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COMMISSION STAFF WORKING DOCUMENT

European Financial Stability and Integration Report 2013

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CHAPTER 6: DERIVATIVES ACCOUNTING DYNAMICS IN BANKS' FINANCIAL REPORTING

6.1. INTRODUCTION - MOTIVATION OF THE CHAPTER

Derivatives, traded on exchange or over the counter (OTC), were a frequent subject of research even before the financial crisis. But since the start of the crisis, literature looking at derivatives from different angles has exploded. Some of this recent research questions the assumptions in models of modern finance from which the benefits of derivatives had been derived.

The central role derivatives played during the crisis has also triggered new forms of regulation across the globe[251] in order to overcome some of the risks identified. In the EU, EMIR[252] provides for central clearing of OTC derivatives and for record keeping of transactions. This has led to some expected outcomes in the EU markets including greater transparency, increased safety via reduced counterparty risk and reduced operational risk.

Banks use derivatives for different purposes in relation to the following strategies and objectives:

- Banks *hedge* intrinsic risk by using derivatives to mitigate exposures faced due to their business activities, thus either eliminating the risk of future changes in the prices of the underlying assets or eliminating the variability of their cash flows.
- Banks *speculate* (*trade*) with derivatives, exposing themselves to different types of risks in the hope of higher returns (e.g. generation of revenue) based on their predictions of future changes in prices of the underlying assets.
- Banks *intermediate* in derivatives market on behalf of their clients, allowing them to obtain income from fees and to expand services to customers through product innovation and market making.

Therefore, as banks are major users, derivatives are also a central concept in banking regulation. For example, in Capital Requirement Directive (CRD IV), capital requirements related to these types of instruments were revised (compared to CRD III) as was the role of the credit valuation adjustments (CVAs). But bank regulators acknowledge the difficulties that these instruments pose due to reasons including their complexity, valuation issues and bilateral agreements. For example, for the bail-in tool in the Bank Recovery and Resolution Directive (BRRD), although liabilities originating from derivatives exposures should also be included, the effective application of the tool to those exposures is not as legally straightforward as for other types of liabilities.

[251] European Financial Stability and Integration Report (2012).

[252] The Technical Standards on the Regulation (EU) No 648/2012 on OTC Derivatives, Central Counterparties and Trade Repositories (known as "EMIR" - European Market Infrastructure Regulation) came into force in March 2013.

Therefore, if bank resolution authorities applied their write-down and conversion powers to liabilities arising from derivatives they would quickly face several practical issues: (i) identifying the transactions subject to netting agreements and determining the net liability arising from those transactions, (ii) assessing the appropriate methodologies to determine the value of certain classes of derivatives and (iii) creating the justification for the relevant point in time at which the value of a derivative position should be established.

In any case, derivatives are constantly monitored by bank supervisors in their on-site and off-site functions. First, a bank's outstanding derivatives exposure is one of the key indicators that supervisors use to identify whether a bank is systemically important[253], as it points to its interconnection and complexity. Credit counterparty risk, market risk, liquidity risk, maturity risk, collateral management and risk management levels are assessed using derivatives' notional and market value and its different features (maturity, type, etc.) as key variables. Supervisors also test and scrutinise the models (inputs, assumptions and outputs) banks use to calculate derivatives' fair value[254]. But most of the granular data on derivatives that supervisors track is not generally disclosed.

For the general public, banks' annual reports, which are subject to financial reporting rules, are the main source of information on their position, strategy and use of derivatives.

This chapter aims to provide a basic, rather holistic explanation of how to interpret the accountancy of derivatives in a bank's annual accounts. To that end, some elementary questions on the meaning of derivatives in bank reporting need to be addressed:

1. *Why are derivatives different, and what problems do they pose to accountants and analysts of banks?*

2. *In the EU, what do financial statements reveal about derivatives? Do derivatives accounted for on the balance sheet provide useful information to investors on the financial position[255] of a given bank?*

3. *Do aggregated figures on derivatives inform or mislead investors on bank stability?*

4. *How can changes in the fair value of derivatives play themselves out in terms of balance sheet stability?*

The chapter is organised as follows: Section 6.2 gives a general overview of derivatives accounting and disclosure in financial statements. It is subdivided into six subsections: 6.2.1 gives a general background to how accounting rules imposed fair value on derivatives, 6.2.2 describes the specificities of derivatives accounting and the two types of derivatives with regard to their accounting at inception, 6.2.3 explains the impact of derivative valuation in

[253] At international level, the Basel Committee on Banking Supervision (BCBS) has developed a methodology for identifying *global systemically important banks* (G-SIBs). The assessment methodology refers to the following set of indicators: size, interconnectedness, cross-jurisdictional activity, suitability and complexity.

[254] For OTC derivatives, fair value is measured with internal valuation techniques or valuation models (e.g. Black-Scholes model). For more details see *Section 6.2.3.*

[255] Remember that the purpose of the balance sheet is to report to investors what a company is worth at one point in time.

accounting (with a visual illustration of which type of derivatives will be accounted for in the balance sheet), 6.2.4 explains the impact of different national accounting systems in the EU on the comparability of accounting for derivatives, 6.2.5 describes accounting for held-for-trading (speculation) derivatives and hedge accounting, together with the problems related to effectiveness testing, and 6.2.6 explains some intrinsic features of derivatives such as netting and collateral that may affect banks' balance sheets. Section 6.3 explores empirically some of the theory expressed in section 6.2, showing the differences in banks' reliance on derivatives by country and by business model and exposing the different types of accounting disclosure of derivatives within an average bank. Some conclusions are drawn in section 6.4. Finally, section 6.5 contains an annex with the main types of hedge accounting.

6.2. UNDERSTANDING DERIVATIVES IN EU FINANCIAL STATEMENTS

6.2.1. The history of derivatives accounting

Following the stock market crash of 1929, generally accepted accounting practices[256] (GAAP) aimed to establish what a company's profit was in a given year. This method was based on the traditional difference between revenues and costs.

In this context, revaluations, i.e. value changes that were not due to any transaction, were not considered profit given that there was no increase in liquidity that could be used to manage liabilities. The cornerstone of the whole accounting process was to determine the timing and recognition of that revenue as profit, i.e. the timing when revenues or expenses had transformed into more or less liquidity for the company (e.g. cash or other financial assets).

In accordance with the generally accepted accounting practices of those years, profits were recorded only when they had completed the entire productive cycle, i.e. the traditional process, money - goods - money. This only happened when it could be proven that there had been: 1) a sale or equivalent process, and 2) an increase in liquid assets.

That traditional measure of realising benefits was not suitable for recording and valuing derivatives. In most cases (e.g. interest rate swaps), derivatives do not require any initial investment, have zero cost and therefore accounting for derivatives based on historical cost provides very limited useful information to investors. Furthermore, the existence of liquid markets and the development of valuation methodologies accepted by financial market participants (e.g. the Black - Scholes - Merton model for European options) reduced the information value of the historical cost information provided in the financial statements for these instruments.

Consequently, in the early 1990s, the different financial reporting standard setting bodies (the IASB and FASB, essentially) issued rules that initially sought to address the problem of so-called "off-balance sheet" items, whereby assets and liabilities resulting from derivative

[256] Until the establishment of the US Securities and Exchange Commission (SEC) in 1934, accounting criteria varied widely but none was a "*generally accepted accounting principle*" since there was no regulation of the profession. In the case of listed entities, the market itself guided the different principles used in presenting the financial statements. Any new accounting proposal was accepted as long as it lowered the financing costs for the entity.

contracts were not reflected in the balance sheet. Subsequently, they also addressed issues such as credit and market risk disclosure, the treatment of financial hedges for these risks, etc. These bodies agreed on the goal that was to be achieved, namely information transparency for financial instruments and the only solution found for this was *fair value accounting*.

However, it was sometimes not possible to reach consensus on the fair value of certain derivatives, either because the underlying asset was not actively traded, or because future contingent settlements depended on the decisions of others, such as a derivative that swaps the interest on a debt instrument for dividends paid by the stock of an entity. In situations where it was not possible to reliably value a derivative, under some national GAAPs in the EU[257], it was deemed more appropriate to present the information regarding the fair value of the derivative as a range of fair value in the notes to the financial statements.

In 2002 the European Union agreed that from 1 January 2005 International Accounting Standards/International Financial Reporting Standards (IAS/IFRS)[258] would apply for the consolidated accounts of EU listed companies[259]. Therefore, under the IFRS framework, IAS 39[260] *Financial Instruments: Recognition and Measurement* is the standard that sets out the requirements for recognising and measuring financial assets and liabilities, including derivatives.

6.2.2. Why are derivatives different?

A derivative can be defined as a financial instrument whose value derives from or is dependent on an underlying asset, such as the price of a financial instrument (e.g. the stock of a publicly traded company), a reference interest rate (e.g. LIBOR), a currency exchange rate, a commodity or a credit event/bond (e.g. a credit default swap).

Thus, the parties involved in a derivative contract are transferring the financial risk inherent in the underlying asset. Generally, derivatives grant to a party a contractual right or obligation vis-à-vis another party in the future under conditions that are potentially favourable or unfavourable. As a general rule, an entity shall register all derivatives in its balance sheet as an asset or a liability, depending on the rights or obligations arising under the contracts.

From an accounting point of view, it is important to distinguish between two categories of derivatives. Both have an impact on the balance sheet and the income statement.

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[257] This does not apply under IFRS, but under some national GAAPs in the EU.

[258] Regulation (EC) No 1606/2002 of the European Parliament and of the Council of 19 July 2002 on the application of international accounting standards.

[259] The application of IAS/IFRS only applies to listed companies that prepare consolidated accounts. However, throughout the EU some Member States also granted the option to other companies to apply the standards voluntarily.

[260] The IASB is currently working on IFRS 9 *Financial Instruments*. When completed, an effective date will be added and IFRS 9 will completely replace IAS 39.

The first type refers to derivative instruments that usually have a fair value different from zero at their inception. This is the case of the options. Its fair value is composed of two elements: the intrinsic value and the time value. Therefore, although the intrinsic value of an at-the-money (ATM) or out-of-the-money (OTM) option[261] is zero, the time value of the option has a positive value, reflecting the potential for profit during the exercise period of the option.

At the time of inception (t_0), this type of derivative instrument implies the payment or collection of a premium when bought or sold, and thus it leads to the record of a financial transaction. The derivative instrument is registered in the balance sheet in the amount equivalent to the premium paid or received. It is recorded on the balance sheet as an asset if the company is buying the option, as the option represents a right, or as a liability if it is selling, as the option represents an obligation. It is worth mentioning that options usually represent a small portion of the total derivatives held by banks, falling within a range of 5 to 15 percent of their total derivative assets or liabilities.

The second category refers to derivative instruments (e.g. forwards and swaps) that do not usually require the recording of financial transactions at inception, because their market value is nil and they do not trigger any cash flows. Although at inception (t_0), there is no accounting record on the balance sheet, IAS 39 requires these derivatives to be reported in the notes to the financial statements. In the following period (t_1) when their fair value changes, the company records the derivative in the financial statements as an asset or liability.

In sum, for all derivatives except options, derivatives originate assets and liabilities during their life span depending on the amount and sign (positive or negative) of their valuation. They may shift suddenly from being assets to liabilities and vice versa, and this does not depend on who is the buyer or the seller of the instrument, but on whether the derivative instrument represents a right to receive or an obligation to pay cash in the future. This is different from other financial instruments recorded on the balance sheet, as an asset generally solely represents a right to receive cash in the future, and a liability generally solely represents an obligation to pay cash in the future and this economic position does not change during the life of the instrument.

If a derivative is recorded as an asset, any increase in its fair value represents a gain and any decrease loss. On the contrary, if the derivative is recorded as a liability on the balance sheet, any increase represents a loss, and any decrease is a gain. The bank recognises gains and losses resulting from derivatives that are held for trading immediately in the income statement, while gains and losses resulting from the derivatives that are accounted for under the hedge accounting rules are reported differently (in the equity or income statement), depending on the type of hedge. In other words, the value accounted for in the balance sheet of a derivative is dynamic[262] as it responds to price movements in an underlying asset which

[261] Obviously, in-the-money (ITM) options have a positive intrinsic value.

[262] The balance sheet would not be influenced by whether the derivative is classified as being held for trading or hedging.

may make derivatives fluctuate between the asset and the liabilities side of the balance sheet during the contract's life span. Some derivatives require a very low initial investment while other financial instruments (loans, bonds and other types of debt) are usually fully funded from inception.

In conclusion, derivatives provide a major challenge for accounting standards and market analysts due to the variety of ways in which they are used and the lack of homogeneity of their financial disclosure.

6.2.3. Impact of valuation of derivatives in the financial statements

The fair value measurement of financial instruments, including derivatives, is carried out according to IFRS 13 Fair Value Measurement. This standard gives priority to using quoted market prices available from active markets when determining fair value. However, most derivatives held by banks are traded either on illiquid markets or OTC thus fair value is measured with internal valuation models based on Level 2 and Level 3 inputs[263]. Valuation models are designed to apply observable market prices and rates as input whenever possible, but can also make use of unobservable model parameters. These parameters comprise interest rates, volatilities, correlations and other ad-hoc assumptions. If such information is not available, fair value can be estimated with a valuation model that reflects how market participants would reasonably be expected to price the instrument. In any case the lack of disclosure by banks on their internal models applied to valuates derivatives make it difficult to assess their appropriateness and accuracy and impede comparison between banks' derivatives portfolios. This problem has recently been acknowledged within the supervisory context by the ECB in its "*Asset quality review, Phase 2 Manual"*[264]. This review guides the national competent authorities to assess the pricing models related to accountancy standards in a consistent and comparable way. In any case the information that supervisors may have, while not perfect, is much more granular than that disclosed in the annual accounting reports, where disclosure on the models is non-existent.

The lack of reliable estimates for the value of a given financial instrument raises significant concerns with respect to the reliability of financial statements. This was the case at the beginning of the crisis when market participants became less confident in their OTC counterparties and put in doubt the valuation models for derivatives used in the banking sector.

Whenever models are used in lieu of observable prices, there is potential for management to introduce bias into the valuation process through the use of judgment and discretion. This

[263] The *IFRS 13 Fair Value Measurement* standard defines a 3 level "*fair value hierarchy*" system to reflect the level of judgment involved in estimating fair values. The hierarchy categorises the inputs used in valuation techniques into three levels. Priority is given to Level 1 inputs, which are quoted prices in active markets for identical assets or liabilities that the entity can access at the measurement date. In the absence of Level 1 inputs, managers can use Level 2 inputs composed of inputs other than quoted market prices included within Level 1 that are observable for the asset or liability, either directly or indirectly. The lowest priority is given to Level 3 inputs represented by unobservable inputs for the assets or liabilities.

[264] ECB (2014), "Asset quality review, Phase 2 Manual", Section 8.4 "Element 3: Derivative pricing model review".

issue becomes critical when valuing OTC derivatives on the basis of Level 3 inputs, given the high degree of discretion management have to determine the inputs in the valuation process. It could easily lead to overvaluing derivatives accounted for on the asset side or undervaluing a derivative accounted for on the liability side of the balance sheet. Taken to the extreme, it can be the case that a derivative valued on a bank's balance sheet as an asset should in fact be classified as a liability, if inputs were adjusted for their valuation.

IFRS 13 also provides that the fair value for OTC derivatives should reflect the credit quality of the derivative instrument. This means that the valuation of a derivative instrument should be adjusted for the credit risk of the counterparty (counterpart credit risk) and that of the reporting entity (own credit risk). The valuation adjustment for counterparty credit risk requires a credit valuation adjustment (CVA), and an adjustment to a bank's own credit risk requires a debit valuation adjustment (DVA). Although CVA and DVA valuation methodologies are well advanced, they are still not standardised and vary among market participants, ranging from relatively simple (e.g. calculating the current mark-to-market value of the derivative and then adjusting the discount rates) to highly complex methodologies (e.g. simulated modelling of market risk factors and risk factor scenarios). Some entities cannot justify the high cost of technology, infrastructure and staff to perform this type of valuation and tend to opt for less costly alternatives such as spreadsheet models. Using simple valuation methodologies is subject both to input errors, and to a degree of management discretion.

Theoretical example: Swap accountancy dynamics, the special case of credit default swaps (CDS)

Credit default swaps or CDS are, as their name suggests, *swaps*, not options, guarantees or insurance. But under some EU national GAAPs applied to domestic non-listed banks, CDS are accounted as financial guarantees, insurance or even options (i.e. the pay-out from the CDS is reflected in the statement of a financial position only if credit event becomes probable so off balance sheet). However, under EU IFRS[265], although CDSs in theory are eligible for hedge accounting, in practice CDSs normally do not meet the current accounting criteria for designation in a hedge relationship and consequently need to be measured at fair value in the balance sheet and their fair value changes recorded as a profit or loss. Furthermore, under IFRS, a CDS is fundamentally different to an option. In the case of an option, the *time value* paid is known from the inception whereas the "*CDS premium*" is contingent on the occurrence or not of a credit event and is paid over time, but only until a credit event occurs. Therefore, in the case of an option the total amount to be amortised is known, while that is not the case for a CDS.

Likewise, given that the buyer of protection cannot lose more than the premium paid, it should be explained *"how a CDS bought by the buyer of protection move from the asset side to the liability side?"* This can happen when the buyer is paying more for the protection than

[265] A CDS does not meet the definition of a financial guarantee contract as stipulated in paragraph 9 of IFRS 39, given that in a standardised CDS contract the credit events triggering the pay-out may not directly relate to the failure to pay on that particular debt instrument (e.g. an entity can hold a naked position and the definition of credit events in a standardised CDS is broader than a failure to pay).

the current market conditions justify. Take the example of a 10 year CDS bought at a high of financial distress and suppose that no credit event occurred so no pay-out was effectuated. At the purchase date of the CDS the buyer locked in a 10 year annual payment of 1000 bps. In the following period, the current equivalent credit spread dropped to 500 bps. From an accounting point of view, this is an "*onerous contract*" as the buyer is currently paying more than the amount justified by the current pricing of the credit risk of the counterparty. Given the re-pricing of the market credit risk, the asset increased in value (gain). However, given that the buyer has locked in the credit risk, a corresponding liability (loss) needs to be recorded.

CDS accountancy creates confusion even among EU accounting experts and EU accounting standard setters which is why it deserves particular clarification.

CDS have many different, highly complex and detailed features and aspects. For pedagogical reasons, and in order to give a quick background to help the reader understand the impact that valuation and accountancy dynamics of CDS have in banks' balance-sheet, the following is a simplified summary of their definition and main characteristics:

Credit default swaps are designed to transfer the credit default risk of fixed income products between parties. A credit default swap (CDS) is also referred to as a credit derivative contract, where the purchaser of the swap makes payments in the form of a premium[266] ("spread"), until the maturity date of the contract. Payments are made to the seller of the swap. In return, the seller agrees to pay a loss compensation[267] (e.g. a third party debt or cash) to the buyer if the third party defaults on the underlying debt instrument(s).

