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Essays on Regulation and Competitive Dynamics

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Declaration

This thesis is submitted as fulfilment of the Doctoral Course in Economic Sciences, XXIX Cycle SEAM, University of Messina.

I declare that Chapter 3 is forthcoming on the **Journal of Banking Regulation**.

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Chapter 1

1. Introduction

This thesis aims at analyzing how differences in the economic and institutional environment may shape the behavior of the economic actors. When differences in the type of economy, financial system, corporate governance, labour market institutions, regulations are involved, it is likely to have different outcomes when a cross-country analysis is of interest. In particular the thesis focuses on Germany and the UK. Germany and the UK are two European systems often under study, because of their opposite economic and institutional environment. This has made them very attractive as object of study, from different point of views.

The UK and Germany provide two extremely different examples of economies, financial markets, banking systems, and corporate governance mechanisms, labour market institutions and regulations, thus it is quite interesting to see whether these differences lead to differences in the economic dynamics.

According to the of the "varieties of capitalism" debate, the institutional complementarities deliver different corporate behaviours, investment patterns and governance practices. One underlying assumption is that each firm consists in a relational network, operating in the market and the environment in which it is institutionally embedded; i.e., it is assumed that firms' behaviour and labour dynamics

are intrinsically intertwined[1]. The proponents of the VoC school point to differences in corporate governance between Germany and the UK[2] In particular, the German economy provides an example of Coordinated Market Economy (CME), while the UK provides an example of Liberal Market Economy (LME). Therefore each of the two systems reflects the "status" of being driven by different policies: the German banking system by a more protectionist approach, while the UK system by more liberal policies. This in turn is mirrored by two different types of financial system which have been developed in the two countries (bank-based *vs* market-based systems)[3]. The German banking system is characterized by mainly public ownership. It appears to be extremely risk-averse, and it is mainly focused on its own stability at the expense of more profitable activities and competitive dynamics (i.e. a risk-oriented system). This in turn reveals the public function performed by banks within the country.

The UK banking system, instead, is characterized by mostly private ownership. It is more risk-taking, and it mainly focuses on profit-making activities which go beyond traditional banking activities (i.e. a profit-oriented system).

[1] Hanckè, B. 2009. Debating Varieties of Capitalism. Oxford: Oxford University Press.

[2] Dore, R. P. 2000. Stock Market Capitalism: Welfare Capitalism : Japan and Germany Versus the Anglo-Saxons. Oxford University Press. Hall, P. A., & Soskice, D. 2001. Introduction. Varieties of Capitalism (Hall, P.,). Oxford: Oxford University Press. Op cit. Hanckè

[3] Levine, R. (2002). Bank-Based or Market-Based Financial Systems: Which Is Better? Journal of Financial Intermediation, Vol. 11, pp. 398–428.

Therefore, the nature of the ownership, mostly public in the German banking system, and private in the UK; and the function performed by the banking system in each of the two economies, reveal the inner difference between the two systems.

The "status" of being driven by different policies, more protectionist in Germany and more liberal in the UK, influences also the institutional context in which the two countries operates. From this point of view, companies in the UK and Germany operate within radically different environments of corporate control[4]. According to the VoC school, there exist two alternative models of corporate governance: (i) the "shareholder" model; (ii) the "stakeholder model". The shareholder model focuses on the maximization of shareholder value, and only shareholders enjoy strong formalized links with top management. In the case of the stakeholder model, instead, a variety of firm constituencies, including employees, suppliers and customers, and the communities companies are located in, enjoy "voice" in the firm. In that model all these interests need to be balanced against each other in management decision-making.

While Germany is one of the foremost examples of the stakeholder model, the UK instead represents an example of the "shareholder" model, instead. The German system is characterized by more formal participation in the decision-making

[4] Vitols, S. Varieties of Corporate Governance: Comparing Germany and the UK, in The Institutional Foundations of Comparative Advantage, Hall, P. A., and Soskice, D, (eds), 2004 Oxford University Press.

process by the different firm constituencies, and a strong control on the amount of equity by shareholders who have a long-term commitment to the company.

In the UK, instead, is characterized by the weak formalized role of constituencies other than shareholders in firm decision-making. It is characterized by large, well-developed equity markets where the equity in each company is controlled by the shareholders[5].

Finally the last important element which makes us distinguishing between the two systems is the degree of elasticity of the labour markets in the two systems. From the point of view of the labour market institution and regulation the UK is among the countries with the least restrictive employment protection legislation, while Germany has relatively strict employment protection[6].

The high costs related to firing, dismissals or redundancies, make the German labour market less flexible, also in terms of job mobility, than the UK labour market.

Moreover, unlike the UK, Germany has a tight corporatist labour market, with centralized wage negotiations. Although there are no legal minimum wages in Germany, the union membership is able to affect the wage.

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[5] Conyon, M. J., Schwalbach, J. (2000). Executive Compensation: Evidence from the UK and Germany, Long Range Planning, 33, pp 504-526.

[6] Dustmann, C. and Pereira, S. C. (2008). Wage Growth and Job Mobility in the United Kingdom and Germany, Industrial and Labour Relations Review, 61, 3 pp. 374 393. Fortin, N., Lemieux, T. and Firpo ,S. (2011) Decomposition Methods in Economics.
Handbookof Labour Economics, Elsevier.

The UK is instead characterized by the overall mobility, and more flexibility in the wage determinants. In the UK the wage is overall less regulated, there is no minimum wage and the impact of the collective bargaining is very low. These differences can lead to differences in the returns to tenure and experience, since unions tend to be associated with reduced wage dispersion in general and lower returns to labour market experience in particular.

