and the following Great Depression, President Hoover set up an investigation “of [the] buying and selling practices as well as borrowing and lending of securities upon the stock market” of commercial and investment banks. The investigation found heavy abuses and corruption in the securities business of investment and commercial banks, which resulted in a separation of banking and trading under the Glass-Steagall Act. Banks were allowed to buy and sell securities in transactions for bank customers, but prohibited to underwrite or distribute securities (directly or through affiliates). Deposit taking was prohibited for any entity that was active in issuing, underwriting and distributing securities. Loopholes that initially existed for larger banking organizations were closed by the Bank Holding Company Act of 1956.

The implementation of the Glass-Steagall Act was followed by continuing criticism by bankers and policy makers. As early as 1935, Senator Glass tried to repeal the act that carried his name, arguing that it had “unduly damaged securities markets“. Over the subsequent periods, the U.S. banking sector was characterized by low rates of bank defaults. Nevertheless, worries about the competitive stance of commercial banks became more pronounced and led to deregulation.

The 1980s and 1990s saw major reforms of the Glass-Steagall provisions. In April 1987, the FED allowed the bank holding companies Bankers Trust, Citicorp and JP Morgan to establish subsidiaries for underwriting and dealing in residential mortgage-backed securities, municipal revenue bonds and commercial paper. This decision was followed by further deregulation, allowing ties between commercial banks and securities affiliates and finally ended in the repeal of the Glass-Steagall Act by the Gramm-Leach-Bliley Act of 1999. Together with other deregulation during the 1980s and 1990s, this enabled the return of full-blown universal banks in the U.S.

Separation approach. The Volcker rule focuses on two major banking activities: (1) proprietary trading, and (2) hedge fund and private equity business. By and large, both activities are to be prohibited for insured depository institution, also including former investment banks which now possess commercial BHC charters.

The general prohibition of proprietary trading states that banking entities must not hold any proprietary trading positions in covered financial instruments (securities as defined by the rule) in designated trading accounts (accounts defined by the rule). Proprietary trading positions in covered financial instruments comprise long, short, and synthetic positions in the following instruments: securities, derivatives and commodity futures and their derivatives. Exempted from this rule are loans, commodities, and foreign exchange/currency securities.

The exemptions from this general prohibition allow banks to engage in repo-trading, any type of trading activities for liquidity management, as well as derivatives clearing. Banks which also perform securities underwriting, market making, and hedging are allowed to hold covered financial instruments, if they present an internal compliance plan showing that the trading activities are solely directed at these exempted purposes and do not actually present proprietary trading in the prohibited sense.

The rule also defines so called “default” prohibitions which cannot be exempted and which always override any exemptions in the rule in order to close potential loopholes. The three “default” rules are: (1) banks are prohibited from any “high-risk” asset trading, (2) banks are not allowed to engage in any trading activities which might incur a “material conflict of interest”, and (3) all compensation schemes must be designed to deter from proprietary trading.

Further, a banking entity is not allowed to acquire or retain an ownership interest in and have certain relationships, e.g., prime brokerage, with a hedge fund or private equity funds. Banks are also prohibited from sponsoring these funds. There is, however, a de minimis amount with which banks are allowed to retain and/or purchase ownership rights in covered funds: (1) the ownership of a bank in these funds must not exceed 3 percent of the total outstanding ownership rights of a fund, and (2) the aggregate value of all ownership rights a banking entity holds in all funds jointly must not exceed 3 percent of its Tier-1 capital. This rule has generally become to be known as the “3 percent rule”.

3.2 Vickers

Crisis narrative. Over the last decades, prior to the financial crisis, the UK banking system became a banking system with large banks, a high functional diversity and complexity, and extensive interconnectedness within the financial system. Compared to other countries such as the U.S. or Germany, the UK economy became highly dependent on the financial sector (Davies et al. 2010; Bush et al. 2014). Under these circumstances, the financial crisis has had a huge impact on the UK financial

sector, economy and national budget. Public funds committed to the financial sector in 2008 and 2009 were estimated to be about 60% of GDP in the UK, compared to about 30% in the U.S. and about 20% in Germany (Deutsche Bank Research, 2010). A unique UK experience was the 2008 run on Northern Rock, a retail real estate financier.