The corresponding CDS contracts can be settled via physical settlement or cash settlement. In the case of cash settlement, the protection seller pays the face value minus the value of the defaulted bond to the protection buyer. In the case of physical settlement, the protection buyer hands the defaulted bond[268] to the protection seller and receives the face value of the bond. The underlying asset on which the derivative is based does not need to be involved in these swaps.

As regards why EU banks use CDS by EU banks, the basic motivations are twofold: hedging and speculation[269]. Commercial banks are usually natural net protection buyers (through CDS) because they are motivated to cover credit risk, while banks acting as protection sellers (following a speculative strategy) focus on finding additional profitable investments. Dias and Mroczkowski (2010) found that banks' use of CDS is reflected in their net position. They state that if banks are net protection buyers it would indicate that they use credit derivatives primarily to hedge their excess risk while if they are net protection sellers it would mean that these products are used for intermediation or speculation purposes. Remember that for a

[266] The premium is usually referred to as "spread". It is quoted as an annual percentage in basis points of the contract's notional value, but usually paid quarterly.
[267] Depends if it is "cash settlement" or "physical settlement".
[268] Physical settlement does not require valuation of the bond and the protection buyer receives full "*insurance*" under a physical settlement.
[269] Fitch Ratings (2010).

protection seller the whole operation is fully leveraged as he receives the spreads from the buyer without making any upfront payment.

EU banks use CDS in a wide variety of ways, pursuing a combination of purposes, from hedging (both loans and bonds), risk management (both the overall credit risk and the risk of a single reference), mitigation of credit risk as regards the regulatory capital requirements, and dealing in these products for speculative (trading) purposes.

The following three examples illustrate a credit derivative life cycle balance sheet representation for a buyer and a seller of the contract depending on how the valuation of the CDS evolves.

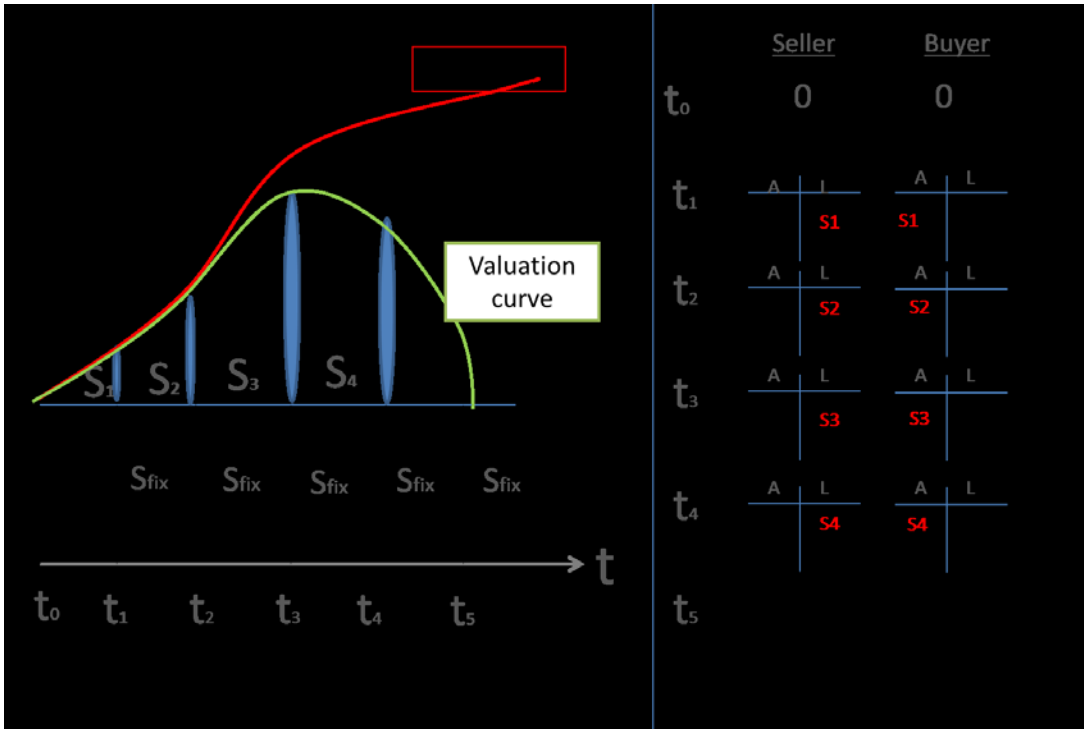
Influences on the valuation of the CDS include the perceived likelihood of default, the recovery rate in the event of default, liquidity of the CDS, time to the end of the contract, and a simulation of the interest rate curve. At inception, the expected present value of the contingent leg (the present values of the sum of all payments to the extent they are likely to be paid, i.e. taking into account survival probability) is equal to the expected present value of the fixed leg (the present values of all expected accrued payments). Thus, the spread is set initially so that the value of the CDS is 0[270].

During the life of the contract the banks will calculate the fair value of the contract which will be based on the CDS spread (if liquid), time value and other variables constituting the valuation curve.

Example 1 – Increase in the fair value of the CDS (spread widens)

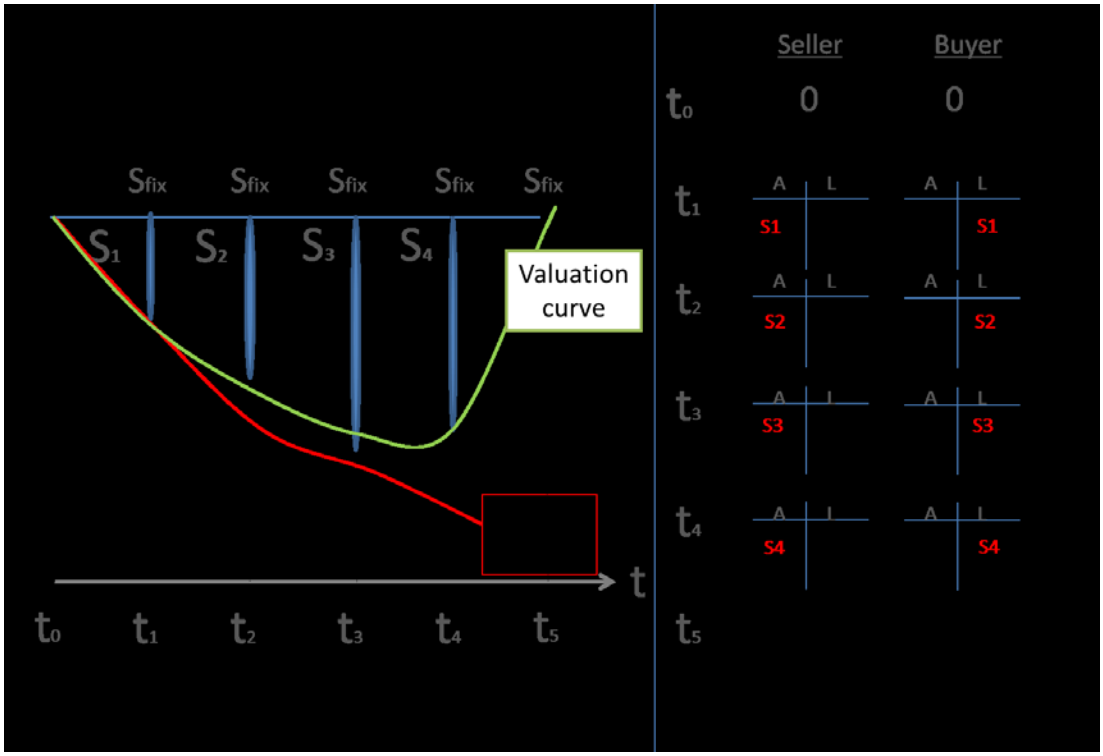
$$S = \frac{(1-R)\sum D(t_i)(q_{i-1}-q_i)}{\sum D(t_i)q(t_i)d_i + D(t_i)(q_{i-1}-q_i)\frac{d_i}{2}}$$

270 Where: D(t) = discount factor for date t, q(t) = survival probability at time t, S = annual premium, d = accrual days, R = current interest rate.



In the first example, the spread of the CDS widens and the fair value of the credit derivative increases during the life of the contract. In the first period, the seller receives the spread (Sfix) fixed at the inception of the contract as cash. This amount will be consequently reflected in the asset side but exactly at the same time will acknowledge a potential loss of Sfix+S1. Thus, in net terms S1 will appear as the fair value of the contract on the liability side of the balance sheet. Exactly the opposite dynamic should be identified in the buyer's balance sheet. The same logic follows in the subsequent periods. The spread of the latest period will go down even if the market CDS spread widens as one of the elements of the valuation of the CDS is how far the contract is from maturity.

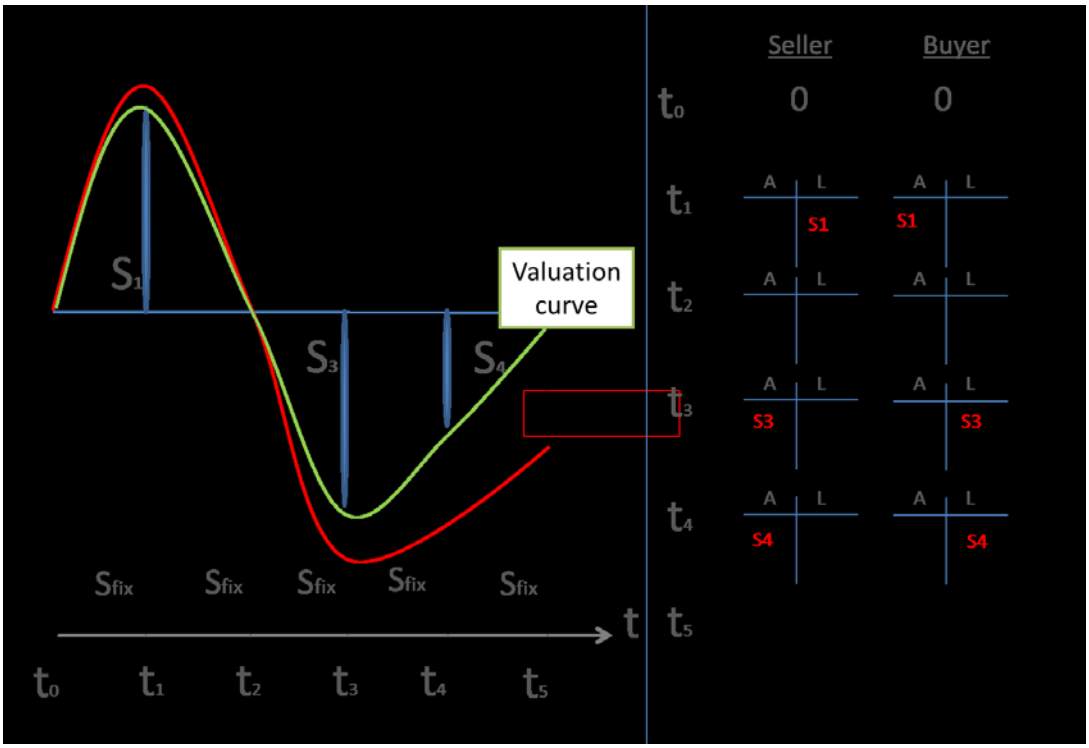
Example 2 - Decrease in the fair value of the CDS (spread tightens)



In the second example, the evolution of the underlying credit risk is the opposite of that in the first example. The spread of the CDS tightens and the fair value of the credit derivative decreases during the life of the contract.

In the third example, the spread of the CDS widens and tightens during the duration of the contract. Therefore, the fair value of the credit derivative increases in the first period, is zero in the second, and finally further decreases during the last two periods. This shows the volatility and impact of valuation on the balance sheet, as in the first period the seller has a net liability, nothing in the second period and net assets in the last two periods.

Example 3 – Increase followed by a decrease in the fair value of the CDS



In the final example, the spread of the CDS tightens for three periods, but between the third and the fourth period the underlying fixed income instrument suddenly defaults. During the first three periods, the fair value decrease of the CDS is recorded as an asset for the seller and a liability for the buyer. However, in the fourth period, the seller, instead of having an asset, has a *net loss* (equal to the notional of the fixed income minus the recovery value of the defaulted fixed income instrument and minus the fixed spread received from the buyer), whereas the buyer will have a *net gain* for the same amount. It should be noted that the buyer recorded the CDS on the liability side of the balance sheet, while in fact the instrument resulted in a gain.

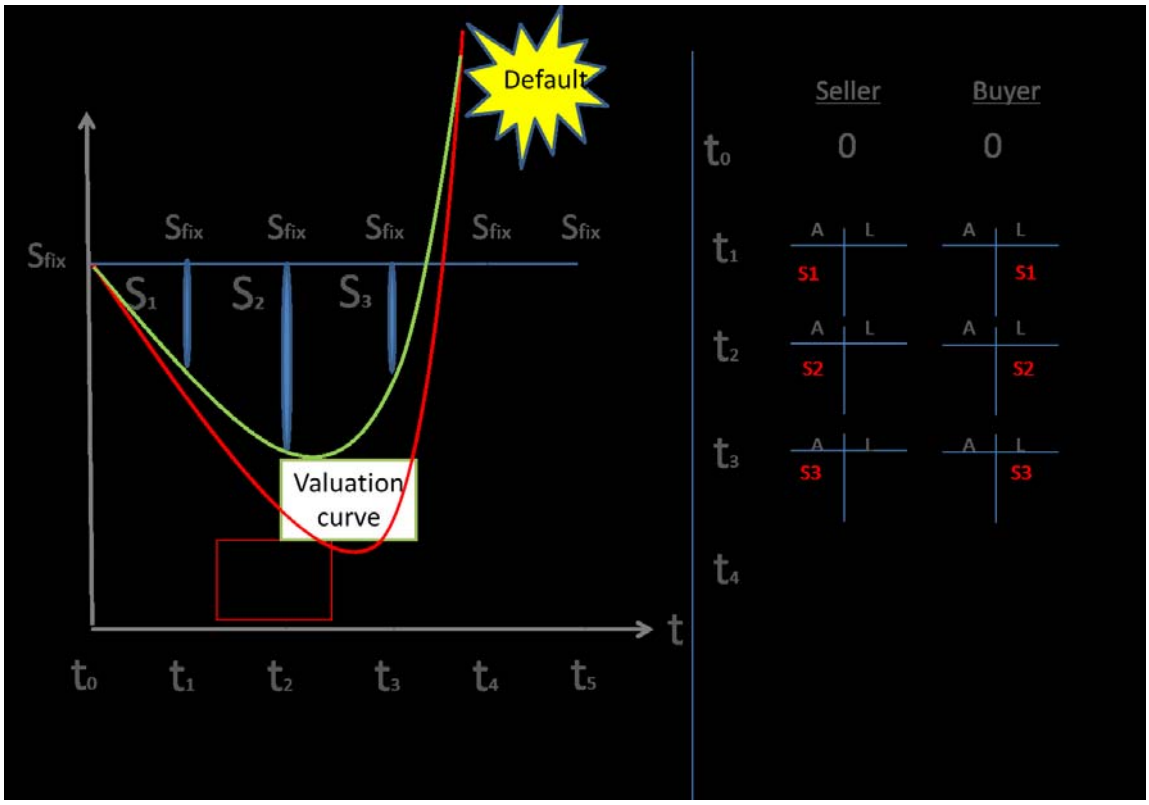
In the case of a sudden default of the fixed income instrument, the accounting representation of the CDS in the balance sheet might not be very informative as to whether this instrument is an asset or a liability for either the seller or the buyer.

In the first three examples, at the end of the contract, when the contract is no longer recorded on balance sheet, the seller will have had a net gain of five times the fixed spread and the buyer a net loss from recognising the expense (e.g. the premium paid) of the same amount. In the first example the representation of the CDS will appear as a liability for the seller over the life of the contract. In the second example, when the credit risk of the underlying asset decreases, the seller of the protection records the CDS as an asset, while in the third case the volatility of the valuation shifts the representation of the contract from the liability side to the asset side for the seller.

It could be concluded that during the life of the derivative, the fair value changes of the CDS could lead to increases or decreases on the balance sheet of the bank even if the purpose of the contract was not to offset the position during its life. Furthermore, in the case of a sudden

change of valuation due to an unexpected default, the representation of this instrument in the balance sheet will be confusing as to the nature of the instrument (whether it is an asset or a liability) and its impact on the income statement.

Example 4 – Unexpected default of the underlying asset



6.2.4. EU accounting differences and the problems of country aggregation

Until the move towards IFRS in the EU in 2005, banks disclosed information on their use of derivatives largely on a voluntary basis, so comparison analyses between banks within the EU related to derivatives were almost impossible. Since then, an increased level of transparency for derivatives was to be expected. In this respect, IAS 39 brought most of the derivatives that used to be off-balance sheet (either not disclosed or inappropriately disclosed) onto financial statements (i.e. balance sheets and income statements). Recognising derivative instruments on balance sheets led to grossing-up the balance sheet, had an impact on net earnings and increased the volatility of the income statement.

Nevertheless, there are some divergences between EU Member States with regards to the implementation, application and transposition of the IFRS standards in the national accounting systems[271]. This leads to differences in the accounting treatment of derivatives

[271] Although there is an endorsement process for the IFRS standard at EU level, some differences persist between Member States. The differences between countries can be divided into two main types: (i) the degree to which IFRS has been mandated or allowed for particular companies or types of reporting, and (ii) the degree to which

between Member States that will generate some problems when analysing and comparing derivatives positions in different countries' banking systems. First, currently IFRS standards are only mandatory for the consolidated financial statements of European banks[272] whose securities are traded on a regulated securities market. In addition, in some countries an early voluntary adoption of a particular standard is allowed before its mandatory application date for all banks following its endorsement at EU level.

In most Member States, trading and use of derivatives are concentrated in the hands of rather large banks that prepare consolidated financial statements and report under IFRS. However, this does not mean that other credit institutions are not also active on derivatives markets. Although these credit institutions have a small share of the derivatives outstanding in EU banks' balance-sheets, the unfeasibility of assessing the risk that derivatives pose in their balance sheets in a consistent way across the EU, could represent a major obstacle for analysis and for detecting structural weaknesses[273], primarily for the individual bank in question but also for the whole banking system.

For example, this lack of consistency does not only affect the smaller banks but can also be the case of a US subsidiary bank operating in the UK that is very active on the derivatives market[274]. According to the current accounting standards, this bank has to follow national GAAP, and as a result off-balance sheet disclosure of its derivative exposure may be allowed.

6.2.5. Strategies in derivatives accounting: trading versus hedging

The basic principle in IAS 39 is that all derivatives are recorded on the balance sheet at fair value with any gains and losses resulting from changes in their fair value recorded in the income statement. However, derivatives are commonly used to hedge assets and liabilities that are measured at cost or amortised cost. For example, if a bond is valued at cost (in the held to maturity portfolio), any changes in the value of the bond are not fully reflected in the income statement[275], unlike with the changes in value of the derivative which are immediately registered in the income statement. This creates a mismatch in the timing of gain and loss recognition and calls for a special accounting treatment, namely hedge accounting, to adequately reflect the necessary financial coverage. Hedge accounting aims to avoid much of the volatility that would arise if the derivative gains and losses were reflected in the income statement as required by normal accounting principles. All that is not

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the practice of IFRS differs along national lines (e.g. under the influence of the previous national accounting practices).