In the light of the above, the remaining of this thesis is developed into three main chapters and some concluding remarks. Chapter 2 is divided into two parts. The first part provides an overview of international banking regulation. In particular it studies the international standards on capital requirements, namely the Basel Accords[7]. The second part provides the comparative analysis of the German and the UK banking system. In particular, it firstly describes the structure of the German banking system and the UK banking system respectively, by highlighting their main characteristics. And secondly analyses these characteristics on a comparative base. This part of the thesis aims at providing the theoretical framework for the analysis which will be developed further. The above analysis refers to the impact that the

[7] Basel I (1988), Basel II (2004), and Basel III (2010) represent the prudential banking regulation issued by the Basel Committee on Banking Supervision, with the aim of promoting worldwide supervision and enhancing financial stability at a global level. To this purpose, capital requirements ensure that banks keep enough capital so that they are able to manage the risks they take in carrying out their activities. R. M. Lastra, (2004), 'Risk-based Capital Requirements and Their Impact Upon the Banking Industry: Basel II and CAD III', Vol. 12, *Journal of Financial Regulation and Compliance*, pp. 225-239. Basel Committee on Banking Supervision (2014),'A Brief History of the Basel Committee', available at http://www.bis.org/bcbs/history.pdf.

international banking regulation has in the competition dynamics in the banking system, when applied to different economies.

Chapter 3 aims at answering the question: Does the implementation of the same rule, in this case Basel, lead to different incentives in banks' competitive behaviour, if applied to systems based on economies with different characteristics, namely Germany and the UK? This question is of crucial importance because, the degree of competition in the banking sector is beneficial for the stability of the banking system and, therefore, it is also thought as a good substitute for regulation. However, regulations on capital may impose a strict burden on banks, because it may significantly raise the costs of entering into, or staying in, the market and dampen competition dynamics. In this work the level of competition measured *via* the Panzar and Rosse (1987) statistic arguing that the market power of a firm can be measured by the way in which the changes in the input prices affect the equilibrium of revenues. The empirical analysis shows that in a stability-oriented system, such as that in Germany, which is characterized by the risk-reducing drive of its policy and regulation, the implementation of Basel has the impact of aligning the incentives of banks and regulators. In a market-based system, such as that in the UK, the impact of Basel shapes banks' behaviour towards less competitive dynamics and creates a particular category of banks which produces in monopolistic conditions.

Chapter 4 of the thesis aims at answering the question: Are institutional environments of different economies able to design compensations so that there is no incentive for the CEO to migrate? Answering this question is crucial as it gives

insights on the relationship between job mobility and human capital management with respect to knowledge transfer and safeguard of the firm's competitive capabilities at the international level. I answer this question by using Germany and the UK as examples and the Oaxaca (1973) decomposition of the mean of wages. My results suggest that, other things being equal, there exists a pay gap in the fixed component of the CEO compensation across the two economies;(ii) there is a substantial difference in what the two economies pay for the CEO position, with the UK paying a substantially higher premium; (iii) the premium is both due to the UK paying a higher premium for the characteristics the CEO is endowed with, and to the difference to the institutions and regulations the two economies have in place.

Chapter 2

A comparative analysis of the UK and German banking systems

1. Introduction

The aim of this chapter is to provide an overview of international banking regulation in the light of a comparative analysis of two alternative economies: Germany and the UK. In particular it studies the international standards on capital requirements, namely the Basel Accords[8], and aims at providing the theoretical background for further analysis which will be developed in remaining part of this thesis. The above analysis refers to the impact that the international banking regulation has in the competition dynamics in the banking system, when applied to different economies.

Banks provide indeed an array of services and perform activities that involve individuals (e.g. depositors and consumers) and their wellbeing, and hence the interests underlying banking activities are public in nature. This is ultimately why the

[8]Basel I (1988), Basel II (2004), and Basel III (2010) represent the prudential banking regulation issued by the Basel Committee on Banking Supervision, with the aim of promoting worldwide supervision and enhancing financial stability at a global level. To this purpose, capital requirements ensure that banks keep enough capital so that they are able to manage the risks they take in carrying out their activities. R. M. Lastra, (2004), 'Risk-based Capital Requirements and Their Impact Upon the Banking Industry: Basel II and CAD III', Vol. 12, *Journal of Financial Regulation and Compliance*, pp. 225-239. Basel Committee on Banking Supervision (2014),'A Brief History of the Basel Committee', available at http://www.bis.org/bcbs/history.pdf.

main concern of the regulator is to foster competition and stability in the banking system.[9] Basel pursues this aim with rules regarding both the optimal level of capital that banks have to hold (Pillar I), and the complementary supervisory review of the banks' compliance to the capital requirement rules (Pillar II), and the market discipline *via* disclosure, where the aim is enhancing banking transparency (Pillar III).[10]

The 2007/09 financial crisis proved regulation to be somewhat inadequate. This is why, in the aftermath of the crisis, there is the quest for new financial regulation so as to avoid further crisis phenomena. What is believed is that, in order to foster stability in the banking system, there is the need for stricter capital requirements and closer supervision.[11] However regulation, depending on its own provisions, is also likely to affect the competitive environment by either relaxing or imposing restrictions, which are then likely to lead to changes in the incentives the players have. In turn, competition is known to be a substitute for regulation because of the discipline it exerts on the current operators.[12]

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[9]S. C. Dow, (1996), 'Why the Banking System Should be regulated?' Vol. 106, *The Economic Journal*, pp. 698-707.

[10]Basel Committee on Banking Supervision, (2006), 'Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Comprehensive Version' available at http://www.bis.org/publ/bcbs128.htm. Basel Committee on Banking Supervision (2010), 'Basel III: A global regulatory framework for more resilient banks and banking systems', available at http://www.bis.org/publ/bcbs189.pdf

[11]R. M. Lastra, and G. Wood, (2010), 'The crisis of 2007-2009: Nature, Causes, and Reactions', Vol. 13, *Journal of International Economic Law*, pp. 531-550.