In response to the financial crisis, the UK Government established, in June 2010, the “Independent Commission on Banking”, chaired by Sir John Vickers. The commission was to “look at the structure of banking in the UK, the state of competition in the industry and how customers and taxpayers can be sure of the best deal” (Osborne, 2010). The commission published its final report in September 2011. The recommendations made by the Vickers Commission focused on structural reform, loss-absorbency and competition.

Separation approach. With respect to structural reform, the commission proposed a partial separation of UK retail banking services from global wholesale and investment banking services, the so-called “retail ring-fence”. The idea behind this separation proposal is to limit public guarantees to ring-fenced banks, as those perform banking services believed to be vital for the economy. Concurrently, the proposal aims at reducing incentives of non-ring-fenced banks for excessive risk-taking. In the view of the Vickers Commission, ring-fencing would help “insulate UK retail banking from global shocks” and ensure the supply of credit in the economy (Vickers, 2010).¹⁰

The Vickers proposal differentiates between *mandated services*, which have to be provided by the ring-fenced entity, *prohibited services*, which may only be provided outside of the ring-fenced entity, and other services, including ancillary services, in which the ring-fence is flexible. In particular, mandated services include accepting deposits from, and providing overdrafts to, individuals and small and medium-sized enterprises. Prohibited services include investment banking activities such as derivatives, debt and equity underwriting and investing and trading in securities. Commercial banking services resulting in exposures to financial companies as well as services to non-European customers are also prohibited for the ring-fenced entity. The prohibited services are not exhaustively defined, but the general tendency is clear. The ring-fence is flexible in allowing banks to place other activities such as lending to large domestic corporate and trade finance inside or outside the ring-fence. This raises the natural question of whether banks under the Vickers rule will choose their set of activities within the fence to be small or large. Ancillary services that are necessary for the efficient

¹⁰ As stated by Vickers in his opening remarks for the final report, “retail deposits – now around £ 1 trillion – would fund loans to households and businesses in the domestic economy, not investment banking.” (Vickers, 2010, p. 3).

provision of mandated services may be provided by the ring-fenced bank. This includes the typical treasury functions such as risk management, e.g., interest rate hedging through derivatives, and liquidity management.

It is a key objective of the proposal to improve the resolvability of banks. Therefore, banks have to make sure that the ring-fenced entity, which encompasses the UK retail activities, can be isolated from the group in a few days (separation of legal and operational links). The proposal also requires that transactions between the ring-fenced entity and the non-ring-fenced entity take place on a “third party basis” (separation of economic links). As a consequence, the group’s UK retail banking part should not be dependent on the group’s overall financial health, and failing banks should be easier and less costly to resolve. Further, the proposal recommends increasing the loss-absorbing capacity of the ring-fenced entity through higher regulatory capital requirements. In particular, large ring-fenced banks should hold equity of at least 10% of their risk-weighted assets.

3.3 Liikanen and Barnier¹¹

Crisis narrative. The European perception of the financial crisis of 2007 to 2009 was that it was foremost a U.S. crisis, stemming from the U.S. subprime market and overly risky investment banks, that dramatically affected the European financial system because of interconnected banking and capital markets. The spreading of default risk and the danger of a simultaneous breakdown of numerous banks threatened the ‘real’ side of the economy and the payment system. Hence, the importance of systemic risk became very obvious. The threat of real economic losses, including layoffs and market closures, induced governments to step in and to rescue a large number of banks.

In November 2011, EU Internal Markets Commissioner Michael Barnier set up a “High-level Expert Group”, with Erkki Liikanen as chairman, to evaluate potential structural reforms of the EU banking system.¹² The group presented its proposal in October 2012. The basic philosophy of the proposal is to focus on systemic risk and to respond to the danger of systemic risk by demanding strict resolvability of any bank, no matter how large, and no matter when. The Liikanen proposal forms the

¹¹ This section borrows from Krahen (2014).