[272] The EU IAS Regulation 1606/2002 gives Member States the option to require or permit IFRS as adopted by the EU in separate company financial statements (statutory accounts) and/or in the financial statements of companies whose securities do not trade on a regulated securities market.

[273] In addition to these risks and lack of comparability, for some small entities operating in the EU and not reporting under IFRS we could also be faced with lower quality financial statements.

[274] See also Figure 3 in section 6.3.1. on the weight that derivatives have in the total liabilities of the banking system in different Member States.

[275] As the name of the "*held to maturity*" portfolio suggests, bonds are acquired with the intent to be held until maturity and not sold before.

considered hedge accounting should figure under the held-for-trading portfolio ("speculation-normal accounting").

Trading

In the case of derivatives held for trading purposes, derivatives are part of the held-for-trading portfolio and banks can engage in speculative activities on their clients' behalf or for themselves by taking risk and expecting favourable changes in market factors, which would generate extra profits. Moreover banks serve as the main market makers in many derivatives markets and hold large balanced or unbalanced positions in these derivatives in order to fulfil this role.

However, as the cost of entering into derivative transactions is usually lower than the cost of purchasing or short-selling the underlying asset, derivatives allow banks and other investors, include those who wish to hedge an exposure or portfolio, to benefit from financial leverage. This means the investor can create an exposure to a given risk without having the necessary resources for purchasing the asset to which the risk is originally attached.

For instance, in the case of a derivative, e.g. again with credit default swap, acquired with speculative purposes, the bank seeks to exploit both upward and downward trends in credit risk through direct marketing (selling or buying). When buying credit protection through CDS, a bank bets on an increase in the credit risk that will translate into an increase in the spread. This in turn will lead to an increase in the value of the CDS. When closing the position the bank will make a profit. When selling credit protection through CDS, the expected effect is the opposite.

In these situations the bank basically takes positions in the credit market with the objective of obtaining a return on its investment. The trading derivative is recorded in the held-for-trading portfolio on the balance sheet, and any change in its fair value is directly reflected in the income statement.

Hedging

A hedge is a strategy designed to minimise the unwanted risk of another transaction. A hedging item is an instrument or group of financial instruments that replicate the change in value of the hedged item, which is attributable to the risk hedged against.

Banks holding substantial investments and financing on capital markets are exposed to significant interest rate risk, i.e. they face the risk that the fair values or cash flows of assets or liabilities change in response to interest rate movements.

Additionally, banks with international operations are subject to another major risk, the foreign exchange risk, i.e. the risk that changes in the value of the currencies adversely affect the expected cash flows of the business in foreign currency. Derivatives can be employed to manage these risks, because they can offset the fair values and cash flows that otherwise would have adversely been affected by changes in the interest rate or the exchange rate.

An accounting concept that tries to capture a hedge in the financial statements is called hedge accounting. Hedge accounting distinguishes between three possible types of hedge

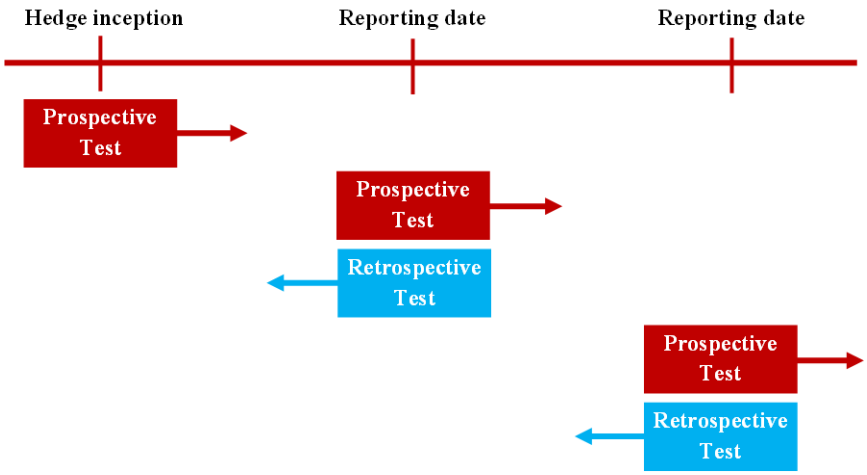
accounting: 1) hedges of changes in the fair value of assets, liabilities or unrecognised firm commitments (fair value hedges); 2) hedges of the variability of future cash flows from highly probable forecast transactions and floating rate assets and liabilities (cash flow hedges); and 3) hedges of the translation adjustments resulting from translating the functional currency financial statements of foreign operations into the presentation currency of the parent (hedges of net investments in foreign operations).[276]

Hedge effectiveness and why hedge accounting does not represent the total hedging role of derivatives within banks' financial statements.

Under IAS 39 Financial Instruments: Recognition and Measurement the entity applying hedge accounting should assess hedge effectiveness both at the inception of the hedge and at future reporting dates. The standard requires two types of effectiveness tests:

- A *prospective* (*forward-looking*) test to see whether the hedging relationship is expected to be highly effective in future periods.
- A *retrospective* (*backward-looking*) test to assess whether the hedging relationship has actually been highly effective in past periods.

Chart 6.2.1. - Graphical representation of the effectiveness test



Source: Analistas Financieros Internacionales (AFI)

Although the standard does not explicitly state how the range of 80 to 125 per cent should be evaluated[277], it seems clear that the correlation between changes of fair values or cash flows of the hedged item and the hedging instrument should stay within the range mentioned.

Both tests need to be highly effective at the start of the hedge and during the whole period hedge accounting is applied. A prospective test is highly effective if, at the inception of the hedge relation and during the period for which the hedge relation is designated, the expected

[276] For more details on the three types of hedges see the annex.
[277] IAS 39 does not establish a method to evaluate the effectiveness of a hedging instrument, except where it recommends the use of a hypothetical derivative in order to register accounting entries.

changes in fair value of cash flows are offset. This means that during the life of the hedge, the change in fair value of the hedged item should be offset by the change in fair value of the hedged instrument. A retrospective test is highly effective if the actual results of the hedge are within the 80% - 125% range.

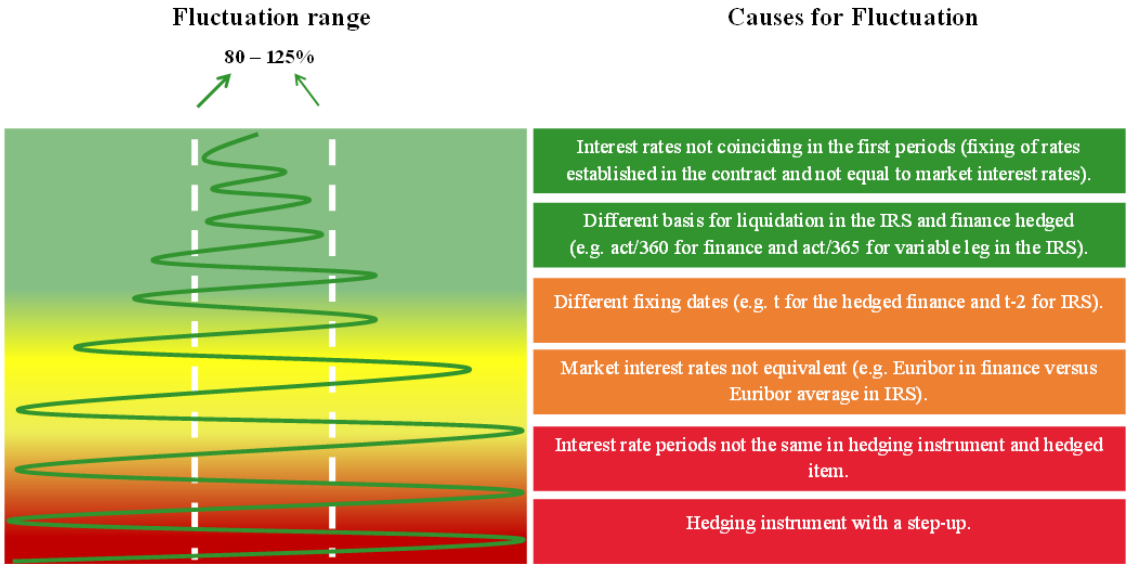
IAS 39 does not specify a single method for assessing the effectiveness of the hedge. The method used depends on the risk management strategy. The most common methods are:

- *Critical terms comparison* - this method consists of comparing the critical terms (notional, term, timing, currency, and rate) of the hedging instrument with those from the hedged item[278]. This method does not require any calculation.

- *Dollar offset method* - this is a quantitative method that consists of comparing the change in fair value between the hedging instrument and the hedged item. Depending on the entity's risk policies, this method can be performed on a cumulative basis (from inception) or on a period-by-period basis (between two specific dates). A hedge is considered highly effective if the results are within the 80% - 125% range.

- *Regression analysis* - this statistical method investigates the strength of the statistical relationship between the hedged item and the hedge instrument. From an accounting perspective this method proves whether or not the relationship is sufficiently effective to qualify for hedge accounting. It does not calculate the degree of ineffectiveness.

Chart 6.2.2. – Fluctuation range and causes for fluctuation: example with an Interest Rate Swap (IRS)



Source: Analistas Financieros Internacionales (AFI)

In addition, before the inception of the hedge, the company has to document the hedging relationship between the hedged item and the hedging instrument.

[278] However, for hedge accounting this does not suffice. Retrospective effectiveness testing is required as well. For more details see IAS 39 IG.F.4.7.

Taking into account the fact that in many circumstances the hedge becomes ineffective anyway and given the burden of the effectiveness test, for many banks it might be less expensive and more efficient not to use the hedge accounting criteria but “normal” derivative accounting (i.e. accounting derivatives as held-for-trading with all the changes in value recognised in the income statement) to hedge their different risk exposures[279]. This is empirically tested in section 6.3 to investigate the weight of hedge accounting over all derivatives.

6.2.6. Netting, offsetting, set-off and the collateral management

Exchange traded derivatives such as futures and options were traded in organised markets before the crisis. These markets have basic rules governing their organisation and functioning, with regards to the investors that can intervene, the general conditions of each negotiated contract, rights and obligations of the parties, the technical aspects of trading, pre-trade and post-trade transparency, clearing and settlement, etc.

In 2009, the G20 set up a roadmap to address the systemic risks and opacity of OTC derivatives and thereby provided a regulatory push for OTC transactions to be traded on exchanges rather than negotiated bilaterally. In the EU, EMIR and the updated Markets in Financial Instruments Directive (MiFID II) requiring that all trades in derivatives be reported to trade repositories, that standardised OTC derivatives be centrally cleared, and that cleared OTC derivatives that are "sufficiently liquid" be traded on trading venues providing for multilateral interaction.

However, many derivatives contracts are still traded on markets that are not organised (OTC markets) and therefore have no specific rules. Generally, the fundamental characteristics of OTC derivatives are that they feature contract terms that better meet the specific needs of the parties to the contract. Thus, the price is the result of the agreement between the parties; there is a direct relationship between the buyer and the seller; the guarantees are laid down in the negotiation, and the risks are fully borne by the parties to the contract.

Before the ongoing set of legislation, many associations and bodies[280] established international standards for OTC derivatives contracts to reduce uncertainty in the trading of OTC derivatives. The ultimate goal was to develop standard agreements leading to a comprehensive self-regulatory framework capable of solving potential disagreements between contracting parties to these OTC derivative contracts. This type of agreement is applied to trades in OTC derivatives markets, providing solutions to any legal lacunae.

The International Swaps and Derivatives Association (ISDA), stands out for having succeeded in establishing an international framework for OTC derivatives contracts through its ISDA Master Agreement,. This agreement covers the fundamental principles governing trades in OTC derivatives markets and establishes the terms and conditions of the derivatives transactions, both with other financial institutions and with end-users.

[279] In addition, hedge accounting is voluntary and not obligatory under IFRS.
[280] For example, the British Bankers Association (BBA) in UK, the Spanish Banking Association (AEB) in Spain, Deutscher Rahmenvertrag für Finanztermingeschäfte in Germany.

One of the main elements of the ISDA Master Agreement refers to the terms of netting, offsetting and set-off, which are often used to express the same notion, while being very different concepts. A better understanding of the terminology and the way in which derivatives are settled provides some insight as to why accounting standard setters have agreed to report derivatives either on a net or gross basis on the balance sheet.

A right to **set off** is a legal right[281]. It is the right that one party has against another party to use its assets (amount owed to it by the creditor or another party) in full or partial payment (or satisfaction) of what it owes the creditor.

The ISDA Master Netting Agreement creates a single contract between the two parties under which all transactions can offset each other. Therefore, each day, the ISDA master netting agreement allows for (i) the aggregation of all trades, and (ii) their replacement with a single net amount.

Netting is, therefore, the termination or cancellation of reciprocal obligations, the valuation of terminated obligations and their replacement by a single payment obligation. During the normal business of a solvent firm, netting takes the form of settlement netting (or payment netting) which involves combining offsetting cash flow obligations between two parties into a single net payable or net receivable. In the event of default or other termination of transactions outside the normal course of business, netting takes the form of close-out netting, which implies that all transactions with a given party should be netted down to a single amount.

Despite close-out netting, there may still be some sort of asymmetry between derivatives payable and receivable. When market participants are in distress, counterparties will tend to try to terminate contracts that are in their favour and leave the other contracts open. This means that when there is serious market stress, or when there is a significant fall in the creditworthiness of a single party, derivatives payable may underestimate the actual amount of risk.

Furthermore, close-out netting may incur general systemic risk and cause uncertainty within the financial markets. Close-out netting impedes contagion through derivatives, but interacts with the seniority of other debtors in the event of a bank default. Consequently, if a bank is perceived to be near default, there is an incentive to trade with this institution via derivatives, rather than providing any kind of funding. This may increase the cost of funding dramatically and drive the institution towards insolvency.

Finally, **offsetting** is a concept used for accounting and reporting purposes only. It refers to the net presentation of financial assets and financial liabilities on the financial statement as a result of an entity's right to set off. When the right to set off is enforceable in a jurisdiction, the derivatives trading partners under a master netting agreement have either a net asset or a net liability, but not both.

[281] Because the right of set-off is a legal right, the conditions supporting the right may vary from one legal jurisdiction to another.

The different requirements that exist as regards offsetting mean that there are significant differences between amounts presented in statements of financial position (i.e. balance sheets) prepared in accordance with IFRS and those prepared in accordance with US GAAP, particularly for entities that are very active in derivatives. The key differences between US GAAP and IFRS lie in the exceptions to the general criteria that US GAAP grants. They allow companies with derivatives under a single master netting agreement with the same counterparty the possibility to report assets and liabilities (including cash collateral) on a net basis, even if they do not intend to settle the cash flows on a net basis. Unlike the US standards, there are no such exceptions in IFRS, which leads to a grossing-up of the balance sheet for companies preparing financial statements under IFRS.

Table 6.2.1 shows that reporting under IFRS, Deutsche Bank's total assets in 2009 amounted to USD 2,146 billion, of which 40 per cent (or USD 863 billion) were derivatives. In contrast, reporting under US GAAP, J.P. Morgan's total assets amounted to USD 2,032 billion, of which only 4 percent (or USD 80 billion) were derivatives. Furthermore, had J.P. Morgan been required to report under IFRS, they would have reported USD 1,485 billion of additional assets.[282]

Table 6.2.1. - Reported gross assets and the effect of offsetting derivative contracts for selected banks in 2009

US$ billion	Potential Impact of Grossing Up	Reported Derivatives	Other Assets	Total Assets
BNP Paribas (IFRS)		527	2,415	2,942
RBS (IFRS)		711	2,021	2,732
HSBC (IFRS)		251	2,114	2,365
Barclays (IFRS)		671	1,549	2,220
DB (IFRS)		863	1,283	2,146
JP Morgan (U.S. GAAP)	1,485	80	1,952	2,032
Citi (U.S. GAAP)	600	67	1,789	1,856
BoA (U.S. GAAP)	1,414	81	2,143	2,224

Source: ISDA (2012)

Collateral posting (e.g. margin calls) is a transitory transaction meant to reduce the risk exposure of derivative contracts. In order to illustrate how margin calls work and what implication they have for banks' valuations, we take the example of Bank A that has bought from Bank B with a credit default swap (CDS). At inception (t_0), the value of the CDS is zero, but suppose in the next period (t_1) the spread widens and the value of the CDS increases. This translates into a positive fair value for Bank A's position and an increase in the corresponding asset on the balance sheet. At the same time, under the framework of the

[282] Analysis by S&P Global Credit Portal (2011) ("Accounting proposal struggles to create global convergences in balance sheet offsetting", 21 September 2011), suggests that total assets for a sample of US banks would increase by about 70% if companies would not be allowed to offsetting derivatives subject to master netting agreements required on the balance sheet. Similarly, for a sample of European banks, total assets would decrease by about 23% if they would apply U.S. GAAP and opt to net eligible derivative assets and derivative liabilities.

ISDA Master Netting Agreement[283], Bank A sends a margin call request to Bank B equivalent to the exposure. For Bank A, the counterparty risk can be measured by the net derivatives receivable minus any collateral received. The funds received as collateral from Bank B reduce the risk exposure and are recorded on the balance sheet of Bank A as a "deposit by credit institutions". This creates a double accounting record on the assets side of the balance sheet. Bank A records an increase in the value of assets due to the positive fair value of the CDS[284] but also records an increase in the cash account for the collateral received[285]. One could think that this leads to double counting, but in fact, from an accounting point of view, it represents the real position of the bank that reflects its risk exposure, as the bank does not have the enforceable right of set-off and does not intent to set off these exposures. However, from an economic point of view, we see a grossing-up of the balance sheet. In addition, the collateral posted by Bank B served as a cheap financing source (at a low cost, e.g. EONIA) for Bank A. The lack of comprehensive information about collateral related to CDSs, and more generally to derivatives, seriously limits our ability to analyse derivatives in the annual accounts of banks and impedes supervisors' ability to effectively monitor this risk.