[12]E. Nier, and U. Baumann, (2006), 'Market Discipline, Disclosure and Moral Hazard in Banking', Vol. 15, *Journal of Financial Intermediation*, pp.332-361.

There exists a strict link between regulation and competition. Banks' economic performances are actually shaped by regulatory provisions.[13] This is important because competition is in turn thought to enhance financial stability.[14]

Germany and the UK provide the main European examples of two different types of financial system (bank-based *vs* market-based systems)[15] and act in two opposite economic environments (Coordinated Market Economies *vs* Liberal Market Economies).[16] The German banking system is characterized by mainly public

[13]R. Gudmundsson, K. Ngoka-Kisinguh, and M.T. Odongo, (2013), 'The Role of Capital Requirements on Bank Competition and Stability: The Case of the Kenyan Banking Industry', *KBA Centre for Research on Financial Markets and Policy*, Working Paper 02. P. Angelini, and N. Cetorelli, (2003), 'The Effect of Regulatory Reform on Competition in the Banking Industry', Vol. 35, *Journal of Money, Credit and Banking*, pp 663-684.

[14]Fostering the optimal balance between costs and production helps the efficiency of banks. In turn, this leads to a higher quality of products, and enhances innovation and stability in the banking sector. OECD Competition Committee (2010), 'Competition, Concentration and Stability in the Banking Sector', Roundtable on Competition, Concentration and Stability in the Banking Sector available at http://www.oecd.org/competition/sectors/46040053.pdf. See also, K. Schaeck, M. Cihak, and S. Wolfe, (2007), 'Are More Competitive Banking Systems More Stable?' Vol. 41, *Journal of Money, Credit and Banking*, No 4, pp. 711-734. S. Claessens, and L. Leaven, (2004), 'What drives bank competition? Some international evidence', Vol. 36, *Journal of Money, Credit and Banking*, pp. 563-583. See also, Op. Cit., Bikker, J. A. and. Bos, J. W. B. (2009).

[15]While in bank-based financial systems, banks play a leading role as the suppliers of external funding to non-financial firms; in the market-based financial systems, instead, the securities market plays the leading role in firms' financing choices. R. Levine, (2002), 'Bank-Based or Market-Based Financial Systems: Which Is Better?' Vol. 11, *Journal of Financial Intermediation*, pp. 398–428.

[16]The Liberal Market Economies (LME) are characterized by large, well-developed equity markets, and rely more on the market forces and in competitive market arrangements. The Coordinated Market Economies (CME), rely more on non-market relationships, like strategic interaction among firms and other actors. S. Vitols, 'Varieties of Corporate Governance: Comparing Germany and the UK, in Varieties of Capitalism', *The Institutional Foundations of Comparative Advantage*, P. A. Hall, and D. Soskice, Oxford, (2004).

ownership. It appears to be extremely risk-averse, and it is mainly focused on its own stability at the expense of more profitable activities and competitive dynamics (i.e. a risk-oriented system).[17] The UK banking system, instead, is characterized by mostly private ownership. It is more risk-taking, and it mainly focuses on profit-making activities which go beyond traditional banking activities (i.e. a profit-oriented system).[18] The likely outcome which the comparative analysis suggests is that as the German system is risk-oriented and the UK system is profit-oriented, the latter is much more likely to be impacted by strict burdens on capital requirements. The former, however, is more likely to be already on the way to having higher capital than required because of the risk-reducing drive of their policy and regulation.[19]

The remainder of the paper proceeds as follows. Section II provides an overview of Basel regulatory landscape; Section III provides the comparative analysis of the German and the UK banking system; section IV provides some concluding remarks.

[17]D. Afanasenko, and P. Reichling, 'The German Banking System: Structure, Regulation and Basel II Implementation', *Basel II: Problems and Prospects of Usage in National Banking System,* Yepifanov and Shkolnik, Sumy 2010.

[18]C. Gola, and A. Roselli, *'The UK Banking System and Its Regulatory and Supervisory Framework'*, Palgrave Macmillan Studies in Banking and Financial Institutions, Philip Molyneux, 2009.

[19]The evidence of the higher number of failures, mergers and acquisitions in the UK banking system, compared with the German system during 2007 onwards, can be seen in the light of a higher cost of adjustment to equilibrium of the former with respect to the latter, and therefore a higher cost of adjustment to Basel.

2. The rationale for banking regulation

2.1 Why should banks be regulated?

The financial system, which includes banks and other financial intermediaries, equity markets, and debt markets, is the marketplace where households and firms exchange resources by channeling funds from agents who have a surplus to agents with deficits[20]. In fact, the financial system allows for capital to be collected from many smaller savers, agglomerated and allocated to the most important of uses. This in turn fosters the efficient use of capital[21].

The financial system provides three main services: (i) payment[22] and settlement system[23]; (ii) intermediation between savers and borrowers; and (iii) helps

[20] On the one hand, individual entrepreneurs do not usually have enough capital to undertake investments themselves. On the other hand, the individual saver would not be able to afford large-scale investments and would therefore face a large degree of risk with little liquidity.

[21] If the savers' funds, instead of being used by the individual saver, are pooled and invested, for example by a firm, this increases the opportunity of returns to scale. In fact, these resources are transferred from individual savers to agents with managerial and entrepreneurial expertise, who are likely to undertake larger and more profitable investment projects. What defines a well-functioning financial system is the degree of goodness of the investment project. Low-productivity investments, indicate that the financial system is functioning poorly. Levine, R. (1997). Financial Development and Economic Growth: Views and Agenda, Journal of Economic Literature, Vol. 35, pp. 688-726.