¹² Further members of the group were: Hugo Bänziger, José Manuel Campa, Louis Gallois, Monique Goyens, Jan Pieter Krahen, Marco Mazzuchelli, Carol Sergeant, Zdenek Tuma, Jan Vanhevel and Herman Wijffels.

basis for the January 2014 proposal of the EU Commission on structural reform in banking, to which we refer as the Barnier proposal.¹³

The Liikanen Group formulated two key policies to reduce systemic risk: First, the mandatory issuance of junior bank debt that does not fall under any sort of depositor protection, and that is prepared for loss bearing (explicit bail-in debt). If the resolution of banks without creditor bailout is credible, or so it is hoped, it will lead the bank to select less risky strategies and will therefore reduce systemic risk. Secondly, large and complex ‘systemically relevant’ banks are to be separated, either effectively or conditionally, into a trading unit and a banking unit.¹⁴

Separation approach. The *Liikanen proposal* distinguishes between retail/ commercial banking activities and trading activities. Importantly, no distinction is made between proprietary trading and client business, market making, or hedging. It is argued that proprietary and client-related trading activities are hard to distinguish since market making in less-than-perfectly-liquid markets consists essentially of a sequence of trades that end up on the bank’s own book.

The experts group discussed two reform options: Avenue 1 suggests a conditional separation of the banks’ trading and retail/ commercial banking businesses, where the resolvability assessment by the supervisor serves as the break-up trigger. There will be no break up if the bank presents a credible resolution plan (i.e., a living will, or a testament) that describes how major banking activities, in particular trading-related activities, can be singled out and separated from the main bank during a financial crisis. Furthermore, Avenue 1 would impose additional non-risk weighted capital requirements on banks that engage in trading activities.

Avenue 2 suggests breaking up large complex financial institutions by forcing major trading activities into legally separate broker-dealer units. The broker dealer unit may be put under the same holding. However, its capitalization and its funding must be separate. This will create two distinct institutions, a trading house (or broker-dealer), and a remaining retail/ commercial bank. Both institutions have their own equity capital, possibly provided by a mutual bank holding firm. While the retail/ commercial bank will still be refinanced by deposits, bonds and unsecured credit, the trading house will have its own funding, probably from bond or wholesale markets. The latter has no access to the deposit market, and therefore does not enjoy an implicit government guarantee. Therefore, the

¹³ European Commission, „Structural reform of the EU banking sector“, 29 January 2014, http://europa.eu/rapid/press-release_IP-14-85_en.htm.

¹⁴ See also Krahenen (2013) on the key points of the Liikanen report.

Avenue 2 proposal may be compared to Vicker's ring-fencing, since in both proposals trading activities are fenced off from the deposit taking entity.

The main objective of separating retail banking and trading is not to reduce trading activities *per se*, but rather to limit a possible implicit subsidization of funding if carried out together with the traditional deposit taking business. Just as any other banking activity, trading should earn its risk-adjusted cost of capital, and thus be subject to market discipline.

The reason for proposing the separation of trading from banking is once again, according to the Liikanen proposal, to facilitate the resolution of the bank and the bail-in of its creditors. International universal banks have become very complex, and trading activities have played a special role in this development. Any attempt to restructure a failing bank over a weekend, the infamous Friday-to-Sunday emergency events, is assumed to be extremely hard to achieve if trading and banking are strongly interrelated.

After considering the Liikanen proposal, the EU Commission, in January 2014, put forth a legislative proposal (*Barnier proposal*) which recommends a ban for proprietary trading and conditional separation of all trading activities for big banks in Europe. According to the draft legislation, it shall be strictly forbidden for affected institutions to trade on own account for the sole purpose of making profits for the bank. This prohibition is also valid for economically congenial investments in hedge funds. These types of trading activities are said to entail the risk of capital losses, for which a safeguarding through deposit guarantee schemes cannot be justified. Other forms of trading, like market making activities as well as hedging transactions for the banks' own accounts, remain allowed. The permission to continue with other high-risk trading activities can, however, be revoked by the supervisory authority, if problems occur that potentially put the whole bank and the wider financial system at risk. In these instances, the proposal grants the responsible supervisor the power to require the separation of all trading activities. For systemically important banks falling under the Single Supervisory Mechanism, this will be the task of the ECB. The Commission's proposal therefore provides the separation requirement as *ultima ratio* in case a bank's ability to manage its risk properly is doubted by the supervisory authority. As the conditions for intervention refer to financial stability in general terms, they give the authority wide discretion.

By way of comparison, the Barnier proposal combines the logic of Liikanen's Avenue 1, the conditional separation of trading activities, with the Volcker rule, i.e., with the outright prohibition of proprietary trading.