6.3. EMPIRICAL CHARACTERISATION OF THE PRESENCE OF DERIVATIVES IN BANKS' FINANCIAL REPORTING

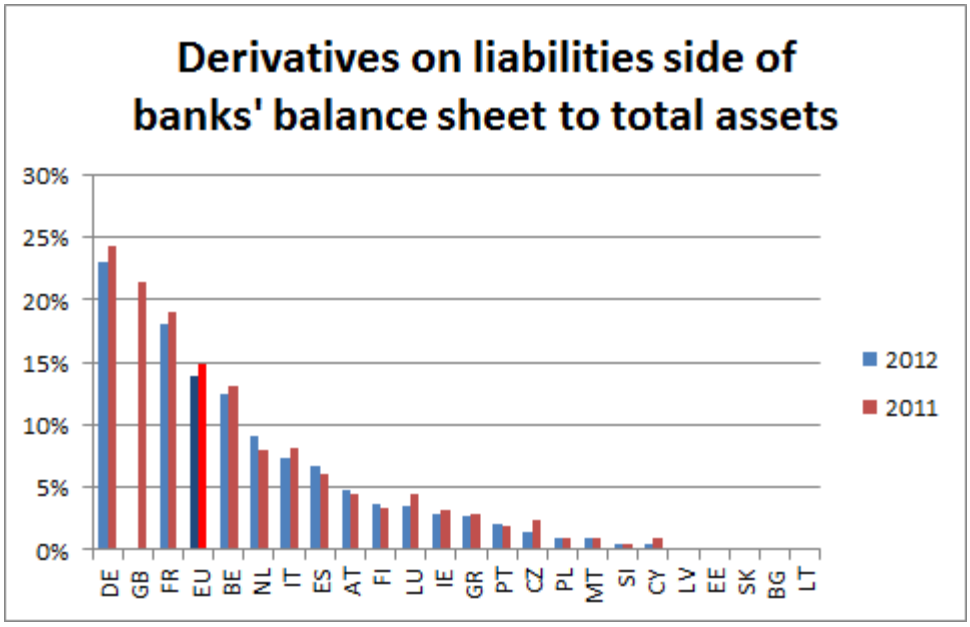
6.3.1. Differences of banking systems in the Member States

EU Member States' banking systems differ widely with regard to reliance on derivatives, and thus there is a similar degree of variance in how much the accounting issues mentioned above affect their balance sheets. The figures[286] on the weight that derivatives have in the total liabilities of banking system are taken as a proxy of the derivatives present in the balance sheet of the banking system due to the mirror correlation with the asset side of the balance sheet as shown in the next section.

Among the EU Member States, only banking systems in three Member States (Germany, UK and France) had an above-EU average share of derivatives in total liabilities, i.e. 14% in 2012. The rest remained below the average (see Chart 6.3.1). Furthermore, for 16 countries the presence of derivatives in their balance sheet is minimal (below 2.5%), and for other three the weight is almost half of the EU average. Derivatives represent almost a quarter of the total balance sheets of the German and UK banking systems. That could be the consequence of the steep increase in their reliance on derivatives between the beginning of the crisis in 2007 and 2012.

[283] Typically an entity first enters into an ISDA Master Netting Agreement with a bank or a dealer prior to transacting derivative instruments. The entity may sign an ISDA Credit Support Annex (CSA) that provides for the posting of collateral to cover all or portion of the net market value of the position to limit the exposure.
[284] We also record the "*unrealised gain*" in the income statement.
[285] We also record the increase in the liabilities side, presented as *"deposits by credit institutions"*.
[286] Consolidated Banking Data from the ECB SDW (Statistical Data Warehouse).

Chart 6.3.1. - Share of Derivatives in total liabilities by Member State



Source: ECB SDW

This huge disparity might be due to the bank business models predominant in each country, and whether one of the nine large EU wholesale banks is present in a particular Member State. Nevertheless, as mentioned in section 6.2.4, it is very difficult to compare the aggregation of derivatives on a country by country basis due to different applicable accounting rules (EU banks might use different financial reporting frameworks that account for derivatives in a different way) and any such aggregation should therefore be interpreted with caution.

6.3.2. Differences in banks' business models

Differences in business models across the EU banking sector seem to be the key variable to explain the disparities in derivatives' role in individual banks' balance-sheet and in banking systems per Member State.

In the context of the BRRD, a sample of 44 EU banks separated into four clusters based on their key characteristics was compiled. The sample was divided in two different ways. First, a separation was made based on size: one cluster contained 25 large banks[287], another cluster was made up of 19 medium-sized banks[288]. Second, the large banks were divided into two clusters linked to the different sources of funding: nine large "wholesale" banks where the main source of funding did not come from deposits[289]; and 16 large "retail" banks where the

[287] Those that have more than EUR 300 billion of total assets on their balance sheets.
[288] Those that have between EUR 80 and 300 billion of total assets on their balance sheets.
[289] Those whose ratio of non-deposit liabilities over total liabilities is higher than 30%.

main source of funding was deposits[290]. Finally, an average bank was constructed out of the totality of the sample.

This type of cluster analysis helps to uncover structural funding differences between different types of banks. When expanding the methodology to the asset side of the balance sheets of the sampled banks with a special focus on derivatives there are several findings:

- The weight of derivatives on the asset side mirrors that on the liability side in all clusters.
- The share of derivatives on the assets and liabilities present large dispersion between business model.
- There is a positive correlation between the presence of derivatives in the balance sheet of a bank and its size: medium-sized banks' reliance on derivatives is around 7% of total assets while large banks' reliance is more than 17% on average.
- Within large banks, as expected, large wholesale banks have more than a quarter of their balance sheets in the form of derivatives (around 27%), while retail-oriented banks obtain their funding from customer deposits and on average the weight of derivatives as a share of their total balance sheets is around 8%.
- Medium-sized banks and large “retail” banks have nearly the same derivative dependence in their balance sheets.

Chart 6.3.2. - Share of Derivatives on the assets and liabilities by business model

Source: EC calculations with data retrieved from SNL Financial, Bloomberg, Dealogic DCM Analytics and S&P Ratings Direct on the Global Credit Portal

In short, derivatives trading and accounting is very concentrated in a small number of banks in the EU. Those banks that have more than 25% of their balance sheets linked to derivatives

[290] Those whose ratio of customer deposits over total liabilities is higher than 30%.

are mostly big dealers in the OTC derivatives market and are only present in four Member States (Finland, the UK, France and Germany).

6.3.3. Case study: analysis of a representative bank

In this section, we analyse derivatives reporting in the financial accounts of an average wholesale bank operating in the EU (hereafter *example Bank*[291]). The aim of this empirical analysis is to allow the reader to put into perspective the theory stated in section 6.2.

The scope of our example Bank's operations includes typical banking activities in the retail and commercial areas (deposit products, credit products) and it is active in financial markets, including both trading activities (for risk management, liquidity maintenance and speculation) and sales activities (currency dealing in spot, forward and options), intermediation in the fixed-income market (mainly bonds and bills), interest rate derivative sales and compound investment products (commodity and equity options).

Balance sheet representation

This section highlights some of the issues relevant to the accounting and valuation of derivatives on a bank's balance sheet.

Table 6.3.1. – Balance Sheet: share of derivatives on assets and liabilities: trading versus hedge and swaps versus options

	Assets			Liabilities		
	2012	2011	Δ%	2012	2011	Δ%
Total Trading Derivatives	97%	99%	-32%	99%	100%	-32%
1. Swaps	87%	92%	-35%	88%	92%	-35%
3. Options	11%	7%	6%	11%	8%	0%
Total Hedging Derivatives	3%	1%	21%	1%	0%	60%
1. Swaps	3%	1%	21%	1%	0%	60%
2. Options	0%	0%	0%	0%	0%	-100%
Total Derivatives / Total Assets	18%	24%		17%	23%	

Source: Example Bank IFRS financial statements and EC calculations

In relative terms, the bank's derivatives account for 18% of its assets and 17% of its liabilities for the year 2012. This is a steep fall from the 2011 figures (down from 24% and 23% respectively). This dramatic fall is particularly acute in non-hedging swaps.

From an accounting point of view, our example Bank's derivatives trading versus hedging has been considerably asymmetric. In 2012, compared with the value of derivatives used for trading purpose (97%), the value of derivatives held for hedging is negligible (3%). Nevertheless, in 2011 the split between trading and hedging was 99% versus 1%, thus hedge

[291] We have randomly selected an example Bank given its increased disclosure detail for derivatives in the reported financial statements and due to its not too large size.

derivatives increase by 400% in just one year. In any case the small amount of hedge derivatives over the total might be due to the fact that, as stated in section 6.2.5, it is not straightforward to design a derivative in a hedge accounting relationship.

Nevertheless is important to highlight that the trading derivatives held by banks with the purpose of economic hedges are not the same as those classified as accounting hedges[292]. This could be for several reasons:

1. Derivatives do not meet the accounting requirements for effective hedges.
2. Derivatives are deliberately classified as held-for-trading to cover the exposure to assets or liabilities held in the same portfolio.
3. The hedge effective tests are too expensive.

For these reasons, theoretically, part of the trading derivatives disclosed in the financial statements, and in particular swaps, are assumed to be used as economic hedges. But financial reporting does not provide any information on those thus making it impossible for an analyst to test the theory[293].

The above table also shows increased volatility from one year to the next in the fair value of swaps, futures and forwards, and less in the case of options. Therefore, options seem to be more stable from an accounting point of view[294]. Nevertheless, volatility in valuation could have a big impact on the size of the balance sheet, leading to some confusion by investors. The year-on-year changes in swaps might be an intrinsic feature of the selected bank due to the deleveraging process in the EU, but nothing is explained about that in the bank's financial reporting.

Finally, the Bank discloses the type of derivative it trades. This type of information is not mandatory and therefore is typically provided only by large wholesale banks. Interest rate swaps account for three quarters of total derivatives, followed by foreign exchange derivatives and credit derivatives with around 10% and 5% respectively. Commodity derivatives, equity derivatives and other derivatives are less important in Bank's balance sheet. The decrease of derivatives between 2011 and 2012 as stated above is very noteworthy, both on the assets and liability side. Volatility is higher for credit derivatives and lower for interest rate swaps, but it cannot be concluded that our example Bank is losing or

[292] For example, the case of a bank's exposure to a corporate bond or loan in a foreign country. In order to hedge the risk of that exposure, and in the absence of an appropriate hedge instrument, e.g. a CDS, the bank decides to hedge its risk (partially or entirely) by purchasing a CDS written on a correlated sovereign from a neighbourhood country which is liquid enough and not on the specific corporate. In this example, the coverage cannot be considered as an accounting hedge but it serves as an economic hedge of the risk. By including both instruments in the same portfolio, the bank manages to have a symmetrical accounting treatment of the changes in fair value of the hedged item and hedging instrument, which in turn are compensated in the income statement.

[293] It is expected that the new proposed disclosure requirements related to hedge accounting envisaged by the IASB in developing IFRS 9 – Financial Instruments will better explain the accounting treatment of derivatives and its link to the overall risk management strategy.

[294] Stability could also be driven by the fact that options do not shift from assets to liabilities and vice versa.

gaining on its different derivative contracts. The structure of this type of liabilities is common to all large wholesale banks.

Table 6.3.2. - Balance Sheet: share of derivatives on assets and liabilities by type of derivative

	Assets			Liabilities		
	2012	2011	Δ%	2012	2011	Δ%
Total Derivatives	100%	100%		100%	100%	
1. Interest rate swaps	81%	74%	-29%	79%	73%	-30%
2. Credit derivatives	4%	8%	-70%	4%	8%	-69%
3. Equity derivatives	3%	3%	-45%	3%	4%	-42%
4. Foreign Exchange Derivatives	11%	12%	-39%	12%	12%	-35%
5. Commodity Derivatives	1%	2%	-58%	1%	2%	-55%
6. Other Derivatives	1%	1%	-48%	1%	1%	-43%

Source: Sample banks' financial statements and EC calculations

Income statement representation

The purpose of the income statement is to show to managers and investors whether the company was profitable or lost money during the period being reported.

Therefore, with regard to all financial instruments measured at fair value, any realised gains and losses, including interest income and interest expenses, are recognised as “net gain or loss from items at fair value” in the income statement.

As previously discussed, most Banks’ derivatives are held for the purpose of trading and less for hedging. Changes in the fair value of trading derivatives are also classified as “Net gain or loss from items at fair value” together with the changes in the fair value of the hedging item and hedging instrument in the case of fair value hedges and the ineffective portion of cash flow hedges and net investment hedges. At the same time, it should be mentioned that this account also records, apart from derivatives, changes in the fair value of all securities held for trading or held at fair value through profit or loss.

For the Bank, "net result from items at fair value" represents more than 40% of that bank's total operating profit in 2012. However, given the low disclosure detail in the bank's income statement with respect to the share of operating income attributable to derivatives, we cannot see the impact of these instruments on its net profit.

The value of gains or losses that was "recycled"[295] from equity and recognised in the income statement amounts to less than 10% of the total operating profit for 2012. However, gains and losses recorded in equity resulting from a change in the fair values of the hedging instrument amounted to less than 2% of the bank's total equity for 2012.

[295] For both cash-flow hedges and hedges of net investments in foreign operations, gains and losses are initially recognised in equity but are subsequently recognised in earnings when the gain or loss becomes realised (a process referred to as "recycling").

6.4. CONCLUSIONS

Derivatives are a major challenge for accounting standard setters and market analysts. First they are accounted at fair value. However, contrary to other financial instruments that are measured at fair value, derivative contracts are accounted as assets and liabilities irrespective of whether you are the seller or the buyer of the instrument. Instead, their accounting record is related to the fair value situation at each valuation point until maturity, and thus derivatives can easily switch from the asset side to the liability side in each period (e.g. derivatives can shift from a right to receive to an obligation to pay).

As most derivative financial instruments do not trade in an active market, how derivatives are valued and how they are reflected in banks' balance sheets relies mostly on internal models. Whenever models are used in lieu of observable prices, there is potential for management to introduce bias into the valuation process through the use of judgment. Managers' discretion in selecting the inputs to determine fair values creates significant differences in the valuation of financial instruments. This puts in doubt the valuation models for derivatives used by the banking sector and can create suspicions regarding the real financial position of an entity. The external verification of both the internal models used by banks and the inputs used (data and parameters) is virtually impossible for auditors, analysts, investors or (to a lesser extent) supervisors. Information disclosed by entities is insufficient. However, it is difficult to find a solution, given the thousands of contracts that are present in banks' balance sheets and their ever-changing character.

In addition, the fact that banks in the EU are not all obliged to adopt IFRS means that there are wide variations in how derivatives are disclosed in financial statements. This may make aggregated figures for countries, banking systems or for the EU as a whole misleading for analysts, contributing to this lack of consistency.

There is abundant research on definitions of derivatives accounting and guidance on how to account for hedging derivatives. Nevertheless, some basic questions regarding the meaning of derivatives in banks' reporting have not been answered. The empirical part of this chapter showed that, although there is a great focus on hedge accounting in accounting standards and the current accounting debate, this represents only a small portion of the total share of derivatives.

Netting, offsetting and collateral management contribute to mitigating the risks for OTC derivatives but also to grossing-up the balance sheet. This is particularly true when IFRS vs. US GAAP financial statements are compared, with US GAAP allowing companies to report derivatives (assets and liabilities, including cash collateral) on a net basis.

This chapter tried to shed some light on the complex dynamics of accounting for derivatives in banks' financial statements.

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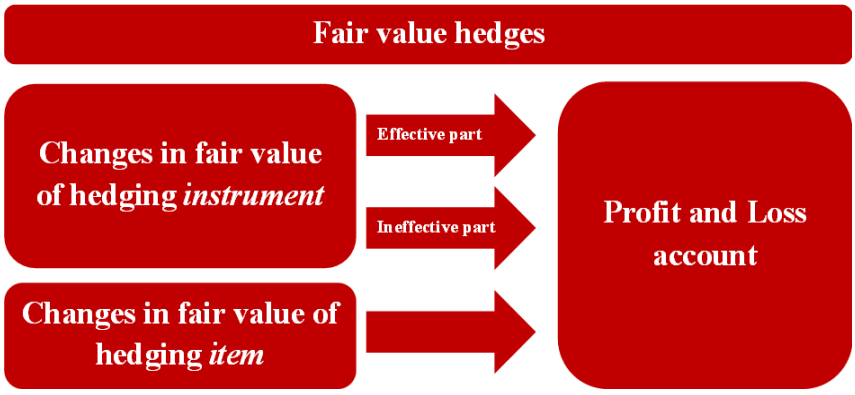
6.5 ANNEX: TYPE OF HEDGE ACCOUNTING

6.5.1. Fair-Value Hedge

A fair-value hedge is a hedge of the fair value of an asset, liability, or firm commitment. The goal of fair value hedge accounting is to offset the risk of changes in the fair value of an existing asset, liability or a firm commitment, which may increase the volatility of the entity's profit or loss. The fair value changes of the hedged item and the hedging instrument will offset and result in zero net impact on the profit or loss.

In a fair-value hedge, the changes in the fair value of the hedged asset, liability or firm commitment are recognised in the consolidated income statement along with changes in the entire fair value of the hedging instrument (the derivative).

Chart 6.5.1 – Fair-value hedge



Source: Analistas Financieros Internacionales (AFI)

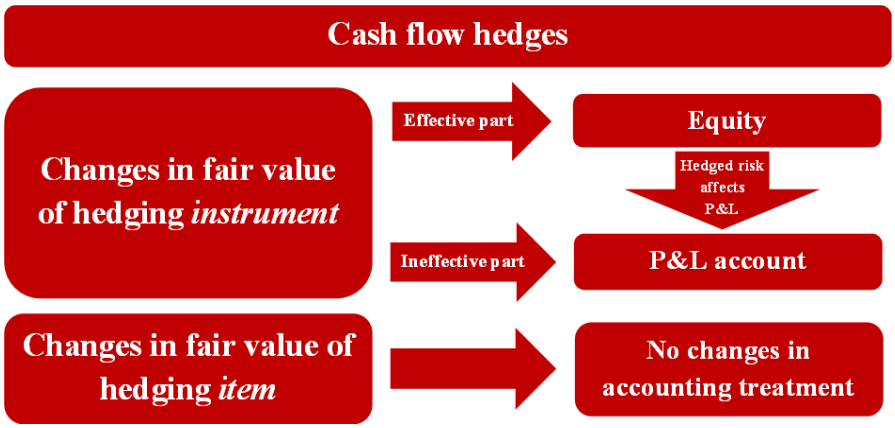
6.5.2. Cash-flow hedge

A cash-flow hedge is a hedge of future cash flows or of a forecasted transaction. The goal in a cash flow hedge is that the stream of cash flows from the hedged item is offset by an opposite stream of cash flows generated by the hedging instrument.

In a cash-flow hedge, the derivative is carried at fair value with changes in value reported initially in other comprehensive income to the extent the hedge is effective. Such gains or losses remain in other comprehensive income until the forecasted transaction or cash flow affects earnings. At that point, some or all of the deferred gains or losses are recognised in

the consolidated statement of income. The ineffective portion of the gain or loss on the hedging instrument is recognised in profit or loss.

Chart 6.5.2 – Cash-flow hedge

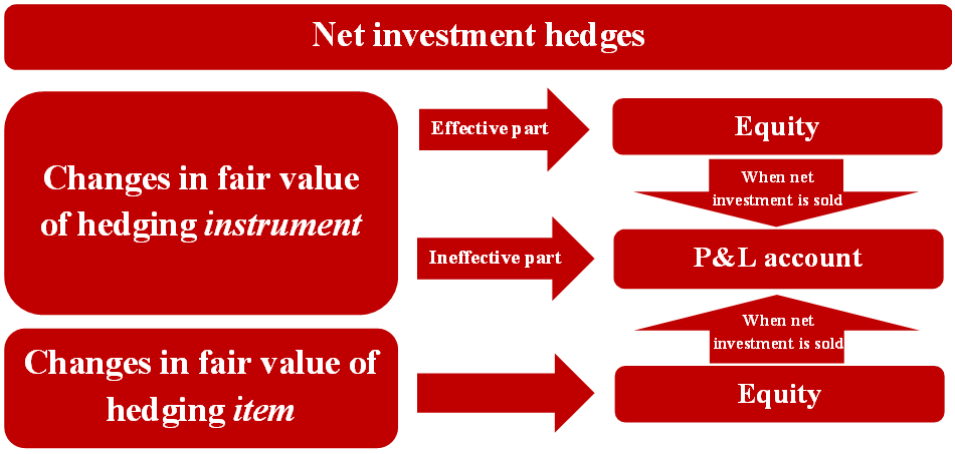


Source: Analistas Financieros Internacionales (AFI)

6.5.3. Hedges of net investments in foreign operations

For hedges of the translation adjustments resulting from translating the functional currency financial statements of foreign operations (hedges of net investments in foreign operations) into the functional currency of the parent, the portion of the change in fair value of the derivative due to changes in the spot foreign exchange rates is recorded as a foreign currency translation adjustment in other comprehensive income to the extent that the hedge is effective; the remainder is recorded as other income in the consolidated statement of income. Changes in the fair value of the hedging instrument relating to the effective portion of the hedge are subsequently recognised in profit or loss on disposal of the foreign operations.