[22] A payment indicates the transfer of funds from the payer to the payee, which then discharges an obligation on the part of the payer to the payee. The payment system encompasses the institutions and technologies which facilitate a transfer of this kind. The Financial Services (Banking Reform) Act 2013 defines the "Payment system" as "a system which is operated by one or more persons in the course of business for the purpose of enabling persons to make transfers of funds, and includes a system which is designed to facilitate the transfer of funds using another payment system".

[23] In a transaction, the settlement activity indicates the delivery of goods and services in exchange for the delivery of funds. In particular, according to the Financial Services (Banking Reform) Act 2013: "Securities settlement system means a computer-based system, and procedures, which enable

with managing and diversifying risk[24]. These are of key importance for a well-functioning economy because, as we have seen, they affect the allocation of capital, and also involve the production and exchange of goods and services. The payment and settlement system services provide deposit and custody accounts, and the efficient functioning of payments between households and companies.

The intermediation refers to the services which transform household savings, which are usually pooled into deposit accounts, pension funds or mutual funds, into funding for households, companies or the government.

Finally, it facilitates risk amelioration by providing liquidity[25]and fostering risk diversification techniques[26], such as securitization[27] and derivatives[28].

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title to units of a security to be evidenced and transferred without a written instrument, and which facilitate supplementary and incidental matters".

[24] Davies, R. and Richardson, P. (2010). Evolution of the UK Banking System, Bank of England Quarterly Bulletin Q4, pp. 321-332.

[25] Liquidity refers to the possibility of quickly converting an illiquid asset into a marketable asset. An asset is said to be marketable if it is easily convertible into cash, and thus into purchasing power. Levine, R. (1997). Financial Development and Economic Growth: Views and Agenda, Journal of Economic Literature, Vol 35, No. 2, pp. 688-726.

[26] Risk is the chance that the actual returns of an investment will be different from that which is expected. Since risk refers to unknown events, it cannot be eliminated. However, it can be reduced and managed through the diversification technique. Diversification reduces the risk by allocating investments among various financial instruments and industries.

[27] It is a technique (the so-called originate-to-distribute model) that, on the one hand, allows issuers to transform otherwise illiquid assets into marketable capital market securities so as to diminish liquidity risks; on the other hand, it allows the credit risk to be diversified because it is transferred and spread to the end investors.

[28] The financial derivatives are securities, the price of which derives from the price of the underlying asset.

Hull, J. (2014). Options, Futures, and Other Derivatives, Pearson Prentice Hall.

Within this system, banks are archetypal financial players. The banking system is of crucial importance for the whole economy, because it makes it possible for an array of everyday commercial transactions and financial operations to be carried out by bank users themselves[29]. Today's banking system is diversified in different lines of business. According to the line of business in which a bank engages, there are differences not only in the activities, but also in the risks faced by the bank[30]. The traditional activity of banks is to accept deposits and make loans[31]. Banks make profits by charging loans with an interest rate[32] which is higher than the rate they pay to the depositor[33]. Therefore, profits are provided by the difference

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The most common types of derivative are: future contracts, forward contracts, swaps and options, and their main function is to hedge the risk. For example, with a future or a forward contract, the counterparties agree to buy or sell an asset (underlying the derivative) at a future time at a certain price. This means that the contract locks the price for the future asset sale and the counterparties manage the risk of changes in the assets price over time.

[29] Banks act as payment agents. A large amount of commercial transactions, the exchange of goods and services, are carried out more conveniently without having to carry around a large amount of actual currency or use cheques, debit or credit cards, instead, which are provided by the bank.

[30] Banking involves an array of risks, such as credit risk, market risk, liquidity risk, interest rate risk, and operational risk... In commercial banking, the most common risks banks are exposed to are: (i) credit risk, which refers to the counter-party's default; (ii) liquidity risk, which refers to the inability of the bank to meet its cash needs, whenever necessary; and (iii) interest rate risk, which is due to changes in the interest rate. Hull, J. C. (2012). Risk Management and Financial Institutions, pp. 21-39 and 121-136, Wiley Finance.

[31] Apart from deposits, which are the main source of loans' funding, banks raise capital by issuing equity or debt. Equity is an important part of a bank's capital from the regulatory point of view as well. The regulatory ratio of Basel, for instance, is mainly based on common equity, which is the shareholders' capital.

[32] Revenues generated by banks' assets.

[33] Funding costs, that is the cost of the money.

between revenues and banks' costs of funding. Deposit-taking and lending activities are mainly what identify commercial banking. In fact, what commercial banks do is to collect money from depositors and lend it to the public who, in turn, use it to buy goods and services, and realize business operations[34]. Both deposits and loans are, in a sense, matters of borrowing: banks borrow from savers, in the form of deposits (in order to lend to the public); the public borrow from banks in the form of loans. From the bank's point of view, while deposits are liabilities, loans, on the other hand, are assets. However, deposits and loans have different maturity which are very short for deposit (withdrawable on demand)[35], and longer for loans[36]. Therefore, what the bank does is to borrow short-term liquid liabilities and to lend long term highly illiquid assets[37]. The ability of banks to borrow short-term and lend long-term is called "maturity transformation". This is an important function performed by the banking system, since it is functional to the "money creation activity"[38]. Maturity transformation indicates the ability of the banking system to transform liabilities, which have very short maturity, into assets, which, on the other hand, have very long maturity. The maturity transformation function is made possible by "fractional reserve banking". According to the fractional reserve policy,

[34] This, in turn, should trigger the virtuous circle on the basis of which money is collected by the bank, lent to the public and then invested in order to create more wealth, so as to come back to the bank in the form of more deposits.

[35] Depositors can draw money from their own accounts at any moment.

[36] For example, mortgages are normally repaid over tens of years.

[37] This is what is referred to as "maturity mismatch".