3.4 Current state of the reforms

In 2015, the three reform proposals are at different stages of implementation. Regarding the Volker rule, which is part of the Dodd-Frank Act that passed legislation in 2010, the main regulatory bodies (SEC, Fed, OCC, FDIC and CFTC) were tasked to come up with a detailed implementation plan of the Volker rule. Since June 2014, the largest banks with asset holdings exceeding 50 billion USD have to report quantitative measures of their proprietary positions and their general compliance to their supervisors. Smaller banks are exempted from requirements until 2016, when the Rule is expected to be fully implemented.

For the UK, the “Financial Services (Banking Reform) bill” that the government introduced to Parliament in February 2013 builds on the Vicker Report’s recommendations, but includes some exemptions from ring-fencing for smaller banks, as well as some other modifications. The UK government completed all legislation, allowing the reforms to be put into effect on 5 May 2015. Still, banks are waiting for the Prudential Regulation Authority in the UK to disclose the final rules on ring-fencing, which, at the moment, are not expected before the end of 2016. UK banks are expected to implement the reforms by 2019 at the latest.

For the European Union, the Council of the EU agreed on 19 June 2015 on its position regarding the draft regulation proposed by Barnier. This piece is the basis for the Council Presidency's mandate to negotiate with the European Parliament on the final version of the regulation. On 28 October 2015, member of the European Parliament, following the lead of centre-right and centre-left groups from mostly Sweden and Germany, issued their own draft that emphasizes a ban of proprietary trading for the top 30 European banks only in the case these institutions are regarded by the supervisors as a threat to financial stability. In these instances, the supervisory bodies should then be empowered to split off the trading arms of these institutions or force them to increase their capital holdings significantly. Following comments by members of the Parliament this means that “... mandatory separation is out, ... but competent authorities need to scrutinize if any bank is a threat to financial stability.”¹⁵ Negotiations in the European Parliament on this draft have momentarily reached a deadlock. As long as EU Commissioner Hill does not recalled the legislative proposal of his predecessor Barnier, the Parliament, however, continues to have a mandate to come to an agreed position on the legislative proposal.

¹⁵ See “Banks fume at EU move to strengthen break-up powers”, Financial Times, 29 October 2015(<http://www.ft.com/intl/cms/s/0/06d6f790-7e53-11e5-a1fe-567b37f80b64.html#axzz3sJ481Q6S>).

4. Discussion of reform proposals

In this section we discuss the proposals currently on the table: the Volcker-, Vickers-, Liikanen and Barnier proposals. Rather than discussing the proposals one by one, we focus on what we view as the main themes of the alternative approaches:

- *Prop trading prohibition* – as in the Volcker rule and in the current EU Commission proposal.
- *Trading separation* in legally distinct or ring-fenced entities within the existing banking organizations – as in the Liikanen proposal, in the Vickers proposal, and, as a discretionary measure of the supervisor in case of excessive bank risk, also in the EU Commission proposal.

The discussion is then structured along the lines of *intended consequences* and *unintended consequences* of the reforms, as outlined in Table 1. Intended consequences are those that policymakers hope to achieve through the respective structural reforms and, taken together, should reduce systemic risk. Our discussion of intended consequences – *improved resolvability*, *reduced systemic risk* and *protection of depositor money* – shows that structural reforms are needed because the modern universal bank business model that developed during the 90s and early 2000s poses risks for financial stability. Our discussion of unintended consequences, in contrast, points at *regulatory ambiguity*, *reduced efficiency of business models*, and *growth of the shadow banking sector*. It is argued that these unintended consequences differ substantially among the alternative reform proposals. Overall, we raise fundamental arguments against a black-and-white characterization of financial market trading activities, showing that an outright prop trading ban is a very unlikely savior of financial stability. The concerns raised cast doubt on some, but not all, proposals currently on the table, and lead to the prime policy conclusion of this paper: Prop trading prohibition will not achieve the desired effect. Separate capitalization of trading activities, sometimes called a separation of trading from banking is, in our view, the more promising path to increased financial stability.