Chart 6.5.3 – Net investment hedge



Source: Analistas Financieros Internacionales (AFI)

CHAPTER 7: FINANCIAL INTEGRATION VERSUS FRAGMENTATION: SOME MEASUREMENT ISSUES BEYOND BANK FUNDING AND DEBT MARKETS

7.1 INTRODUCTION AND MOTIVATION OF THE CHAPTER

Measurement issues always played a central role in the area of financial integration and the creation of a Single Market for financial services (SMFS).[296] More than in other more standardized and regulated areas of the Single Market, the assessment of the economic benefits that could be achieved by creating a SMFS partly depended on what could be measured at a particular stage during the process.

The financial crisis has shown that some previously accepted concepts of measurement needed to be questioned, while others were found to be robust and to be continued. The ECB reviewed its set of indicators[297] for monitoring financial integration in 2012.[298] Data availability has improved. The market value of high quality economic data has increased and commercial data providers have made considerable investments in terms of IT infrastructure, but also in terms of methodology, e.g., how to compile data, make data comparable across countries, legal and accounting frameworks, etc. On the side of official statistics, efforts were concentrated on improving statistics and indicators in the area of financial stability where the ESFS, the ESRB and the ECB assumed new or enhanced mandates which created an urgent need for robust data.[299]

Finally, the economic and financial literature, and especially so since the onset of the financial crisis, has proposed new concepts for measuring financial integration. Overall, improved data availability and more robust theoretical concepts should benefit the capacity to assess the degree of completion of the SMFS. It therefore seemed timely to reflect on some of the concepts used in the Commission's annual monitoring report, and the present special feature is one input to such a reflection.[300] In doing so, the present chapter follows the set of indicators proposed by Adam et al. (2002) and European Commission (2003). This set of indicators was not only largely followed in the annual Commission reports, but it also strongly overlaps with the indicator framework developed in parallel at the ECB.

The remainder of this chapter is organized as follows. Section 7.2 briefly recalls the history and mandate of the financial integration monitoring tool of the Commission. Section 7.3 contains a brief discussion of a subset[301] of the 20 indicators for monitoring financial integration developments recommended by Adam et al. (2002) and retained in European Commission (2003) and the following annual Commission reports. The following three sections discuss some of these indicators in more detail. Section 7.4 presents an assessment of the indicators related to price discovery. Section 7.5 revisits the indicators for the capacity of financially integrated economic areas to insure against shocks to consumption of private

[296] See European Commission (1983).
[297] The first set was described in Baele et al (2004).
[298] See the Statistical Annex in ECB (2013c).
[299] See Israël et al (2013) for an overview.
[300] The same can be said about the other special focus chapters contained in this report.
[301] The discussion of indicators based on optimal portfolio theory is deferred to a later stage.

households and the capacity of the internal market to reallocate savings to their best alternative uses across borders (capital mobility regressions). Section 7.6 discusses corporate decisions on their funding structure and possible implications for indicators to better capture differences in access to finance and discusses some possible links to financial stability issues. Section 7.7 concludes in proposing, based on the discussions in the preceding sections, four additional indicators as part of a reframed set of indicators for monitoring financial integration.

7.2 THE COMMISSION IS TASKED WITH MONITORING THE EVOLUTION OF FINANCIAL INTEGRATION IN THE SINGLE MARKET

In 1988, a study by the Commission[302] used price data collected by a private consultancy[303] to gauge the scope for welfare gains from the future SMFS. The Commission calculations using the macroeconomic model of the OECD at the time simulated a drop in costs for banking and insurance services by half compared to the situation prevailing in the mid-1980s.[304] A decade later during so-called Monti review of the Single Market, the availability of data and indicators had clearly improved. While the estimated welfare gains had not been realized in full, the 1996/7 review had a more comprehensive approach towards measuring the efficient provision of financial services. It included detailed industry surveys, various econometric studies estimating the degree of competition in the financial services industry, and several detailed case studies. Following the European Council in Cardiff in June 1998, the Financial Services Action Plan (FSAP) was the next phase in the creation of the SMFS, and its implementation was monitored continuously.

Finally, in July 2000, the Council tasked the Commission to develop a new framework to monitor financial integration in the Single Market. The Commission ordered four external studies to assess the present degree of financial integration along several dimensions.[305] One of the studies by Adam et al. (2002) was explicitly dedicated to the question which sort of indicators could and should be used to measure correctly financial integration going forward in order to identify those areas where policy action would be required to achieve an appropriate level of integration in line with the completion of the Single Market.

Taking into account the recommendations of the mentioned studies,[306] the Commission working document in 2003 identified in a comprehensive manner suitable indicators for financial integration and established the monitoring framework for a decade of annual reports compiled by the Commission starting in 2004. Hence, last year's EFSIR completed a decade of reporting along these lines.

[302] European Commission (1988).
[303] Price Waterhouse.
[304] See European Commission (2003).
[305] See references in European Commission (2003).
[306] The study by Adam, et al. in 2002 shows how our appreciation of the degree of financial integration, or fragmentation for that matter, today is conditioned by measurement issues and the availability of appropriate indicators.

7.3 A SET OF 20 INDICATORS TO MONITOR FINANCIAL INTEGRATION

Adam et al. (2002) had recommended a set of 20 indicators for assessing the degree of financial integration in the Single Market as shown in table 7.3.1. This chapter discusses in turn some[307] of these indicators against the background of three intended outcomes of an integrated financial market. These favourable outcomes as compared to less integrated financial and economic area are:

A. a more effective and economical price discovery (cost efficiency)

B. improved risk sharing opportunities (shock absorption)

C. an improved access to finance (allocation efficiency).

The role of this chapter is to start a discussion how to develop the set of indicators taking into account a number of measurement issues that emerged during the crisis, but also taking into account improved data availability.

Table 7.3.1: Set of recommended indicators of financial market integration in Adam et al. (2002)

<table>
<tr><th>The indicator measures the effect of financial integration on:</th><th>Price-based indicators</th><th>Quantity-based indicators</th></tr>
<tr><td rowspan="3">A. Credit and bond markets</td><td rowspan="2">Interest rate differentials in the money market (1), bond market (2), mortgage market (3), and corporate loan market (4)</td><td>Importance of foreign banks: asset shares (6) and number (7)</td></tr>
<tr><td>Foreign assets (8) and liabilities (9) held by domestic banking sector</td></tr>
<tr><td>Cross-border banking fees (5)</td><td>International Diversification of Bond (10) and Money Market (11) Funds</td></tr>
<tr><td>B. Stock Markets</td><td>Correlation of national stock market returns (12)</td><td>International Diversification of Equity Funds (13), Pension Funds (14), and Insurance Companies (15)</td></tr>
<tr><td rowspan="2">C.1 Household decisions</td><td colspan="2">Saving-investment correlations (16)</td></tr>
<tr><td colspan="2">Consumption correlation across countries (17)</td></tr>
<tr><td>C.2 Corporate decisions</td><td colspan="2">Cross-border M&A activity (18)</td></tr>
<tr><td>D. Legal Institutions</td><td colspan="2">Dispute Resolution Index (19), Dispute Duration Index (20)</td></tr>
</table>

Source: Adam et al. (2002), table 4.1

Ad A.: Price discovery cannot simply be taken for granted. Interest rates and economic returns have more structure than previously assumed, competition issues have to be looked at

[307] Indicators (11), (12), (13), (14), (15), (18), (19), and (20) are not discussed in this chapter; indicators (6), (7), (8), (9), and (15) are discussed also in sections 1.4 and 1.5 of this report; indicators (10), (11), (13), and (14) provide alternative measures of assessing the degree of diversification of financial risk and are discussed also in chapter 3 on shadow banking and chapter 5 on commodity derivatives markets.

more seriously (beyond the question of state aid), and the quality of benchmarks that play a crucial role in (the human choices in markets which bring about) price discovery needs to be safeguarded as benchmarks can be more or less efficient, and in the worst case become the object of manipulation and fraud. ***A more integrated financial market is the market with a more (cost) efficient technology of price discovery.***

Ad B.: Risk sharing, insurance against idiosyncratic shocks to (total) consumption (and hence welfare) is a central advantage of a more integrated financial market. As Shiller (1993) pointed out, many (and as Shiller noted some of the largest) individual risks remain uninsured. Plus, as will be seen in the next section, the degree of risk sharing varies over time, and not necessarily in the direction of higher risk sharing.

Ad C.: The provision of an improved and less discriminatory access to finance *throughout* the EU has emerged from the crisis as a major desirable feature that one should expect the integrated financial market to deliver to a higher degree than a segmented conglomerate of national markets. However, measurement issues abound since supply and demand effects are difficult to disentangle. In any case, few still assume a pure version of the efficient market hypothesis to hold in the sense that every investment with an expected rate of return exceeding the risk-free rate will find its appropriate financing.

7.4 INDICATORS FOR PRICE DISCOVERY

7.4.1. Integration of money markets (1)

In 2002, Adam et al. found that convergence had been achieved in the market for 3-month (unsecured) interbank loans by January 1999 for the euro area and by September 2001 for the EU as a whole. In terms of indicators, the ECB is computing a dispersion index based on its panel of EONIA reporting banks.[308]

7.4.2. Integration of markets for sovereign bonds (2)

In 2002, Adam et al. found that convergence had been almost achieved in the market for sovereign bonds (10-year government bond benchmark yields), with the largest part of the reduction in interest-rate differentials having been achieved by 1997.

Discussion of the use of indicators (1) and (2):

These historical episodes of *measured* full convergence pose many difficult questions today. The *measured* full convergence was at least partly driven by perceptions of market participants which included the view that betting on divergence would not return any profit. Indicators (1) and (2) were among those having seen the most dramatic shifts since 2007. Their recent development is reported in sections 1.2 (sovereign bonds) and 1.4 (interbank loans) of this EFSIR. There is no straightforward approach how to correct for the failure in

[308] See the Statistical Annex in ECB (2013c).

interbank markets and markets for sovereign debt to correctly price risk. Banks also failed during the pre-crisis period and unsecured lending was not without risk back then. Sovereigns failed as well in the sense of allowing either their actual liabilities, or their contingent liabilities to grow without bound.

There is no agreement in the literature on the sustainable level of contingent liabilities. The bulk of contingent liabilities in EU Member States takes the form of pension and health care entitlements and the size of these contingent liabilities can be several multiples of the current stock of government liabilities. The structure of these contingent liabilities should matter as well. Here, in contrast with outstanding debt where some Member States have been vulnerable due to their significant levels in foreign-owned, and foreign-exchange denominated debt, contingent liabilities most of the time constitute a form of debt vis-à-vis citizens or residents of the same country, and hence there is no currency mismatch. More problematic are contingent liabilities that come in the form of state guarantees. In terms of structure they will more often resemble actual outstanding debt with all its implications from a financial stability point of view.

At the same time sovereign debt restructuring was considered, until recently, to be the exclusive right of heavily indebted poor countries (HIPCs), and debt restructurings for these countries were discussed behind closed doors in the Paris Club (official creditors) and London Club (private creditors). For the monitoring of financial integration the circularity, or self-fulfilling character of perceptions in markets where trust and market liquidity are closely interdependent, is a real issue.

Even if it is not difficult to agree that 2007/2008 is a major structural break, it is not clear if this structural break is primarily of a statistical nature, or if behavioural and political/institutional assumptions that underlie the modelling of these markets have been invalidated as well.[309] State guarantees, implicit or explicit, and the lender of last resort insurance against liquidity risk provided by central banks helped to lower risk perceptions. It took several major disruptions to undermine these perceptions, but once done financial institutions moved quickly to a bad equilibrium where lack of trust caused a sharp drop in unsecured lending.

Whereas the lack of trust in interbank markets could be partly substituted for by energetic intervention of monetary authorities,[310] the increasing significance of CDS markets has been viewed by some as being part of the change in attitude of market participants towards debt instruments. Clearly, the role of CDS markets for sovereign debt, in particular since the debt restructuring in Greece and Cyprus, has shifted the focus of analysis of sovereign debt

[309] Israël et al (2013), page 11, note in this context that "(w)ith the crisis, business cycles are structurally distorted, which makes econometric modelling increasingly difficult", and they see an increased importance for reliable "(s)tatistics, with a view to assessing economic and financial developments in the very recent past, adding expert judgement for the near future."

[310] While the move to a full allotment policy by the Eurosystem effectively addressed liquidity risk in the system and the Eurosystem fully played out its role as lender of last resort in this respect, it also brought to an end the unsecured inter-bank lending which had continued up to that point.

markets from the previously dominating financial integration to a financial stability perspective; a shift which, in its present significance, had not been anticipated a decade ago.

7.4.3. Markets for mortgage loans (3)

In 2002, Adam et al. found that markets for mortgage loans had not achieved full convergence (by 2001), but the speed of convergence (beta-convergence) had increased substantially to values comparable to those of interbank loan and government bond markets after the introduction of the euro.

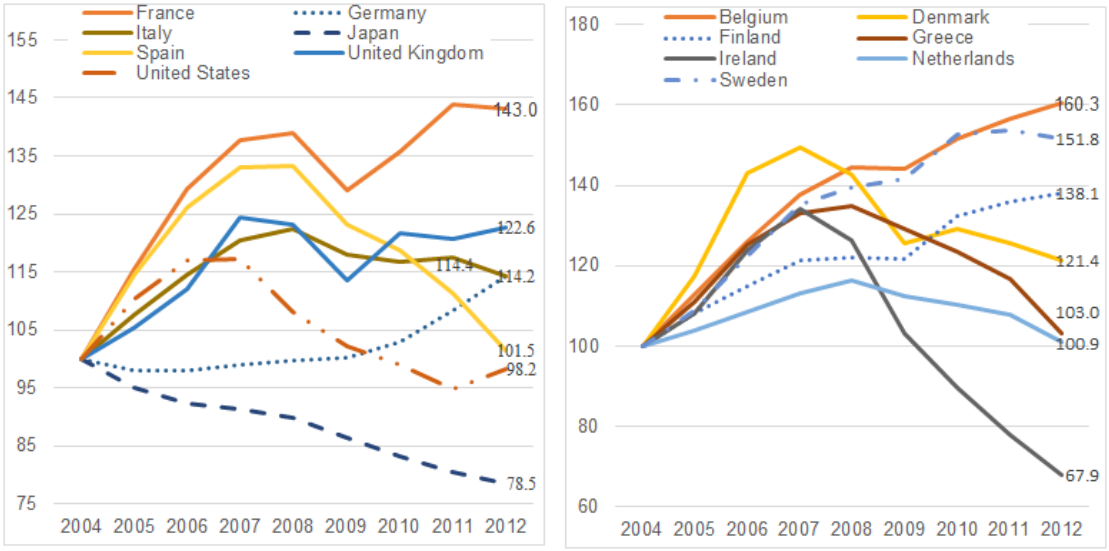
Discussion of the use of indicator (3):

Sørensen and Lichtenberger (2007) observe that a significant part of mortgage rate variations across euro area countries cannot be explained by business cycles or structural factors. They conclude that country-specific institutional features, including enforcement procedures, tax subsidies and loan-to-value ratios, have an influence on mortgage rates in addition to local demand and supply factors.

Furthermore, it is difficult, since these markets have been domestic markets for a very long time, to decide if the lack of supply of, or demand for, certain banking products reflects a market for banking products that is not fully integrated, or a lack of competition, or if differences are due to local tastes that have become part of local cultural preferences. These preferences could reflect differences in labour mobility, the relative importance of the buy-to-let market and the market for renovation of residential real estate as compared to new constructions.

Chart 7.4.1: **House price developments**[311]

[311] It is worth noting that, among the statistical gaps highlighted by the financial and economic crisis, real estate price statistics was considered one of the areas to be urgently developed. Particular attention has been devoted to developing internationally comparable House Price Indices (HPI). Starting from 2013, the European monitoring of changes in house prices is based on data regularly compiled by Member States and transmitted to Eurostat. This should be taken into account in future exercises.



Source: OECD

According to data gathered by the OECD, national rates of home ownership differ widely across countries. It is remarkable that high per-capita income countries tend to be in the lower part of the distribution (lower shares of owner-occupied housing and higher shares of rental housing) which may reflect a greater variety of savings instruments available to private households, whereas the lower per-capita income EU Member States such as Portugal, Ireland, Spain, Greece, Hungary, Slovenia, Slovakia and Estonia have the highest home ownership rates which may reflect the lack of alternatives of long-term savings instruments in those countries.

Similarly, house prices continued to move at very different speeds across countries (Chart 7.4.1). Twenty years after the liberalization of the capital accounts including in the sections dealing with the acquisition of real estate in another Member State, a sudden shock to housing equity remains one of the main economic risks that households face over their lifetime (Shiller (1993)). Banks, insurers and the shadow banking system have achieved high degrees of international diversification of real-estate based assets and structured finance products, but the markets for the underlying assets have remained largely segmented along national borders, reflecting different national legal institutions and differences in taste, including for different real estate financial retail products.

Based on a new set of information from a recent bank survey, Villar-Burke (2014) finds such differences in taste for particular variants of mortgage products to be substantial between EU Member States. This could severely hamper the robustness of an indicator as mortgage loan rates for assessing interest-rate differentials throughout the SMFS. If changes in the central banks' main refinancing rates are passed through at very different speeds in a systematic way, even a simple indicator of variance of interest rates for mortgage loans would be systematically biased. The effect identified by Villar-Burke (2014) would indeed result in an increase in the dispersion of mortgage loan interest rates whenever the national Central Bank (or the ECB in the case of the Euro Area) changes the main refinancing rate. A straightforward question could be to test for asymmetries, i.e., if a rate hike produces the same bias as reductions in the key refinancing rate. The bias should be measured in all EU

Member States. In the euro area, there could be the additional problem that such a bias translates into an uneven transmission of monetary policy in one of the most important market segments.

Even during "normal" times transmission of monetary policy to the real economy can have a non-trivial structure and a fully evenly transmission should not be taken for granted. Belke et al. (2013), exploiting a harmonized set of data and controlling for the crisis period, point to considerable differences in the size of the interest rate pass-through with respect to either different loan rates and with respect to different countries. In addition, they find that in the majority of cases the pass-through is incomplete and the dynamics of loan adjustment are different for reductions and hikes of money market rates.