[38] The activity of "money creation" does not refer to the classical "printing money activity". It refers to the "fractional reserve banking", which is a key concept in understanding how banking functions.

banks are required to keep only a small fraction of the deposits on hand as reserve in order to meet depositors' demands. A major amount of money is instead lent to the public, who, in turn, buy goods and services, and make investments in order to ultimately create further wealth. This is why, according to the Federal Reserve, a bank is actually creating money whilst lending funds. What the fractional reserve realizes, in the end, is a more efficient use of these funds[39].

Commercial banking encompasses: (i) retail banking; and (ii) wholesale banking. The retail banking sector takes relatively small deposits from private individuals or small businesses and makes relatively small loans to them. The wholesale banking sector, however, is characterized by operations of a larger scale, since it provides services to medium and large corporate clients, fund managers, and other financial institutions[40].

Besides deposit-taking and loan activities, the banking system is diversified into other activities which can be defined as non-traditional banking activities. Most large banks are involved in investment activities and act on behalf of their clients. Investment banking is a very different business from commercial banking, and it can be defined as being purely fee-driven[41] lines of business. Investment banking

[39] In fact, on the one hand, it should be considered that banks make profits by charging the borrowers an interest rate which is higher than the rate they pay to the depositors. On the other hand, if banks kept all the available deposits, it would be likely that the depositors would need to pay additional fees to banks for further safekeeping services. Thus we can conclude that, keeping all the deposits within banks will make both banks and depositors worse off.

[40]Hull, J. C. (2012). Risk Management and Financial Institutions, pp. 21-39 and 121-136, Wiley Finance.

[41] In the sense that banks act on behalf of their clients and take profits from the payments of the fees for the services provided.

provides companies with assistance in asset management, for example assisting companies in raising equity and debt[42], securities brokerage[43], or in taking important corporate finance decisions, such as mergers or acquisitions[44]. Large banks often engage in securities trading[45]. What makes the difference between the two lines of business is the role of banks, and consequently the risks banks are exposed to. In the case of purely fee-driven activities banks, they act as agents for their clients, therefore they do not "directly" put equity capital at risk[46]. In the case of trading activities, banks either make their own investments or they take the position of stakeholders, and are then more exposed to market risk[47].

[42] If a company is interested in raising equity or debt in order to fund a project, for example, it hires an investment bank. The latter, in its capacity as underwriter, acts as a middleman between the company, that wants to issue new securities, and the buying public. In particular, it determines the value and riskiness of the business for the new security to be priced, underwritten and sold.

[43] A securities brokerage is a firm which employs brokers authorized to buy and sell stocks, bonds and other securities on behalf of its clients. In exchange, clients will pay a commission for that service.

[44] Mergers and acquisitions, provide one of the most important source of fee income to investment banks, the role of which is to advise buyers and sellers on business valuation, negotiation, pricing and structuring of transactions, and on the procedure and implementation. For example, one of the most important analysis is the accretion/dilution analysis, which aims at investigating the profitability of the business.

[45] Security trading refers to the activity of buying debt or equity and sell it in the short by exploiting the expected increase in the price.

[46] Banks can make equity capital at risk indirectly, for example because of operating losses (business risk).

[47] The movement in market prices.

The central bank stands at the top of this system and represents the monetary authority of a country. In reality, the central bank performs an array of functions[48] which make it of central importance to the financial system. The rationale for central banking has changed over the years as it has adapted to historic contingencies[49]. Nowadays, the rationale for central banking is a dual one which enhances monetary stability[50] and financial stability[51]. Among the main functions of the central bank, the power of issuing notes represents a traditional one. This task is, in fact, functional to the original rationale for the central banking establishment, which was, essentially, government financing[52].

[48] For example, note issue, government finance, monetary policy, banking supervision and regulation, banker's bank, lender of last resort, smooth operation of the payment system, management of gold and foreign reserves, conduct of foreign exchange operations, debt management, exchange controls, development and promotional tasks, and others. Lastra, R. M. (2015). International Financial and Monetary Law. Oxford University Press.

[49] The original rationale for central banking was the note issuing function and government financing (especially in war-time). The need to keep excessive inflation in check led to the creation of the Bundesbank in Germany in 1957 with a new mandate of prices stability. The same mandate became the main rationale for the establishment of the European Central Bank in 1999. Finally, the 2007/09 financial crisis highlighted the close link between monetary stability and financial stability and the opportunity of not treating them as disjoined tasks, especially from the point of view of macroprudential supervision.

[50] Monetary stability means stable prices and confidence in the currency. Bank of England available at http://www.bankofengland.co.uk/monetarypolicy/Pages/default.aspx

[51] Financial stability is a broad concept which refers to the safety and soundness of the financial system and to the stability of the payment and settlement system. Lastra, R. M. (2006). Legal Foundations of International Monetary Stability, pp. 34-106, Oxford University Press.

[52] The power of issuing notes also allows the central bank to act as lender of last resort, which remains a major rationale for most central banks around the world, both in developed and developing countries. Op. Cit., Lastra, R. M. (2015).

Another fundamental function is that of defining the monetary policy within a country. This is the suitable instrument by which the central bank promotes monetary stability. The monetary policy deals with money supply. This is the total amount of monetary assets available in an economy, and it is carried out by setting ~~the~~ interest rates[53] according to the government's inflation target[54], so as to keep prices stable and inflation low[55].

There exists a the two-sided relationship between the central bank and the banking system. On the one hand, the central bank can also act, as a banker of banks through the lender of last resort (LOLR) and, on the other hand, as a banking supervisor[56] and regulator, in order to foster prudential banking behaviour, prevent bank runs, and enhance stability. The LOLR is the injection of liquidity which, under certain conditions, can be provided to the banking sector during times of bank insolvency or financial crisis. The LOLR aims at temporarily preventing illiquid

[53] The interest rate is the price at which money is lent.