Table 1: Intended and unintended consequences of structural reforms

Intended consequences	Unintended consequences
a) Improved resolvability	a) Regulatory ambiguity
b) Reduced risk-taking <ul style="list-style-type: none"> • Implicit subsidies for trading 	b) Reduced efficiency of business model <ul style="list-style-type: none"> • Market liquidity
c) Protection of depositor money <ul style="list-style-type: none"> • Moral hazard 	<ul style="list-style-type: none"> • Bank profitability c) Growth of shadow banking

4.1 Intended consequences

Improved resolvability. Improving the resolvability of banks is arguably the overriding and single most important objective of the entire EU banking union project. If one were to draw a pyramid of economic arguments supporting the banking union agenda of the years 2010-2014, credible resolvability would stand at the top of the pyramid. By itself, resolvability is the direct response to a diagnosis, discussed since the outbreak of the crisis in 2007 that emphasizes too-big-to-fail financial institutions as the leading culprit in the crisis years. Accordingly, a significant equity cushion and a high degree of resolvability are now widely seen as a pre-condition for financial markets to force limited risk-taking on bank management. For example, if a large institution is structured like a holding corporation with several subsidiaries along functional or regional lines, a workout is probably much easier to achieve than if all lines of business are fully integrated into one corporate entity. Moreover, if these subsidiaries have their own management, and are endowed with their proper equity and bail-in-able (subordinated) debt capital, excessive risk-taking and even contagion risk may be further reduced. In the absence of quick resolvability, systemically relevant institutions are likely to become too-connected-to-fail in a crisis situation. The higher the degree of interconnection, and the more opaque the network of mutual exposures, it is more likely that a supervisor will shy away from bailing-in shareholders and creditors in times of crisis.

For an evaluation of the resolvability one has to keep in mind that the ultimate objective of resolution is not necessarily, even not primarily, the liquidation of a struggling bank’s assets and liabilities. Rather, the resolution of a banking institution will typically entail the disposal of business

units to domestic and international competitors. To this effect, the business units need to be separable along production input and management lines, e.g., IT, software, personnel, and risk management.

Consider a situation prior to structural reforms where traditional banking and prop trading are combined within a modern universal bank. It is then extremely difficult for the banking supervisor, especially within a short time period, to disentangle the bank's loan exposures and prop trading exposures in a crisis situation. Obviously, the complexity of the bank's portfolio and risk management rises in the number of loan transactions and hedging or prop trading transactions.

A key initiative of regulatory authorities in response to complexity is requiring large banks to prepare a resolution plan, commonly known as a "living will". The rejection of several such living wills by the U.S. supervisor in 2014 and 2015 suggests the proof of resolution plan credibility to be more difficult than widely expected.¹⁶ More concretely, to render a resolution plan credible (in the eyes of an outsider, like the supervisor), more is needed than a technical description of how one could separate activities and portfolios in a moment of stress. Credibility of a resolution plan requires the designated interface (i.e., the break-up point between the old institution and the separated institution) to be established and viable prior to a crisis actually happening. This requires large banks to carry out dry-separation exercises, much like a passenger cruise ship that needs to prove the feasibility of its emergency rescue plan in good times.

Setting up the critical interface is most credible in the form of a factual separation, e.g., requiring separate legal entities, separate sourcing of software licenses and the separation of other contractual matters, like employment and financing contracts. The factual separation claim may hold particularly true for trading activities as the centerpiece of the integrated universal banking model. According to their resolution plans published in 2015, large U.S. banks would sell-off or significantly shrink their broker-dealer activities in case of bankruptcy.¹⁷ This emphasizes the critical relationship between banking and trading for the resolvability of banks. Notably, an adequate and well-monitored dry

¹⁶ See <http://www.federalreserve.gov/bankinfo/reg/resolution-plans.htm>, and, e.g., Washington Post, 5 August 2015: „U.S. regulators reject resolution plans of 11 big banks“.

¹⁷ A report published by Bloomberg News (6 July 2015), following the release of U.S. banks' resolution plans states: "Excerpts released Monday show the strategy at most of the big banks is to keep subsidiaries operating while their parent companies go to bankruptcy court and then sell some units. Many of the firms would cling to their core banks while shedding Wall Street operations that trade securities and make markets for clients." (<http://www.bloomberg.com/news/articles/2015-07-06/biggest-u-s-banks-would-sell-off-brokerage-units-in-bankruptcy>). This relates to the current debate about multiple- versus single-point-of-entry resolution strategies for banks.

separation, as required in fulfillment of a living will, comes close to an outright separation of banking and trading, as far as the potential resolvability is concerned.

Reduced risk-taking. Early on, the policy debate has focused on proprietary trading as a major contributor to the outbreak of the financial crisis in 2007, as it is believed to foster high risk-taking. Fittingly, the first comprehensive regulatory response in the U.S. to the crisis experience, the 2010 Dodd-Frank Act, includes the Volcker rule that introduced a prop trading ban. According to this rule, no financial institution with access to lender of last resort facilities shall engage in securities trading to the benefit of its own (proprietary) bottom line.