Thus, the debt financing technology used and the location of the end user matter also during non-crisis periods. Favera and Imbs (2012) have an interesting result in the area of housing mortgage loans where regulatory change induces entry in local mortgage markets and only the new cross-border lending increased mortgage supply which in turn has a positive effect on house prices. Has the additional supply been achieved using the same lending standards, or have the new entrants accepted higher credit risk in return for getting the "foot in the door"?

7.4.4. Markets for corporate loans (4)

According to Adam et al. (2002) markets for corporate loans had not achieved full convergence (by 2001) and showed little signs of accelerated convergence even after the introduction of the single currency.

In a fully integrated financial market, interest rates of corporate loans to companies in the same sector, with firms being of comparable size and age, of similar legal and ownership structure should converge over time. However, similar as in the case of mortgage loans, the structure of demand and supply[312] continues to vary across the EU, reflecting a multitude of factors that eventually motivate differences in interest rates for corporate loans of similar duration. Sections 1.3 and 1.4 of this report discuss in some detail the supply side factors active in this market segment. In this chapter, following the proposed new framework of indicators, section 7.6 discusses some aspects of demand for corporate loans from the angle of firms' capital structure choice.

7.4.5. Other recommended indicators for price discovery

There may be a need to have a fresh look at price and cost differentials faced by users in the EU's financial market (indicator (5)). Indeed, price differentials for similar financial services or products across countries, or the cost of a standardized cross-country credit transfer were among the first indicators to be used and monitored by the Commission in the early days of the Single Market.

[312] See the supply and demand factors as enumerated in ECB (2013a).

Later the focus shifts towards ensuring the equal and non-discriminatory access to financial services (and this should become again more visible as a dimension of the financial market in its own right) and towards relying on increasingly competitive markets for financial services to take care of the elimination of remaining cross-country price differentials. Measurement issues can arise in so far as prices for retail financial services (see the case of mortgage loans above), as long as access is non-discriminatory, can reflect local tastes and may not be fully comparable. Stock market returns (indicator (12)) are not further discussed here, we only note that simple correlations do not seem to show much as noted already by Adam et al. (2002).[313]

Financial benchmarks are proposed as an additional category under this heading. Benchmarks play an important role for price discovery in markets where products are complex and verifiability and direct comparability are too costly for individual market participants.[314]

7.5 RISK SHARING IN THE INTEGRATED FINANCIAL MARKET

Adam et al. (2002) proposed two indicators to measure financial integration based on or triggered by the savings and investment decisions of households: (i) savings-investment correlations (16), and (ii) consumption-growth correlations across countries (17). The first indicator is based on the notion that in an integrated economic area, savings should not be strongly correlated to investments in any specific country.

7.5.1 Saving-investment correlations (16)

Adam et al. (2002), applying a concept first introduced by Feldstein and Horioka (1980), estimated the following regression for the 15 EU Member States between 1980-2000 and concluded that correlations between national savings and investment decreased after 1995 which signals increased financial market integration:

Gross Investment Rate = Constant + Coefficient x Gross Saving Rate **(Equation 1)**

Estimating the same equation today delivers very similar results for the average estimated coefficient across the entire sample period (Table 7.5.1). The results do not change much if one extends the estimation period backward and forward to 1960-2012.

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[313] Stock market returns could also figure under "access to finance" since, as shown by Whited and Wu (2006) financially constrained firms that are listed share common stock return characteristics which is a feature that can be exploited for the construction of financial integration indicators.

[314] For the purposes contained in the Directive on criminal sanctions for market abuse a benchmark is defined as any rate, index or figure made available to the public or published that is periodically or regularly determined by the application of a formula to, or on the basis of the value of one or more underlying assets, or prices, including estimated prices, actual or estimated interest rates or other values, or surveys and by reference to which the amount payable under a financial instrument or the value of a financial instrument is determined. Underlying assets or prices referenced in benchmarks can include equities (e.g. the FTSE 100 index), bonds (e.g. NASDAQ OMX fixed income), interest rates (e.g. LIBOR or EURIBOR), or commodities such as agricultural products (e.g. cocoa LIFFE London), metals (e.g. Gold COMEX) or oil (e.g. Brent oil ICE); see also European Commission - MEMO/14/78, 4 February 2014 available at http://europa.eu/rapid/press-release_MEMO-14-78_en.htm

Table 7.5.1: Capital mobility regressions (1)

	Adam et al. (2002)	*EFSIR 2013*	*EFSIR 2013*
	1980-2000	**1980-2000**	**1960-2012**
Coefficient	0.30811**	0.40**	0.36**
Constant	0.11355**	0.14**	0.16**
Adjusted R-squared	0.5182	0.62	0.60

** denotes statistical significance at the 1% level, * at the 5% level; OLS panel regressions with country and period fixed effects; estimations were carried out with data from the Commission's AMECO database

To monitor the evolution of capital mobility, the same equation is estimated year by year, and the change of the estimated coefficient is monitored over time. Again, results are similar to what Adam et al. (2002) found. In their results very little capital mobility appears during the 1980s, only slightly more from 1990 to 1994, and as of 1995 until the end of their sample period in 2000 the estimated coefficient is negative and insignificant which according to the Feldstein-Horioka proposition points to full capital mobility.

This result may reflect a small sample bias. The change of the coefficient in 1995 is too abrupt, the actual liberalization of the capital account was more gradual. However, the small sample bias could be more relevant due to the 1995 enlargement round and the association agreements with Central and Eastern European countries (that would eventually join in 2004 and 2007).

Using a full sample of EU Member States we run the regressions for several sub-periods that have a relation to changes in the openness of Member States' capital accounts. There is clearly an increase in capital mobility over time until the beginning of the crisis. The evolution up to 2007 is in line with findings in the economic literature:[315] savings are invested increasingly in foreign assets (which corresponds to a decrease of home bias on national balance sheets) allowing for a higher degree of risk-sharing (against country-idiosyncratic or sector-specific shocks).

In the last period 2008-2012 the absolute size of the coefficient remains almost identical compared to the 1994-2007 period, i.e. the degree of capital mobility does not change, however the change in sign signals that the explained variance in the sample is deriving from situations where increased national savings are associated with reduced national investment, i.e. savings turn counter-cyclical whereas for smoothing purposes in line with the permanent income hypothesis private savings should be pro-cyclical.

Table 7.5.2: Capital mobility regressions (2)

	EFSIR 2013	*EFSIR 2013*	*EFSIR 2013*	*EFSIR 2013*
	1960-73	**1974-93**	**1994-2007**	**2008-12**
Coefficient	0.83**	0.46**	0.23**	-0.23*
Constant	0.06**	0.13**	0.18**	0.25**
Adjusted R-squared	0.72	0.69	0.67	0.74

** denotes statistical significance at the 1% level, * at the 5% level; OLS panel regressions with country and period fixed effects; estimations were carried out with data from the Commission's AMECO database

[315] See, e.g. Sorensen et al (2007), Demyanyk and Volosovych (2008).

7.5.2 Consumption-growth correlations across countries (17)

As a second indicator for financial integration related to the decisions of households[316] Adam et al. (2002) proposed to estimate the degree of consumption risk sharing among EU Member States based on the risk-sharing indicator proposed by Cochrane (1991) and Mace (1991). Again, they argue in favour of using annual data from the national accounts.[317] Under full risk sharing, consumption should not depend on idiosyncratic shocks (as idiosyncratic risk is diversifiable), and consumption should be perfectly correlated with aggregate shocks. To estimate the degree of risk sharing, the growth rate of consumption of each Member State is regressed on the growth rate of GDP, the latter being the proxy for the idiosyncratic shock:

Growth rate of consumption = Constant + Coefficient x Growth rate of GDP **(Equation 2)**

Table 7.5.3 shows the results obtained by Adam et al. (2002) and our estimations for this report. We find very similar results with the main difference that we find higher levels of statistical significance including for the year-by-year regressions which allows identifying distinct sub-sample periods.

Table 7.5.3: Risk sharing regressions

	Adam et al. (2002)	*EFSIR 2013*	*EFSIR 2013*
	1980-2000	**1978-1994**	**1995-2008**
Coefficient	0.8446**	0.78**	0.40**
Constant	0.00867**	0.02**	0.03**
Adjusted R-squared	0.3839	0.94	0.77

** denotes statistical significance at the 1% level, * at the 5% level; OLS panel regressions with country and period fixed effects; estimations were carried out with data from the Commission's AMECO database

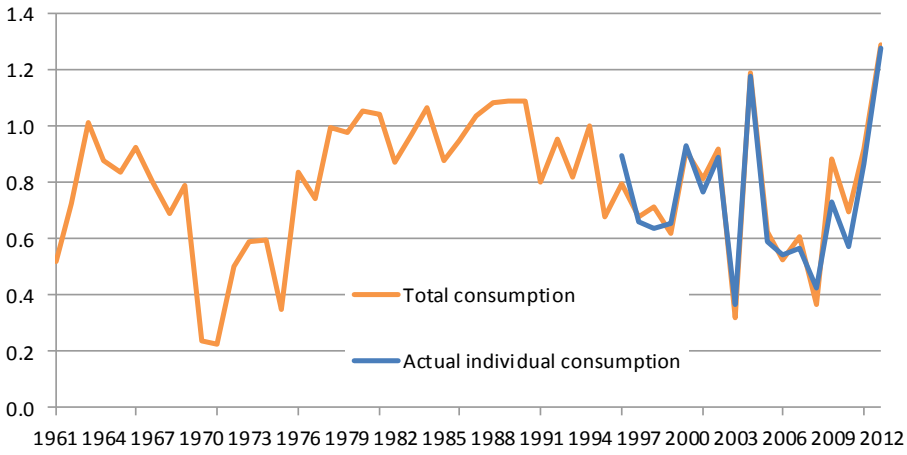
Between 1978 (when the effects of the oil price shocks have fully fed through into reduced consumption opportunities in EU Member States) and 1994 the degree of risk sharing is very low. The average coefficient is around 0.8, but yearly regressions have coefficients close to 1 (no risk sharing) basically for each and every year during this period. Shocks to national gross domestic products feed through almost unfettered to reduced or increased consumption opportunities during those years.[318]

Chart 7.5.1: Degree of consumption risk sharing in the EU15

[316] The informational assumption on the household should be taken with some caution. It is correct that ultimately decisions of private households determine where private savings are invested, but the varying degree of intermediation of such decisions by financial service providers is an important factor to keep in mind. The changing savings-investment relationship within the integrated area and the changing degree of consumption risk sharing will reflect in many cases the decisions of financial intermediaries taken on behalf of private households seeking a decent return on their savings.

[317] Quarterly data would result in having more observations which may be preferable for estimating shorter sub-sample periods. However, as Adam et al (2002) point out as well, quarterly data is less robust as it contains itself a much higher share of estimated as opposed to measured data. In the worst case, regressions show high goodness of fit because the researcher has "found" the data generating process of the statistician who compiled the data in the first place. This risk is reduced in the case of annual data, albeit the "hardness" even of annual national accounts can vary significantly from one country to another.

[318] In its Alert Mechanism Report 2014 (European Commission (2013c)), the Commission also raised the possibility of inefficient financial intermediation in this context.



Source: own calculations with data from the Commission's AMECO database

The yearly regressions show even better a pattern that corresponds to the evolution of the liberalization of the capital account in the EU:[319] the first wave of liberalization measures in the 1960s sees a decline in the estimated coefficient from its previous range between 0.8 and 1 (very low level of risk sharing) to a lower range between 0.2 and 0.6. However, this period shows highly volatile capital flows, which are considered as too volatile from a financial stability point of view. The second period with a robust trend towards more risk sharing begins in 1995 and lasts until the onset of the crisis in 2007.

The light line in Chart 7.5.1 displays the estimated coefficients for the year-by-year consumption risk sharing regressions using total (domestic) consumption. The dark line displays the estimated coefficients using a narrower concept of consumption, effective individual household consumption, which shows that the size of the coefficient does not depend in any significant way on changes in government consumption.

Discussion of the use of indicators (16) and (17):

There are several possible motivations for a continued use of these two indicators. First, as underlined by Adam et al. (2002), their calculation is comparatively simple and can be updated every year as new national accounting data becomes available. Second, as indicators they provide a good starting point for more detailed analysis how the actual risk sharing is achieved. After all, risk sharing is one of the desired features of a financially integrated Single Market to begin with.[320]

Several studies have taken equations (1) and (2), and variants of them, as starting points for their inquiry into the differences of risk sharing levels and dynamics. Comparing the EU experience to the U.S. experience[321] suggests that financial markets can provide a much higher amount of risk sharing and shock absorption than a system of integrated debt markets

[319] The European Commission monitors the free movement of capital as one of the four elementary freedoms within the Single Market. For an account of the historical evolution of the capital account see, e.g., Bakker and Chapple (2002).
[320] See e.g. Commission (1983, 1988).
[321] Asdrubali et al (1996), Demyanyk and Volosovych (2008), Jappelli and Pistaferri (2011).

and (high) ex-post fiscal transfers from national social security systems. Two important stylized features of different risk-sharing technologies can be noted here:

(1) Risk sharing arrangements primarily based on integrated equity markets are capable of providing effective ex-ante risk sharing and are able to deal with both transitory and permanent shocks.[322]

(2) Risk sharing arrangements primarily based on integrated debt markets can also provide effective risk diversification, but in addition they can also accelerate the propagation of risks, as highlighted in a recent policy paper by the OECD.[323] Debt markets are better equipped to deal with transitory shocks, and risk sharing takes place in an ex-post manner rather than ex-ante as in the case of equity markets.[324]

In the context of the desirable outcomes from a high degree of financial integration within the Single Market, the following questions emerge:

- Did the Single Market improve risk sharing/shock absorption capacity of financial markets in the EU?

- Where is the optimal trade-off between risk sharing and an acceptable level of exposure to shocks to the national balance sheet that cannot be insured against?

Financial assistance programmes as well as various ECB measures[325] temporarily addressed a structural weakness in the EU's risk sharing mechanism which is its bias towards debt. However, the reliance on debt instruments as opposed to equity renders international risk sharing in the EU less powerful compared to other highly integrated economic areas such as the U.S. It is also more prone to ex-post political bargaining. In contrast, equity-driven international risk sharing is taking place mostly within the private sector. This does not exclude the emergence of an important burden sharing dimension on a case-by-case basis, e.g. in the context of bulky FDI.

Risk diversification, risk insurance, or risk sharing typically allows *some* exposure to all economic entities (countries, regions) as well as to different industrial sectors (both financial and non-financial) *across* the financially integrated economic area. In the run-up to the crisis in Europe Ireland and Finland had the best-diversified exposure in this sense, but Member States having the corresponding exposure to Ireland (and the Irish housing market) were poorly diversified themselves and had little offsetting bets. Also, part of the shock to the Irish balance sheet was part of a common euro area shock where risk sharing with other Euro area economies could not deliver sufficient protection.[326]

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[322] See also indicator 10, ECB (2013c), page 13: Country and sector dispersions in euro area equity returns; Adjaouté, K. and J.P. Danthine (2003).

[323] See OECD (2012).

[324] Commission, QREA (various issues from 2011-2013) provides evidence of the ex-post insurance function of debt markets in contrast to equity markets that insure instantaneously including against permanent shocks.

[325] See chapter 2.3 for additional detail.

[326] See chart 16 in ECB (2013c).

Risk sharing in the Single Market can take place, ideally, by households holding an optimally diversified portfolio of equity and debt securities. However, households may choose to diversify via financial retail products (banking and insurance products) where the actual investment decision is left to the financial institution. Even if the portfolio bought by the household this way is identical, the household is exposed to various forms of risk linked to the intermediation itself (in exchange for the comfort of not having to follow market developments on an ongoing basis). The intermediation risks which materialized during the crisis are certainly one factor explaining the increasing popularity of passive index tracking ETFs whereby households can avoid these risks.

Discussion of the use of indicators (8) and (9):

The degree by which foreign assets (indicator (8)) and liabilities (indicator (9)) are held by domestic banking (and insurance) sectors is of direct relevance for the study of financial integration and is closely linked to the capacity to insure against country- or sector-specific shocks.[327] In that regard, Schoenmaker (2013) makes the following observations with respect to international diversification choices by banks and insurers that (i) throughout the crisis insurers have remained a high level of international diversification driven by those institutions that were already strongly diversified in the pre-crisis period, and that (ii) on average insurers' balance sheets are more internationally diversified than those of comparable MFIs.

If financial integration insures against idiosyncratic shocks primarily via debt markets there are obvious disadvantages compared to risk sharing primarily operating through integrated equity markets. The economic literature points to the fact that debt cannot insure against permanent shocks and that the insurance operates only ex-post. This ex-post rather than immediate adjustment is even more problematic in the case of the EU for a number of reasons. Compared to the U.S., the EU's financial system is characterised by the presence of banks that are big in relation to their home country's GDP (and fiscal capacity).[328],[329]

When country A's income experiences a negative external shock (temporarily), the reduction of consumption is avoided by an increase in A's use of savings from other countries that are members of the integrated economic and financial area. Let us pool these other countries and refer to them as "B", thus the financially integrated economic area comprises A and B. Also, if A has its own monetary authorities, lower interest rates will reduce the income to foreign banks during the adjustment period which further adds to equilibrating available resources for consumption in A and B.

For integrated debt markets to remain a viable insurance mechanism against the risk of suffering lower consumption after a shock to the national income in either A or B, the integrated economic area should have at least the following features:

[327] Indicators (10)-(15) in tables 7.3.1 and 7.7.1 have a similar motivation and are not further discussed here.

[328] The economics literature has studied consumption risk sharing mainly in the U.S. context, either using state-level data or data on municipalities and agglomerations.

[329] This is in line with Rajan and Zingales (1995) and Antoniou et al. (2008) who study capital structure in bank-oriented (mostly Europe) vs. more market-based financial systems.

(A) shocks are more or less randomly distributed across A and B over time,

(B) shocks are predominantly of a temporary rather than of a permanent nature,

(C) there are no major informational asymmetries between A and B that could lead to a systematically biased appreciation of credit risk in cross-border credit operations,

(D) A and B can both sustain the burden sharing arrangement which is an implicit or explicit feature of the decision to have integrated debt markets.

Major and persistent deviations from (A) could point to (i) government[330] moral hazard, (ii) deeper structural economic issues that result in one part of the financially integrated area suffering shocks to its income more frequently than other parts, or (iii) bad luck. Moral hazard is a feature all insurance mechanisms have to struggle with, and the economic governance arrangements within the integrated economic area will be more or less successful in addressing it (see also chapter 2 of the present report).

The second possible explanation has become a recurrent topic in the EU's economic policy discourse. Sometimes countries that are more prone to experience shocks are referred to as "vulnerable" countries. The concept of "vulnerability" can be found close to discussions on the appropriate degree of exposure one country should accept with respect to different kinds of risk. In our present context of financial integration and insurance against consumption risk, risks can take the following forms:

A(ii)-1 Valuation risks: assets and liabilities held on the national balance sheet are subject to varying degrees of valuation risk, with some forms of risk remaining beyond the control of national policy makers. An asymmetric shock leading to an asset-liability mismatch can change how the country is perceived in international debt markets and impact the country's cost of and access to financing in those debt markets. A more or less pronounced maturity mismatch between the asset and liability sides will typically magnify such market reactions.[331]

A(ii)-2 Foreign exchange risks: some assets and liabilities on the national balance sheets are denominated in foreign currencies and produce income streams in foreign currencies. This can give rise to currency mismatch and liquidity risks.