[54] The central bank fixes its official interest rate, which is the Bank Rate, on the basis of a government's inflation target. If the demand for goods and services in the economy exceeds supply, inflation tends to rise above the Bank's target rate. In order to re-balance the relationship between demand and supply of goods and services, the central bank will change the Bank Rate. This change will, in fact, influence the overall level of activity in the economy. Op. Cit. Bank of England.

[55] Low inflation is a factor which helps long-term stability in the economy with sustainable growth and employment.

[56] While in some jurisdictions this constitutes a "typical" function of the central bank, in others it does not. It is true that in the aftermath of the 2007/09 financial crisis, the role of the central bank as a supervisor was revisited (for example, in the UK, the Financial Services Act 2012 returned the role of supervisor to the Bank of England. It had been transferred to the Financial Services Authority in 1997). The central bank is in fact seen as a suitable institution for performing supervision at the macro level. Op. Cit., Lastra, R. M. (2015).

but solvent banks[57] from failing, by providing short-term loans[58]. Interestingly, it has been highlighted that, in reality, the LOLR performs multiple functions and that the different functions performed by the central bank are interconnected. For example, while the central bank is setting the discount rate at which the central bank lends, the LOLR is used as an instrument of monetary policy. In addition to this, it becomes an instrument of supervision of the financial institution which gets into difficulty[59].

This helps us to understand why banking activities have become increasingly important in modern life and how a wide range of everyday financial transactions are made possible by the banking services provided. Therefore, the failure of a bank

[57] This situation happens when the financial institution holds more assets than liabilities (thus, it is solvent). However, these assets are highly illiquid, so this then raises the risk of insolvency.

[58] There are other principles which apply to the LOLR: (i) The central bank should lend freely, but charge a penalty rate; (ii) the central bank should accommodate anyone with good collateral, valued at pre-panic prices; (iii) the central bank should clarify its readiness to lend freely in advance. However, being illiquid but solvent is a necessary, but not sufficient, condition. In fact, while the central bank is acting as banker of banks, it is performing a function which is of public interest, this is why banks will be provided with liquidity only if the interest of the entire financial system, and not only the specific institution, is involved. In other words, since costs related to the LOLR are borne by the public, the central bank will decide for the injunction of liquidity, only if there is a systemic risk related to the difficulty of the single institution. The central bank is the one which judges, on the basis of cost-benefit analysis, if the request for liquidity is in public interest. The voluntary, therefore non-mandatory, nature of this task is, in fact, one of the basic principles which applies to the LOLR. Lastra, R.M. (2011). Cross-Border Bank Insolvency. Oxford University Press, UK

[59] Op.Cit., Lastra, M. R. (2011).

and the potential loss of access to banking services, even for a short time, can seriously affect the ability of people to live their lives because their major concern is the potential loss of their deposits held within the bank[60].

From the point of view of deposit activities, banks are important because individuals usually place a substantial amount of their funds into a bank and these may be withdrawn on demand and transferable to make payments. These "demand deposit powers" make banks agents in many financial transactions and payments systems, which in turn fosters the exchange of goods and services. From the point of view of lending activities, they have a pivotal role in providing credit, both to enterprises and individuals, thus determining how a large portion of credit is to be allocated across a country. Through the combination of these activities, banks can affect the aggregate supply of money and credit and therefore the overall condition of the economy[61].

It is because of these particular activities and their impact on the economy as a whole, and as well because of the consequences that banking activities may have on individuals, who consequently need to be protected, that banks are treated as a matter of public interest, and this is why they have been heavily regulated. In particular, the cause of regulatory concern is the financial fragility of banks due to the features of their balance sheet: (i) low cash to assets (fractional reserve banking);

[60]House of Commons Treasury Committee (2007). The Run on the Rock, Fifth Report of Session 2007–08, Vol. I.

[61]Spong, K. (2000). Banking Regulation: Its Purposes Implementation, and Effects, Division of Supervision and Risk Management Federal Reserve Bank of Kansas City, p. 5-14.

(ii) low capital to assets (high leverage); and (iii) maturity mismatch (short-term liquid liability withdrawable on demand and long-term highly illiquid assets)[62].

Another reason for regulating the banking sector is the range of risks that a bank runs in carrying out its activities: the credit risk, the market risk, the liquidity risk, the interest rate risk, and the operational risk.

Credit risk is the risk that the counterparties in loan transactions and derivative transactions are not able, or willing, to meet their obligations (default). This type of risk also refers to the case of a sovereign debtor (sovereign risk). Another credit risk is when, even if the debtor is creditworthy, the loan will not be repaid because of changes in government policy or changes in the economic conditions (country transfer risk).

Market risk is the volatility of the prices in the financial market and it arises mainly from the bank's trading operations. This risk has become of increasing concern for regulators because the evolution of the banking sector, due to financial innovation, has brought greater involvement in the security market, thus leading to more complex operations and a greater exposure of banks to market risk.

Liquidity risk[63] refers to the ability of a financial institution to meet its cash needs, whenever necessary. It is, however, worth stressing the difference between solvency and liquidity. A financial institution is solvent when it holds more assets than liabilities, therefore its equity is positive. Liquidity refers to the ability to make

[62]Lastra, R. M. (2004). Risk-based Capital Requirements and Their Impact Upon the Banking Industry: Basel II and CAD III, Journal of Financial Regulation and Compliance, Vol. 12, pp. 225-239.