Prop trading is seen as the culprit in a story of excessive risk-taking which is said to be induced by an implicit subsidy from low(er) risk universal banking activities to high(er) risk market trading activities (Boot and Ratnovsky 2012a/b). A universal bank can finance its trading activities at the comparatively low deposit rates. Deposit rates remain low, even in universal banks, since deposits are guaranteed by the insurance scheme. The fungibility of capital will allow universal banks to engage in more trading activities, and to take on more risk, than it would find worthwhile if both activities, trading and banking, were separately capitalized.

If trading activities are separately capitalized, the market mechanism is allowed to work and the costs of capital are not distorted by deposit insurance considerations. If such a situation is established, we see no a-priori economic argument why prop trading should result in excessive risk-taking. Therefore, the exigency for prop trading prohibition is questionable.

Protection of depositor money. One argument at the core of the structural reform proposals is that trading separation is needed to shield banks' deposit-taking business and the deposit insurance scheme against the risk realization emerging from trading activities. Indeed, as argued above, the funding of bank activities with insured deposits endangers the smooth operation of market discipline. Deposit insurance lowers the banks' funding costs, and induces investors (in the role of depositors) to remain agnostic with respect to a bank's risk-taking behavior. At the same time, shareholders stand to benefit from high-risk strategies with potentially high profits, as long as the down-side of these operations is not reflected properly in the bank's funding costs due to expected deposit guarantees.¹⁸ The undesired incentives emerging from a deposit guarantee scheme could

¹⁸ For example, Lambert et al. (2015) show that the increase in deposit insurance coverage from \$100,000 to \$250,000 per depositor and bank through the U.S. Emergency Economic Stabilization Act in October 2008 caused banks with relatively high increases in insured deposits to become more risky.

theoretically be counterbalanced by fully risk-adjusted insurance premiums. This, however, requires a sophisticated and powerful deposit insurance entity which is capable of correctly assessing bank risk-taking.¹⁹ While supervisory agencies got more sophisticated and powerful since the financial crisis, perfect monitoring of bank risk is unlikely to be achieved ever.

In the absence of such a super-efficient regulatory institution, banking separation is a more mundane, direct method of shielding deposits and eliminating undue burdens from deposit guarantee schemes.

4.2 Unintended consequences

As with many regulatory interventions into market structures, the proposals for bank structural reforms do not only affect banks' risk-taking in an intended way. Rather, these proposals may come with unintended consequences for banks' business activities. As far as possible, these need to be considered in policy decisions.

Regulatory ambiguity and the blurred dividing line between virtuous and vicious trading. The biggest challenge to a prop trading prohibition is that prop trading is difficult to observe and supervise. The reason is that the classification of an individual transaction, say the purchase of an interest rate swap (for a particular amount, a particular maturity, a particular underlying asset quality), as being a hedge, an outright speculation, or an arbitrage operation depends entirely on the intended nature of other transactions, current and future, in the bank's portfolio.

The classification of a single transaction as compliant or non-compliant with a prop trading ban therefore requires knowing aggregate intended bank exposures, not only individual existing exposures. Correlations among the individual exposures are also important. The attribution of prop trading becomes model dependent – and models will be as complex as the bank's business portfolio itself, involving a large number of transactions. In the end, the final classification of a trading transaction as being proprietary or not, needs to be approved by the supervisor. Very likely, the more complex transactions, which are a core element of modern bank business models, are not without ambiguity in terms of their role in bank risk management.

¹⁹ Ideally, the deposit insurance agency should operate functionally equivalent to a supervisory agency. Moreover, a unified institution combining supervision and deposit insurance under one roof is widely believed to be an efficient setup, also for a European agency. See the account given by Sheila Bair, the former Chairwoman of the Federal Deposit Insurance Agency (FDIC) in her review of her years at the FDIC (Bair 2012).

This ambiguity leads to two unintended consequences of a prop trading ban, both of which may turn out to have implications for financial stability:

- Type-I error: In this case, transactions that are indeed proprietary transactions are misclassified as being non-prop trading. Assuming that these transactions lead to undesired risk-taking, financial instability is increased.
- Type-II error: In this case, transactions that are substantively non-proprietary, because they are client-driven or hedging-oriented, are misclassified as prop trading. Assuming that these transactions reduce system-wide risks, as they should, banning these transactions again increases financial instability.