A(ii)-3 Growth risks: a country may be more or less exposed to macroeconomic risks beyond its immediate control due to the structure of its economic model of creating value added. An economy that is highly dependent on primary inputs for its domestic production (and not just

[330] As in the current example the insurees are national jurisdictions of the financially integrated economic area, it is clearer to speak of government moral hazard as opposed to individual moral hazard when insurees are individual economic agents, such as private households.

[331] See Catão and Milesi-Ferretti (2012) for an analysis how the structure of external liabilities has a stronger impact on vulnerability compared to the level of indebtedness. This is a finding at the level of sovereigns that resembles the finding for non-financial companies where financial leverage alone cannot explain the riskiness of funding structures.

for final consumption) is exposed to large and sudden changes in the price of those inputs. The risk can be magnified by a combination with exchange rate risk.

The more "vulnerable" a country, the less attractive it becomes as a member taking part in the international insurance mechanism in the integrated economic and financial area. It is obvious that persistent deviations from condition (A) will lead to a situation where the choice between possible explanations (i), (ii) and (iii) becomes even more blurred.

Turning to condition (B) we immediately notice that conditions (A) and (B) will not be easily distinguishable in all circumstances. Is the fact that economy A after a severe shock (e.g., due to the materialisation of one of the risks listed under A(ii)) does not return to the level of growth it enjoyed before the shock linked to the fact that (a) the shock was a permanent shock to A's potential growth. Or (b) is it linked to A's lack of resilience and therefore is, at least partly, the result of poor economic policies?

A prudent risk manager in the presence of uncertainty as to the true nature of the shock will assume the shock to be a permanent one and create room for positive surprises. Debt is obviously a poor insurance against permanent shocks to a country's capacity to generate income as under such circumstances the net present value of future income streams has diminished while the amount of debt (principal and interest) has remained the same in the best of all cases. If the interest part is variable and the lower income generating capacity results in a higher risk profile of the country, the interest rate will rise and with it the level of total indebtedness.[332]

Turning to the next item in our list, we find that condition (C) has not received sufficient attention before the recent crisis arouse. There seems to be a real issue with functioning of markets (in the sense of price discovery) in the joint presence of strong industry-specific growth and informational asymmetries. We will come back to this point in the next section.[333]

In the absence of a joint resolution regime and resolution fund, Condition (D) concerns the fiscal strength of the home sovereign ultimately backing banks that are lending cross-border. Once there is a joint regime it will contain an explicit burden sharing arrangement.

7.6 INDICATORS MEASURING THE ACCESS TO FINANCE

Different banking structure can have an impact on the access to finance. The relative importance of foreign banks in a domestic market, either in terms of asset shares (6) or in terms of number of foreign institutions operating branches or subsidiaries (7) continues to be used. Some studies try to relate banking structure variables to the question if borrowers (in

[332] For decades this has been the situation of several highly indebted development countries where a combination of factors as listed under A (i), (ii) and (iii) led to situation where countries could not even service the interest payments on their national debt.

[333] The link between leverage, sectoral growth and informational asymmetries is further explored in Kühnhausen and Stieber (2014).

particular non-financial companies) were credit-supply constrained during the crisis (IMF (2013), ECB (2013a)).[334]

Discussion of the use of indicators (6) and (7):

Again, we do not see particular measurement issues in this area. The ECB monitors structural developments in the banking sector and publishes an annual report with comprehensive information on (i) the number of MFIs, (ii) cross-border market penetration via branches and subsidiaries, (iii) M&A activity, (iv) the degree of competition, (v) the composition of banks' balance sheets, (vi) banks' capital structure choices, and (vii) the financial performance of MFIs. The latest such report was published in November 2013.[335]

As an indicator for financial integration based on corporate decisions Adam et al. (2002) proposed to look at the evolution of merger and acquisition activity. We think this indicator can be better exploited for assessing the degree of risk sharing, as merger and acquisition is an important means for achieving a certain risk profile on either side of the economic agent's balance sheet. Perhaps the previous choice reflected at least partly the data availability situation in 2000/02. Since then a growing number of commercial data providers has collected the information of annual financial statements of companies. The data are made comparable across different national accounting standards, and various financial metrics are computed. In general there remains a big data gap between listed and non-listed firms. However, data availability has improved sufficiently in order to motivate the inclusion of non-listed firms in the present chapter.

In the context of the monitoring of financial integration, one would like answers to the following questions with respect to corporate financial leverage: Do capital structure choices of non-financial companies reflect financial fragmentation at the firm level (before and during the financial crisis)?[336] Is there evidence that non-financial companies in the EU used excessive leverage? Was "excessive" cross-border bank credit accessible to firms from all sectors? [337] How relevant is debt bias in corporate taxation across Member States?[338] Does the relative importance of short-term corporate loans differ strongly from country to country; are there different levels of competition between alternative funding sources from one country to another? What are the effects of more or less rigid bankruptcy regimes on debt

[334] Using data from the ECB Lending Survey, the IMF (2013) finds significant demand effects for loans to non-financial companies, but cannot find significant supply effects. See also sections 1.3 and 1.4 in this report.

[335] The Banking Structures Report, November 2013; ECB (2013b).

[336] Ferrando and Mulier (2013), Kühnhausen and Stieber (2014), ECB (2013a), European Commission (2013). One definition of "financial fragmentation" depicts a situation where economic agents, in particular non-financial corporations (NFCs), face a country-specific risk premium after controlling for any industry-specific factors that could lead to diverging user costs of capital (UCCs) across different industries within the internal market. At the same time, within the group of non-financial firms, the focus is on SMEs and large domestically orientated firms as compared to large international firms that have access to funding in different jurisdictions, including different money and capital markets.

[337] Buch et al (2013) mentions "excessive" cross-border bank lending.

[338] See Feld et al (2012) for an econometric meta-study; in this context it is worth noting that work on the CCCTB was ongoing within the Council during 2013 with a first technical examination concluded. In March, the high level working party agreed on the approach to the organisation of future technical work in this area. This approach was confirmed in the ECOFIN report to the June European Council. The Presidency is taking work forward in accordance with this approach and has put forward new compromise proposals.

leverage? To what extent do interest rates for corporate loans reflect local (risk) factors (similar to insurance retail products)?[339]

A recent comprehensive review of structural issues related to corporate finance and economic activity for the Euro area has pointed to the potential impact of capital structure choices for the financial stability and economic performance of the economy as a whole.[340] In our analysis for this chapter we find very similar econometric results as in ECB (2013a) for a broader range of countries as to which firm-specific factors determine (i) the potential use of external funding by non-financial companies (NFCs) and (ii) its degree (leverage).[341]

A stylized fact that motivated us to start our inquiry using firm-level data is the pronounced cross-country variation in NFCs leverage ratios. Apparently different models of funding structure are compatible with comparable levels of economic activity and well-being. At the end of the 1980s the bank-financed German and Japanese models where considered the most sustainable, where banks took important stakes in non-financial (manufacturing) industries and thus had their incentives aligned with the long-term funding needs of research and development intensive sectors.

The Japanese model has become infamous shortly after and Germany's costly re-unification created a structural break in the economic data for a number of years. At present a normative model of a well-diversified funding structure is developed on the back of a major banking crisis. However, Germany and some other European economies have done managed well with rather high leverage rates and with NFCs using mainly financing intermediated by banks rather than capital markets.[342]

The analysis contained in this section takes as a point of departure the observation that some explanations of NFCs' seem to better allow for country heterogeneity along the financial leverage dimension than others.[343] Consequently, testing such theories can help identify the presence of financially constrained firms or a presence of wide-spread information asymmetries. Such presence could create in turn the starting conditions for twofold adverse selection with its detrimental impact on asset quality of financial institutions.[344]

More specifically, if a theory of firms' financial structure can be confirmed empirically where equity is the least favoured source of financing, a number of policy considerations can be listed here:

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[339] See Reindl et al (2013) and Giroud et al (2012) on market implied bankruptcy cost: Is it possible to exploit better market data for indicators?

[340] See ECB (2013a), page 13.

[341] We regress firms' leverage on firm characteristics and other controls following the approach of Rajan and Zingales (1995) who had identified four relevant factors for leverage (tangibility, growth, size, profitability) and that of related empirical studies such as Faulkender and Petersen (2006), Antoniou et al. (2008), Bharath et al. (2009), Brav (2009), Frank and Goyal (2009), Psillaki and Daskalakis (2009), Degryse et al. (2012), Fan et al. (2012) and Köksal et al. (2013).

[342] Accordingly, Aoki and Nikolov (2012) identify this possibility of a stable bank-financed economy and a possible increase in systemic risk as capital markets expand and diversify.

[343] For an overview of capital structure choice theories including trade-off theory, pecking order theory, market timing theory, and agency theory see Myers (1977, 2001), Goldstein et al. (2001), or Bhamra et al. (2010).

[344] See Kühnhausen and Stieber (2014) for additional detail.

- From a micro and macro prudential perspective the taxation bias in favour of (bank) credit[345] could be more problematic in this case and the need for a more balanced fiscal treatment of different sources of funding could emerge.[346]

- If market-based funding can alleviate information asymmetries more successfully compared to bank finance, structural obstacles to a more diversified funding base (in addition to taxation issues) should receive more attention.

- For firms without access to corporate bond markets and/or firms lacking other mechanisms addressing effectively information asymmetries, changes to the local bankruptcy regime may not deliver the expected results. The trade-off between increased probability of default, funding costs and other frictional costs (such as those related to layoffs during a restructuring phase) will be a more complicated one compared to a situation where firms simply trade off cost of finance and cost of financial distress.

One motivation for the study of the role of the credit scoring and business information industry in European Commission (2013a) was the scenario where informational asymmetries lead to an adverse selection of riskier projects over viable low-risk projects. In turn such a situation could impact negatively risk-taking by NFCs due to a self-enforcing feedback loop between supply of bank credit and riskiness of projects to be financed. In the end, in a bank finance-based economy, the adverse selection bias is likely to become locked-in into banks' balance sheets resulting in a lower asset quality on average, with asset quality deteriorating gradually, and unnoticed, during the economic upswing.[347] When the economic boom comes to an end and banks need to deleverage and shed risk-weighted assets, forbearance and lacking incentives to acknowledge credit risk on banks' balance sheet could even strengthen the adverse selection bias during the deleveraging process.

While banks will try to protect low-risk assets they may be reluctant to recognize losses in the portion of their asset structure where the riskiest projects are located. As a consequence, and in the absence of external pressure to recognize losses e.g. in the context of a granular and stringent asset quality review, the part of the loan book containing medium risk projects could come under the strongest pressure. In this sense the deleveraging phase could result in pressure on NFCs funding of working capital even for those firms that have a viable going concern and that are in a medium-risk, medium-return category.

Finally, if information on the riskiness of investment projects is local, cross-border funding structures could be more exposed to adverse selection bias than local funding structures. Cross-border financial flows other than green-field foreign direct investment could contribute to a deterioration in the quality of funding structures, and the more so if rates of return in the host country exceed significantly economic returns in the home country and if the home

[345] The OECD identifies this taxation bias as one of the major factors that contributed to the financial fragility of countries in a world of free movement of capital; OECD (2012), p.7.

[346] Feld et al (2013) exploiting all existing empirical studies on the size of the debt interest corporate tax shield estimate an elasticity of 0.27, i.e., an increase in the corporate tax rate by 10 percentage points increases leverage by almost 3 percentage points.

[347] EC (2013) page 92.

country has excess liquidity in comparison which matches a lack of domestic savings in the host country. The dynamics of non-performing loans in some emerging markets in Central and Eastern Europe as well as in South-Eastern Europe could partly result from the described adverse selection bias having been active during the years of rapid credit growth before the crisis.

Table 7.6.1: Empirical tests of pecking order and trade-off theory of capital structure choices

Variables	Pecking Order Theory	Trade-off Theory	Rajan/ Zingales (1995)	Faulkender/ Petersen (2006)	Antoniou et al. (2008)	Brav (2009)	Frank/ Goyal (2009)	Psillaki Daskalakis (2009)	Chen/ Yu (2011)	La Rocca et al. (2011)	Degryse et al. (2012)	Fan et al. (2012)	Köksal et al. (2013)	Our Data
Size	?	+	+	-	+	+	+	+	-	+	+	+	+	+
Growth	+	-	-	-	-	+	-	?	?	+	+	-	?	?
Profitability	-	?	-	-	-	-	-	-	-	-	-	-	-	-
Tangibility	+	+	+	+	+	+	+	-	+	+	+	+	+	-
Liquidity	?	?	n.a.	-	?	-	-	?	?	-	?	?	-	-
Nickell	n.a.	n.a.	n.a.	n.a.	-	n.a.	-	n.a.	n.a.	n.a.	+	n.a.	n.a.	?
Total Ind. LR	?	+	n.a.	+	n.a.	n.a.	+	n.a.	n.a.	n.a.	+	n.a.	+	+
Ind. Growth	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	+	n.a.	n.a.	+	n.a.	n.a.	n.a.	+
Tax Shield	n.a.	+	+	+	+	n.a.	?	n.a.	n.a.	n.a.	+	+	+	+
Inflation	n.a.	+	n.a.	n.a.	n.a.	n.a.	+	n.a.	n.a.	n.a.	n.a.	-	+	?
GDP Growth	+	n.a.	n.a.	n.a.	n.a.	n.a.	+	n.a.	n.a.	n.a.	n.a.	+	-	?
Capital Flows	n.a.	n.a.	n.a.	n.a.	+	n.a.	+	n.a.	+	n.a.	n.a.	+	+	?
Unemployment	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-
Stock Prices	-	n.a.	n.a.	-	-	n.a.	-	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	?

NB: ? = theories are ambivalent or results are inconclusive (either coefficient is not significant or switching signs), n.a. = factor was not included in study

Source: Kühnhausen and Stieber (2014)

The main results of the empirical analysis[348] are displayed in table 7.6.1: determinants of higher financial leverage of non-regulated non-financial companies are: the size of the firm, leverage of the industry and growth of the industry sector to which the firm belongs, as well as the tax shield.

However, looking at year-by-year regressions, regressions for individual countries, or for individual industries, we find that company size, total industry leverage and industry growth do not remain relevant factors in all circumstances. Also, industry growth has a different impact (different sign) depending on the country which makes it less suitable as an indicator for policy analysis for the Single Market. Company size explains around a tenth of differences in leverage. Hence, its effect is rather small compared with the other main traditional explanatory factors of financial leverage: tangibility of assets and profitability.

On the other hand, the tax shield[349] is not only highly significant, it has a relevant - because sizeable - impact on financial leverage of NFCs, and its impact is very robust and stable during our observation period running from 2003 to 2012. The distortion via the corporate income tax reaches on average the size of a quarter of the effects of the main explanatory factors for financial leverage, tangibility and profitability. On average, non-financial firms not only increase their level of indebtedness by the full amount of the tax advantage, but add

[348] See the Annex for detailed results of the regression analysis.

[349] We define the tax shield as the difference in interest paid by companies not having any long-term debt and the companies having long-term debt.

40% of additional debt on top of the absolute tax advantage. However, this is only the average effect.

The significance of the tax shield varies strongly from country to country. Among EU Member States we find the lowest tax shields in Romania, Austria and Hungary, the highest tax shields are found in Malta, followed by the Netherlands, Germany, and Belgium. Malta is a strong outlier with a tax shield around three times the tax shield compared to the country coming second, and Malta is the only country where the tax shield is the most important factor for explaining higher financial leverage. However, in the group of highly industrialized countries such as the Netherlands, Germany and Belgium, the tax treatment of external debt represents a highly significant factor next to the four variables identified by Rajan and Zingales two decades earlier. For the question of correctly measuring how financial integration in the Single Market impacts corporate decisions such a strong taxation bias represents a challenge as it potentially impacts a number of other indicators shown in table 7.3.1.

A logical extension of the analysis of non-regulated industries here would be to include the literature about the impact of corporate income taxes on banks' and other regulated industries' financial choices.[350]

Estimating determinants of financial leverage shows that the availability of tangible fixed assets is important as it serves as collateral for obtaining longer-term external financing. Industry growth is important, but as discussed in this chapter could be problematic from an asymmetric information point of view. The tax shield favouring debt financing over other forms of funding is highly relevant even for the average firm in our very large and diverse sample.

Could the presence of financially constrained firms of the type identified by Whited and Wu (2006)[351] give rise to adverse selection phenomena in the upswing of the credit cycle? And could deleveraging of banks after a credit bubble further exacerbate this adverse selection when banks reduce risk-weighted assets or if banks or supervisors exercise forbearance with regards to the most strongly mispriced risks?

The computation of Whited-Wu indices[352] of financially constrained firms gives the following results in the case of our data containing 1.2 million firms: during the 2003-2012 period, firms were not financially constrained in the sense that they could not achieve desired investment levels. Rather the indicator hints to a substantial number of firms that overinvest during that period.

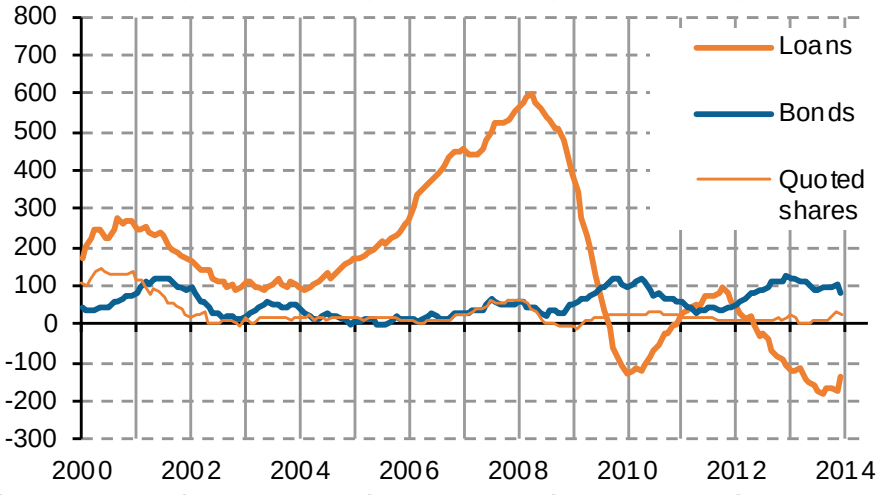
[350] Some of these papers reinforce the case against the corporate tax debt bias, others are critical pointing out the interaction with regulation as a result of which eliminating the corporate tax debt bias may not have the desired effects in the banking sector; see for example Gropp and Heider (2010), Hemmelgarn and Teichmann (2013), Horvath (2013), De Mooij et al. (2013), Keen and De Mooij (2012), Devereux et al. (2013).

[351] In contrast to the growth-constrained firm studied by Kaplan and Zingales (1997).

[352] As proposed in Whited and Wu (2006).