[63]Op. Cit. Hull J. C., (2012).

cash payments as they become due. A financial institution, although solvent, can fail because it lacks liquidity, e.g. when a bank, whose assets are mostly illiquid mortgages, bears a huge withdrawal of deposits due to maturity mismatch[64]. In this case it is referred to as liquidity funding risk. Liquidity funding risk is related to liquidity trading risk, which is the lack of marketability of a bank's assets since it becomes difficult to sell them. There is a strong relationship between the two, because one way for the institution to meet its funding needs is to liquidate part of its trading book. Like market risk, liquidity risk has become of increasing concern to regulators because of the above-mentioned complexity which characterizes today's banking system and which makes it more difficult to predict the cash needs of a bank.

Interest rate risk arises when there are changes in the interest rate. To put it simply, a bank's earnings consist of interest payments on loans less interest payments on deposits, etc., and costs. The interest rate risk emerges particularly when the rate that banks pay for deposits or other funds increases faster than the rate earned on loans. This risk increases when there is a high degree of maturity mismatch between assets and liabilities because banks are very sensitive to interest rates movements. This risk can also involve cross-country operations (foreign exchange interest rate).

Operational risk consists of several risks. It may be negatively defined as losses which are not related to credit or market events. Such occurrences involve

[64]The case of the run of the Northern Rock (a British bank) is an example.

fraud, settlement errors, accounting and modelling mistakes, lawsuits, natural disaster, IT breakdown, and other types of losses[65].

2.2 The purpose of financial regulation

The dual goal of financial regulation is to preserve financial stability and enhance confidence in the banking system[66]. Financial stability is a broad concept which refers to the safety and soundness of the financial system and to the stability of the payment and settlement system[67]. Confidence and trust play a central role in the banking sector. The loss of confidence and trust may weaken the ability of banks to attract deposits as a source of financing or to attract capital from investors[68].

[65]The inclusion of this type of risk in Basel II, in order to calculate the amount of regulatory capital needed, has given rise to too many issues which range from the difficulty to clearly define this risk to the method used to calculate it. Lastra, R. M. (2004). Risk-based capital requirements and their impact upon the banking industry: Basel II and CAD III, Journal of Financial Regulation and compliance, Vol.12, No 3, pp. 225-239.

[66]It is worth noticing that the achievement of this goal is pursued not only by the regulatory task, but also by supervision and crisis management activities. Regulation refers to the rule-making activity; supervision refers to the enforcement of the regulation; crisis management refers to the instruments available to the authorities in case of a pathologic stage of a bank's life. It is necessary to ensure that if a bank gets into financial difficulties, this stage is handled in an orderly manner in order to prevent further damage to the economy, the financial system and the interests of small depositors. In particular, these instruments are: lender of last resort, deposit insurance and insolvency proceedings. Garicano, L. and Lastra, R. M. (2010).Towards a New Architecture for Financial Stability: Seven Principles. In Cottier, T., Jackson, J. H. and Lastra, R. M. (eds.) International Law in Financial Regulation and Monetary Affairs, pp.72-94, Oxford University Press.

[67] Op. Cit., Lastra, R. M. (2006).

[68]Kjeldsen, K. (2004). The Role of Capital in Banks, Monetary Review, 3rd Quarter.–Danmarks Nationalbank., pp. 57-69.

Since the costs of a crisis to individuals can be quite large, and usually they exceed the private costs of financial institutions, it is important that regulation fosters an internalization of these costs. This achievement requires the fulfilment of different tasks: (i) to grant the protection of individuals (depositors and consumers), (ii) enhance the smooth conduct of a business (efficiently and competitively), (iii) safeguard the payments' system, and (iv) contain systemic risk and prevent the risk of contagion[69].

Protection of individuals

Banks' depositors have a particular relationship with their own bank, and it is one which makes them different from other kinds of customers in most other businesses. First of all, since they hold deposits, depositors use their a bank when writing and cashing cheques and carrying out other financial transactions, therefore assuming the position of creditors of the bank. This implies that any event which affects the bank's financial conditions is likely to have a direct effect on the position of the depositors. Given that banks run too many risks, depositors consequently run the risk of a bank's failure before their deposits have been withdrawn.

Another feature of this relationship, which deserves caution, is due to the fractional reserve system on which banks operate. Deposits are only partially backed by the reserves banks hold in the form of cash and balances. This determines that there are many other factors which can affect depositors' financial safety, including

[69]Lastra, R. M. (2011). The Quest for International Financial Regulation, Inaugural Lecture, Charterhouse Square.

the capital in a bank and the condition and value of its loans, securities, and other assets[70]. The high costs and complexity of eventual investigations into these factors also make it difficult for depositors to acquire important information regarding a bank's financial condition.

Individuals are also safeguarded by a better disclosure of deposit and credit terms. One of the features of the services industry in general, but particularly acute in banking, is information asymmetries. These refer to the fact that the provider of the service knows much more than its consumer. The aim of better disclosure is to allow consumers to make informed choices when considering different institutions and financial instruments, and to protect borrowers from abusive practices by making them more aware of the costs and commitments in financial contracts.

Efficiency and competition

Efficiency and competition are closely linked. A competitive market ensures efficiency, which is the optimal balance between costs and production. In turn, this leads to a higher quality of products, lower prices, enhanced innovation and stability in the market. Moreover, to be able to grant the optimal allocation of resources, which is where they are of greatest value, it is necessary to foster competition within the banking sector and between banks and other industries[71].

Safeguard the payments' system

[70]Bikker, J. A. and. Bos, J. W. B. (2009). Bank Performance: A Theoretical and Empirical Framework for the Analysis of Profitability, Competition and Efficiency. Routledge International Studies in Money and Banking.

[71]Global Financial Development Report (2013). The Role of the State in Promoting Bank Competition, pp.81-100.