Type-II errors have the potential to create a situation of ambiguity for bank risk management that will force banks to leave areas of their business unchartered/unhedged.²⁰ This is to avoid unwarranted legal action and punitive damages against which no objection is reasonably successful (due to the model-dependence of the judgment). JP Morgan's London Whale of 2012, as already mentioned in Section 2.1, is a prime example for such ambiguity. For outsiders, it remains unclear whether the transactions represented prohibited prop trading or were misclassified by the supervisor, leading to erroneous regulatory consequences (type-II error). Consequently, this ambiguity may lead to less trading activities and endanger the business models of some large international financial institutions.

In our view, a separation of all trading activities (rather than merely proprietary activities) into separate corporate entities, possibly under a common holding roof, would achieve the objectives of a prop trading ban – that is the core of the Volcker Rule – at lower costs. The implications of a trading separation are quite different from those of an outright proprietary trading ban. Most importantly, since prop trading is not forbidden, but merely separated into a distinct entity, there is no ambiguity and no type-I or type-II error.

Reduced efficiency of the business model. It has been suggested by representatives of large banks that the separation of trading activities from the rest of universal banking will restrict the functioning of a platform model. In particular, the tailoring of hedging and other risk management activities to

²⁰ Ambiguity refers to the uncertainty of the moments of a return distribution, i.e., Knightian uncertainty. As we know from research in decision making under uncertainty, risk averse individuals tend to require an extra compensation for ambiguity, over and above the compensation required for taking the risk, see Krahnert et al. (2014).

the aggregate of exposures vis-à-vis corporate clients, e.g., the consolidated order book of a large group of clients on a particular day. The order book will include orders in different denominations, terms and risk characteristics, and risk management may require net position taking in violation of other regulatory requirements. For instance, the large exposure rule will limit any single exposure of the bank vis-à-vis its broker-dealer subsidiary to a certain fraction of its equity capital (25%). Furthermore, the separation of trading from banking may limit the volume or the type of services the bank can provide to any individual client.

The central question therefore becomes whether it is possible to rebuild the current set of services provided by a universal bank even after the trading entity has been separated into a broker-dealer institution? It seems at least conceivable that a then-separated broker-dealer continues to advise the universal bank with respect to financial strategy and risk management, leaving the execution partly or entirely to peer broker-dealers in the market. While the increase in funding costs may raise the cost of broker-dealer services in the economy, a concurrent decrease of bank profitability is not compulsory. In principle, profits may also remain at current levels, for example, if execution prices rise sufficiently, or if the advisory services remaining with the 'old' broker-dealer command a high-enough market price. Of course, these equilibrium price effects are difficult to forecast, as the resulting competitive structure of the broker-dealer market is endogenous.

A further argument discussed in the context of bank structural reform relates to its possible impact on the liquidity in securities markets. Banks, through their trading desks, are major providers of liquidity. Both prop trading and market making contribute to the supply of liquidity in securities markets. If a separation of some or all of trading business into a separately capitalized unit would endanger the business model of these market makers and proprietary traders, market depth and market liquidity would be reduced. A drain of liquidity could be the result in some markets, like equities, bonds, and derivatives. Thakor (2012) lists these concerns in a report written for the U.S. Chamber of Commerce. Most notably, he argues that the prop trading ban of the Volcker rule will have negative effects on market making as banks retreat from low-liquidity securities. As a consequence, there will be mispricing and market liquidity will decrease. These adverse effects on market-making could cause greater market frictions, with adverse consequences for the real economy. E.g., costs of capital may rise, and investments will be lowered. Moreover, he argues, the Volcker rule will make bank risk management less efficient, due to a restriction of using "risk-management" tools in the form of proprietary securities positions. This outcome, if it is truly the consequence of a trading separation, and moreover, if no substitute institution emerges to offers

liquidity as a business product, would be unintended, and most undesired. It would lead to a rise of capital costs, and would likely have indirect costs in terms of growth and employment foregone. These indirect costs, as in all other cases of welfare judgments, have to be traded off against the benefit of a reduction in systemic risk, and thus an alleviation of bank bailouts with taxpayer's money.