There are several qualifying comments to make in this respect. First, the Whited and Wu index builds on a structural model of firm investment behaviour. The model itself is estimated with firm level data from 1975 to 2001. The major drawback of this firm-level data is that it only includes listed companies. Second, the monetary conditions during 2003-2011 were indeed not very restrictive compared to 1975-2001, so the result is in line with what could be expected ex-ante. Third, as pointed out in chapter 1 of this report, the part of bank funding that contracted the most was lending to other financial institutions. Fourth, the indicator could not be computed for 2012 (and 2013 is missing altogether). As a consequence, a credit crunch, especially one affecting smaller companies, in 2012 and 2013 is not excluded on the basis of our analysis. The index may underestimate therefore the degree of financial constraints since it is consistent with investment behaviour of listed non-financial companies (excluding all financial companies as well as regulated utilities).

Chart 7.6.1: Funding structure of EA NFCs, year-on-year monthly flows



Source: ECB

A logical extension of this index is to estimate the index allowing for a difference between listed and non-listed firms, as well as between firms being part of an international group with access to internationally diversified internal capital markets and stand-alone firms.

The role of internal capital markets is in our view one of the most important elements to be explored further to better understand the information in some other existing indicators, e.g., diverging stock market developments. This is why we propose to include it, once we have identified an appropriate method to create such an indicator, into a revised indicator framework. Furthermore, we could so far only compute the index up to 2011 as 2012 still contained too many missing values in our database.

Chart 7.6.1 also seems to suggest that until the first quarter of 2012 firm did not suffer major credit supply shocks, in line with findings in the context of the IMF EU FSAP (IMF (2013)).

For the future monitoring of financial integration it would seem highly desirable to have a more differentiated set of indicators capable of tracking in a reliable manner how decisions of corporations relate to varying degrees of financial integration. These could vary with respect to companies' positions in the (sector- or industry-specific, or economy-wide)

business cycle. In principle, the Whited-Wu approach shows how firms can under- but also over-invest depending on their firm specifics, but also specific features of their industry as well as their broader macroeconomic, fiscal and financial environment. Matching such an indicator with supervisory data on changing lending standards could further enhance our understanding how asymmetric information, agency problems and adverse selection bias respectively play themselves out to lay the foundations of a credit boom and its ensuing "boom" of non-performing loans.

7.7 SOME PRELIMINARY CONCLUSIONS

This chapter intends to launch a discussion on the need to revisit the set of existing indicators and identify new indicators for financial integration in the Single Market. In the first section, the advantage of more granular data for computing dispersion indices for interbank loans is recalled. Sovereign bond markets can be monitored comparing yields of varying maturity as well as CDS spreads. Several new empirical studies propose how to identify country-specific risk premiums and thereby to avoid an over-estimation of the degree of fragmentation of sovereign bond markets. On mortgage loan markets it is recalled that comparing interest rates needs to be enhanced by a more structural analysis of these markets that have remained strongly segmented along geographical borders and national tastes.

Finally, two sets of indicators that were proposed at the outset of the Commission's monitoring tool a decade ago are discussed in more detail. Capital mobility and consumption risk sharing regressions show indeed evidence of an increase in financial integration between the mid-1990s and the onset of the crisis in 2007/08. The period 2008-12 is not easy to study, but there are indications that while consumption risk has been "re-nationalised", at least capital mobility has not followed this trend to the same extent. The last observation is important for the last topic which deals with the capacity of the integrated financial market to offer non-financial firms a sufficient variety of funding sources, and access to funding which does not lead to under-investment.[353]

To address new demands that emerged during the crisis, a reframing of the monitoring tool is proposed along three dimensions of a well-functioning financially integrated market: price discovery, risk sharing, and access to finance. All previously established indicators can be used. In some cases measurement issues need to be addressed. Finally, the discussion of additional indicators shall complement the refined existing ones in order to ensure a fit-for-purpose monitoring tool.

Thus, a slightly reframed set of indicators is presented in table 7.7.1, with four additional indicators (in bold).

Table 7.7.1: Reframed and augmented set of indicators of financial market integration

[353] The issue of over-investment in this context would certainly deserve a discussion on its own.

The indicator measures the effect of financial integration on the Single Market's capacity to further:	Financial institutions (MFIs, ensurers and pension funds, other FIs)	Non-financial companies	Households
A. Price discovery	money market (1)	corporate loan market (4)	mortgage market (3)
	bond market (2), **financial benchmarks (21)**		
	cross-border banking fees (5)	Correlation of national stock market returns (12)	
B. Risk sharing	Foreign assets (8) and liabilities (9) held by domestic banking sector	Cross-border M&A activity (18)	Consumption correlation across countries (17)
	International Diversification of Bond (10), Money Market (11), Equity (13), Pension (14), and Insurance Companies (15) Funds; Saving-investment correlations (16)		
C. Access to finance	foreign banks: asset shares (6), number (7)	corporate loan market (4); **FCI (22), stock market capitalisation (23), internal capital markets (24)**	mortgage market (3)
	Dispute Resolution Index (19), Dispute Duration Index (20) (speed and costliness of bankruptcy regimes)		

Financial benchmarks (21) are an important element of the overall price discovery process. Their significance for the daily conclusion of financial contracts signals the importance of transactions costs even in highly developed financial systems. For the vast majority of market participants it is too costly to observe prices of financial contracts on a continuous basis. They rely on formulae-based benchmarks. The reliability of such benchmarks has been the focus of recent EU regulations. For the purpose of monitoring financial integration, the availability of benchmarks is equally important.

The study of corporate funding choices carried out for this report has underlined the need for additional indicators reflecting corporate financial choices in the Single Market. The financial constraints indicator (22) as proposed by Whited and Wu (2006) is a possible candidate in that regard. But also the impact of the relative and absolute sizes of local capital markets (23) as well as the role of internal capital markets (24) need to be explored in more detail. These additional indicators would be complementary to an important price-based indicator such as the interest rate, or the dispersion thereof, for corporate loans which received much increased attention in the aftermath of the crisis as one of the main indicator of financial fragmentation in the Single Market and the Euro Area.

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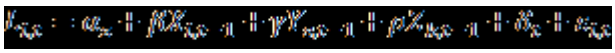
ANNEX: DESCRIPTION OF THE DATA USED IN THE FIRM LEVERAGE REGRESSIONS[354]

This Annex explains the data sample and the definition and motivation of variables used to estimate Equation (3) below, and estimation results are reported.

Testing the predictions of different capital choice theories[355]

The predictions of the pecking order as opposed to the trade-off theory are tested with a series of fixed effects panel regressions as follows:



(Equation 3)

where indices $z=\{i,s,k\}$ represents firm-, industry- and country-specific fixed effects, respectively and t stands for time. L is the leverage ratio per firm and period. There are three measures that accordingly reflect short-term, long-term and total debt over total assets. X is the vector of firm characteristics while Y is the vector of industry-specific factors and Z is the vector of country factors. The regression model also includes α_z and δ_t to account for omitted firm-specific and year fixed effects, respectively.[356]

Data sample

The data set measures capital structures in Europe, Japan and the USA from 2003 until 2012. For firm-level data, we use the ORBIS database[357] which contains company information for unlisted and listed companies. We include firms with either revenue above EUR 1 million, assets above EUR 2 million, or more than 15 employees which are active in all industry sectors except financial services.[358] Macroeconomic data comes from the World Development Indicators of the World Bank. We identify different industries by using the two-digit industry codes of the European NACE Rev. 2 classification.

Table A.7.1 Summary statistics

[354] Based on Kühnhausen and Stieber (2014).

[355] This part is based on Kühnhausen and Stieber (2014); the empirical strategy is similar to Frank and Goyal (2009), Fan et al (2012) and Köksal et al (2013). These authors analyse similar questions and provide valid frameworks to assess capital structure choices.

[356] To reduce problems with endogeneity and to include all factors in the information set, we lag our independent variables by one time period. To account for firm heterogeneity, we use only ratios or logarithms of our variables; for additional details on the empirical strategy see Kühnhausen and Stieber (2014).

[357] The data is from the ORBIS database of Bureau van Dijk.

[358] NACE Rev. 2 classification Section K - industry codes 64, 65, 66.

Variable	Mean	Median	Std. Dev.	Min.	Max.
St LR	0.545	0.561	0.267	0	1
Lt LR	0.105	0.005	0.181	0	1
Total LR	0.650	0.696	0.249	0	1
Size	7.824	7.681	1.808	0	20.457
Growth	3.221	0.058	610.000	-1	877202
Profitability	0.080	0.056	0.127	-1	1
Tangibility	0.329	0.249	0.282	0	1
Liquidity	0.127	0.059	0.164	0	1
Nickell	0.293	0.059	43.050	-18505	83094
St Ind. LR	0.548	0.579	0.108	0.164	0.745
Lt Ind. LR	0.020	0.006	0.029	0	0.325
Total Ind. LR	0.693	0.694	0.053	0.381	0.821
Ind. Growth	0.058	0.065	0.057	-0.288	0.244
Tax Shield	0.005	0.005	0.005	0	0.063
Inflation	2.810	2.166	2.790	-4.481	25.296
GDP Growth	1.359	1.725	3.089	-17.955	12.233
Capital Flows	0.003	0.001	0.005	-0.020	0.042
Unemployment	8.185	7.900	4.452	2.300	49.700
Stock Prices	10.250	12.012	33.227	-82.190	189.230

Some preparation of the dataset is required: Any observations with missing data or implausible values for balance sheet items (e.g. negative revenues) are dropped. To eliminate coding errors and outliers, firms reporting short-term debt greater than total debt are deleted, similarly normalized ratios[359] that exceed the interval [0,1] or [-100%,100%], respectively, are deleted. The final sample is an unbalanced panel of 1,366,497 firms with 7,238,829 firm-year observations. There are less than 10 years of data for some firms because each year some firms enter or exit the sample. The number of observations is further reduced as we include more explanatory variables. In the baseline regression with country fixed effects N takes the value of N=3,220,380 firm observations (table A.7.2).

Table A.7.2 Results of estimating Equation (3)

[359] This includes the different leverage ratios, tax rate, profitability, tangibility and liquidity.

Variables	(1) **Total Leverage**	(2) **Long-term Leverage**	(3) **Short-term Leverage**
Size	0.006***	0.002***	0.003***
	(0.000)	(0.000)	(0.000)
Growth	0.000	-0.000	0.000*
	(0.000)	(0.000)	(0.000)
Profitability	-0.158***	-0.062***	-0.127***
	(0.001)	(0.002)	(0.001)
Tangibility	-0.029***	0.103***	-0.104***
	(0.001)	(0.002)	(0.001)
Liquidity	-0.080***	-0.004**	-0.076***
	(0.001)	(0.002)	(0.001)
Nickell	0.000	0.000***	-0.000
	(0.000)	(0.000)	(0.000)
Total Ind. LR	0.145***		
	(0.008)		
Lt Ind. LR		-0.092***	
		(0.014)	
St Ind. LR			0.161***
			(0.007)
Ind. Growth	0.008***	-0.024***	0.031***
	(0.002)	(0.002)	(0.002)
Tax Shield	1.104***	1.389***	-0.414***
	(0.020)	(0.096)	(0.025)
Inflation	0.001***	-0.001***	0.002***
	(0.000)	(0.000)	(0.000)
GDP Growth	0.001***	0.001***	0.000***
	(0.000)	(0.000)	(0.000)
Capital Flows	0.188***	-0.329***	0.502***
	(0.034)	(0.045)	(0.040)
Unemployment	-0.002***	0.001***	-0.003***
	(0.000)	(0.000)	(0.000)
Stock Prices	0.000***	-0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Year FE	Y	Y	Y
Firm FE	Y	Y	Y
Constant	Y	Y	Y
Observations	3,220,380	1,776,342	3,218,498
Number of firms	872,905	590,893	872,590
R-squared	0.113	0.131	0.221

NB: Robust standard errors clustered at firm-level in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Dependent variables, explanatory variables and underlying hypotheses

Three different measures for the capital structure of firms are used in the analysis: short-term, long-term and total debt over total assets, respectively, in line with Rajan and Zingales (1995) who demonstrate that ratios of liabilities to assets are an appropriate measure for financial leverage of companies as they serve as a proxy for what is left for shareholders in

case of liquidation.[360] On the other hand, the data set consists of three different groups of independent variables: firm characteristics, industry-specific parameters and country-specific variables.[361] Table A.7.1 provides summary statistics.

Firm-specific Factors

Firm age: As proposed by La Rocca et al. (2011) the age of firms as derived from the respective date of incorporation is included as a proxy for reputation. Mature firms have had the opportunity to grow and build up a credit history making it easier to acquire debt, and maturity of a firm and leverage should therefore have a positive relation.[362]

Firm size: One of the key determinants of leverage is firm size. Larger firms are usually more established in their markets, diversified and less likely to fail; size can be seen as an inverse measure of bankruptcy risk. There are different approaches which proxy to use for size: Rajan and Zingales (1995), Psillaki and Daskalakis (2009), and Köksal et al. (2013) use revenues, Frank and Goyal (2009), La Rocca et al. (2011), Degryse et al. (2012) and Fan et al. (2012) use (total) assets.[363]

Firm growth: Another important leverage factor is future business of a company (Rajan and Zingales (1995)). How firms react to investment opportunities determines their profitability and status in their respective markets. Again, different proxies have been used in the literature: Brav (2009), La Rocca et al. (2011) and Köksal et al. (2013) use percentage changes in sales, Frank and Goyal (2009), Chen and Yu (2011) and Degryse et al. (2012) use growth in terms of assets.[364] While the pecking order theory predicts a positive relation to leverage, the trade-off theory assumes a negative relation. Results from previous literature are mixed.[365] In the present study a positive relation between growth and leverage is predicted.

Firm profitability: More profitable firms tend to generate more cash flow and firms tend to prefer financing projects with internal funds before looking for external funding. Since retained earnings increase with higher profits, the need for debt financing decreases with higher profitability. In line with Frank and Goyal (2009), Psillaki and Daskalakis (2009), and Chen and Yu (2011) profitability is defined as EBIT over total assets. While the trade-off theory is ambiguous, the pecking order theory predicts a negative relation, as is the consensus in the literature.

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[360] Subsequent studies have followed this approach while other definitions include market values of equity or assets in the denominator (e.g. Shyam-Sunder and Myers (1999), Welch (2004), Faulkender and Petersen (2006), Antoniou et al. (2008), Frank and Goyal (2009)) as a result of the critic against book measures being backward looking. In addition, some studies have used interest coverage or debt maturity to measure leverage of firms (Rajan and Zingales (1995), Welch (2004), Frank and Goyal (2009), Fan et al. (2012)).

[361] All financial data is in thousand EUR.

[362] Age of companies is typically used in investigations into corporate financial decisions during a firm's life cycle.

[363] The pecking order theory is ambiguous but the trade-off theory postulates that leverage is positively affected by firm size as shown in most of the empirical studies.

[364] In order to mitigate problems of multicollinearity we also use growth in sales since several of the ratios used in our analyses are in terms of assets.

[365] Brav (2009) and Degryse et al. (2012) find a positive coefficient, while Rajan and Zingales (1995), Faulkender and Petersen (2006) and Fan et al. (2012) find a negative coefficient in their respective analyses.

Asset tangibility: We define tangibility as the fraction of fixed assets to total assets. The larger the fraction of fixed assets on a firm's balance sheet, the more assets it can pledge as collateral against debt and thus, diminish the agency costs borne by the investor. Also, liquidation values ought to be higher and easier to determine. Thus, it should be easier for a firm with more tangible assets to acquire loans. Both capital structure theories predict and the consensus in the literature is a positive relation between tangibility and leverage.

Liquidity: Firms with less liquidity may find it harder to attract debt as bankruptcy costs increase. Numerous definitions exist, for the present study cash equivalents over total assets are used as a good proxy for how well firms can demand payments from their debtors while holding off on their creditors. Both theories are ambiguous about the relation but Brav (2009) and Köksal et al. (2013) have shown a negative relation.

Debt Tax Shield / (Effective) Tax Rate: We also account for a country's fiscal policy. Taxes affect the size of the tax shield available to debt financing and also reduce retained earnings. Feld et al. (2013) carry out a meta-econometric analysis of the existing empirical literature and show that the marginal tax rate positively affects capital structures. However, Faulkender and Petersen (2006), Degryse et al. (2012), Fan et al. (2012) and Köksal et al. (2013) find that an effective debt interest tax shield is positively related to leverage, while effective taxation is negatively related to leverage. The pecking order theory is ambivalent about taxation, while the trade-off theory predicts a positive relation between tax rates and leverage.

Nickell Criterion of financial stress: This factor comes from Nickell and Nicolitsas (1999) and measures financial stress of a company in terms of how much of its cash flow the firm has to spend to cover debt expenses. Specifically, this flow measure allows to capture interest rate changes on debt.

Financial Constraint Index (FCI): This index measures how financially constrained a firm is in terms of a variety of different firm and industry characteristics. This is based on a structural model by Whited and Wu (2006).

Industry-specific Factors

Industry Leverage: As in La Rocca et al. (2011), Degryse et al. (2012) and Köksal et al. (2013), industry trends are picked up by the median leverage ratio of the group of firms with the same two-digit industry classification code. Early work by Harris and Raviv (1991) already suggested a strong relationship between industry affiliation and leverage ratios and highlights existing differences across industries but consistency within them. The trade-off theory suggests that inter-industry effects exist as the optimal leverage ratio may differ across industries. Also, the effects of aforementioned firm characteristics may vary across industries. The pecking order does not offer a clear prediction. Moreover, intra-industry effects can arise from competition and agency conflicts within a market. Firms may face higher pressure to assert to the optimal leverage ratio in more competitive situations while increasing leverage might deter takeover attempts or signal firm stability.

Industry Growth: To account for industry-specific demand shifts the development of industry size is picked up by average growth rates across groups of firms with the same two-

digit industry classification codes. There is an expected positive relationship with firm leverage.

Country-specific Factors

Inflation: Rising inflation decreases the value of debt and makes it cheaper for a firm. Also, tax deductions from debt financing are more valuable when inflation is expected to be higher. Indeed, the trade-off theory predicts and Frank and Goyal (2009) find a positive relation between inflation and leverage.

GDP Growth/unemployment/output gap: During times of economic prosperity collateral values increase and debt financing becomes easier. Agency problems between firms and investors become more severe in economic downturns. Thus, leverage should be pro-cyclical. However, internal funds of firms generally increase in economic expansion so that according to the pecking order theory firms might make less use of debt financing. Frank and Goyal (2009) find a positive relation while Köksal et al. (2013) find a negative one.

Stock Prices: We also want to take into consideration how expensive equity for public firms is. Thus, we include Standard & Poor's Global Equity Indices, which measure the performance of various stock exchanges around the world. Welch (2004) and Frank and Goyal (2009) argue that the effect of changing stock prices on capital structure may reflect overall growth prospects, relative price changes in asset classes or differences in agency costs. According to the market timing theory, equity issuance is pro-cyclical while debt financing is counter-cyclical. Firms may take advantage of mispricing in stock markets to reduce their capital costs. Thus, capital structure theories predict that stock price development and leverage ratios are negatively related.