We still do not know empirically whether the negative liquidity scenario just described is true, or whether we face a more benign future in which a separated trading institution would unfold new activities in terms of products and services, offered by specialized broker-dealer institutions. Furthermore, in a more benign setting, the pricing of trading services might settle in equilibrium at an increased level (compared with today), rendering broker-dealer services more profitable.

Assuming that the separation of trading is the consequence of a general regulatory ruling, we have to resort to general equilibrium analysis, again, rather than relying on partial equilibrium arguments. In other words, if all banks are required to run their trading activities out of legally separated entities which have their own loss absorbing capital, the pricing of trading services and liquidity is expected to adjust to the higher level of funding costs. Profitability of broker dealers will then increase, raising its attraction as a business model.²¹ According to Richardson (2012) the Volcker rule most likely will not have an impact on the smooth functioning of capital markets, despite disallowing banks to partake in proprietary trading activities. His rather optimistic conclusions are however at odds with more recent survey evidence presented by the Committee on the Global Financial System at the BIS (CGFS 52, 2014).

Our own take on the issue of trading costs starts by considering a prop trading ban, and the possible negative consequences for market making and hedging, as explained earlier. What needs to be compared, then, is the impact a prop trading ban will have on market liquidity, with the consequences a comprehensive trading separation (with no prop trading ban) will have. Although there is no hard evidence today, we expect the cost effect of the former, if strictly enforced, to outweigh the costs of the latter.

Growth of shadow banking. Finally, one argument raised against both prop trading prohibition and trading separation cautions that it may create additional incentives for growth of the shadow

²¹ This is in contrast to the oft-heard claim that broker-dealer are unprofitable in Europe. Note, however, that this argument typically abstracts from a general equilibrium-type market restructuring, assuming unchanged funding costs for competing suppliers of dealer and trading services.

banking sector. This statement is probably true. If nothing else, the broker dealer institution is not counted as a bank, and thus, by definition, expands the non-bank segment of financial institutions. Does it also increase non-bank credit, which is today's most popular definition of shadow banking? As for now, we have no evidence either way.

5. Conclusion

In the previous section, we have compared the main themes of the alternative regulatory approaches for structural reforms in banking (Volcker, Vickers, Liikanen/Barnier). All three proposals attempt to stabilize the banking system through the separation of trading from banking. The proposals differ, among other things, with respect to what is being separated, and how the separated activity is permitted to exist, whether under the same legal roof, or not.

Our analysis supports a wider definition of trading activities to be separated (or conditionally separated).

(#1) In particular, because of significant unintended consequences, proprietary trading should not be singled out for separation or prohibition. We expect a separation or prohibition of narrowly defined prop trading to have little positive effect on the financial stability of large and complex financial institutions – but rather to have negative effects on individual institutions and the market as a whole.

The economic costs of a prop trading ban derive from the difficulties for a supervisor to distinguish comprehensively between proprietary trading on the one hand, and market making for customers and hedging for own positions on the other hand, assuming the existence of modern platform business models. Such indistinguishability is a cost factor in markets, and these costs may prove to exceed the costs associated with separately capitalizing (all of) a bank's trading activities. In particular, we have identified two potential sources of costs which we have likened to type-I and type-II errors in statistical hypothesis testing. The first one follows from the possibility of hiding (undesired) prop trades behind market making or hedging transactions (type-I misclassification), the second one refers to withholding (desired) market making or hedging transactions that are misclassified as prop trading (type-II misclassification).

This leaves the regulator with two alternative paths to pursue. In both cases, proprietary trading is permitted, but kept under control. First, it may define a capital surcharge for the entire trading book

commensurate to a stand-alone exposure (i.e. as if the trading book were operated by an independent broker-dealer bank). In this case, the potential resolvability of the universal bank deserves special attention. The second and more distinct alternative requires large banks to concentrate their trading activities, market making, hedging and prop trading, in a single and separately capitalized business entity, possibly under a joint holding roof.²²

Lastly, we suggest that the business models of international banks should anticipate an environment in which their costs of capital of trading activities reflect the stand-alone funding costs for these activities. This remains true irrespective of whether a conditional or unconditional separation is chosen by the regulator. It is up to policy makers to make the choice – but a clear decision is required.

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²² In this case multiple points of entry (MPE) are mandatory, rather than the fashionable single-point of entry (SPE) models currently discussed in policy circles. MPE help to avoid a spillover of losses from the trading subsidiary to the banking subsidiary.

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