Another important task to be fulfilled by the regulation is the safeguard of the payments system. Banks' liabilities are used as money, and as long as their deposit ratio is sufficiently high, banks can hold long-term assets without incurring illiquidity conditions. It is necessary to ensure that banks' assets retain sufficient liquidity to meet any reduction in deposits and discourage such a reduction in the first place. The "moneyness" of banks' liabilities is a public good[72]: confidence in the capacity of money to retain its value is fundamental. For a sound economy it is indeed crucial that money maintains its role as a means of payment[73], so as to ensure that the huge amount of transactions carried out by individuals and businesses every day can be conducted with a high degree of certainty and safety, avoiding serious disruptions.

Systemic risk and risk of contagion

The last task of the regulation is the containment of systemic risk and the prevention of risk of contagion. Broadly speaking, systemic risk[74] is the risk that a national or global financial system will break down, as opposed to the breakdown

[72]Dow, S. C. (1996). Why the Banking System Should be regulated? The Economic Journal, Vol.106, No 436, pp.698-707.

[73]Op Cit., Lastra, R. M., (2006).

[74]Scott, H. (2010). Reducing Systemic Risk through the Reform of Capital Regulation, Journal of International Economic Law, Vol. 13, No 3, pp.763-778.

of an individual part or component. This risk arises because the linkage across national and international financial markets increases volatility in capital flows and the potential for disturbance to be transmitted. This can happen because of external shocks (e.g. a war) or for reasons linked to the financial sector (e.g. lending failure). It is a risk triggered by disruption to the financial services which can seriously compromise the real economy.

Central to systemic risk is the risk of contagion which refers to the spread of a failure from one financial institution to another, setting off a sort of domino effect which can cause the collapse of the financial system, thus threatening the economy as a whole. The financial crisis has highlighted the fact that the financial network has been transformed by the presence of large and highly-connected universal banks which increase the potential of system-wide contagion in the case of distress of an individual bank[75]. This interconnectedness can refer to assets or liabilities and in both cases indicates the consequent failure of financial institutions which, although healthy, bear the effects of an exposure to the failed institution[76].

In the context of the financial sector, the information and psychological channels are also propagation channels of a crisis[77]. Financial innovation has made the

[75]Davis, S. I. (2011). Risk, Regulation and Profitability: Reconciling Banking's Key Strategic Challenges, pp. 7-12, Searching Finance.

[76] Assets interconnectedness shows a direct credit relationship, where the failed institution is not able to fulfill its payments obligation to a second institution. This in turn can lead to the failure of a third institution with a credit exposure to the second institution. Liabilities interconnectedness refers to the funding problem. In this case the failed institution, which is the source of funding, stops funding other institutions and triggers a chain reaction of other failures.

[77]Lastra, R. M. (2011). Systemic Risk, SIFIs and Financial Stability, Capital Markets Law Journal, Vol. 6 No 2, pp. 197-213.

banking sector more involved in financial transactions of increasing complexity than in the past. This then worsens the already opaque representation of banks' operations and financial conditions, and increases information asymmetries. Given this, on one hand, it becomes difficult for depositors and other banks' creditors to assess the soundness and risk profile of the banks. On the other hand, it may be easier for banks to provide misleading information regarding their own creditworthiness. The combination of complexity, opacity and information asymmetries allows the banks to make off balance sheet operations which do not reflect the true financial condition and sometime can disguise a situation of financial distress. When this is the case, the information channel transmits a misrepresented reality which may then influence the behavior of the economic actors and lead them towards pernicious consequences. Distortions in the information flow make it difficult to perform the task of channeling funds to productive investment opportunities, worsen the adverse selection and moral hazard problems, and this may lead to scarce lending[78].

The information channel can also precipitate panic among the economic actors. From this point of view the information channel is strongly linked to the psychological channel. The latter refers to the general belief that if a bank fails, other banks will also fail. This is a channel of propagation of a crisis which does not depend on any interconnectedness among the financial institution involved[79]. Panic

[78]Pol, E. (2012). The Preponderant Causes of the USA Banking Crisis 2007–08, The Journal of Socio-Economics Vol. 41, pp. 519-528.

[79]Scott, H. (2012). Interconnectedness and Contagion, American Enterprise Institute for Public Policy Research, pp.19-106.

is self-fulfilling and generates homogeneous behavior, such as the collective withdrawal of funds from banks and other financial institutions. Homogeneous behavior in times of crisis can exacerbate the effect of the crisis itself (for example, enhancing procyclicality)[80].

2.3 The quest for a new regulation

The financial markets are an extremely complex network of many different institutions which provide a vast range of different products and services. Nowadays they are interconnected and truly globalized. This characteristic of today's financial markets has been a key factor in fostering the spread of the 2007/09 financial crisis globally

In such a complex environment the literature[81] has identified, and put the blame on, a range of factors as having triggered the crisis. Some of them hare: (i) lax interest rate policy[82]; (ii) regulatory and supervisory failures; (iii) too-big-to-fail

[80]Danielsson, J., Embrechts, P., Goodhart, C., Keating, C., Muennich, F., Renault, O. and Song Shin, H. (2001).An Academic Response to Basel II, Special Paper No 130.

[81]Among the vast literature, see Lastra, R. M. and Wood, G. (2010). The crisis of 2007-2009: Nature, Causes, and Reactions. In Cottier, T., Jackson, J. H. and Lastra, R. M. (eds.), International Law in Financial Regulation and Monetary Affairs, pp. 9-27, Oxford University Press.And Op. Cit. Pol, E (2012).

[82] It is well known that the origins of the financial crisis, can be found in the US housing market. Fearing a deflationary period, the Federal Reserve adopted a lax interest rates policy which lowered the lending standards and made access to mortgage loans by sub-prime borrowers easier. The sub-prime borrowers are riskier, possess less collateral and have worse credit histories than their prime counterparts. In addition the US was the one which innovated by securitizing sub-prime loans, therefore allowing for marginal-credit-quality buyers to be brought into the market. The complexity and

doctrines and distorted incentives[83]; (iv) financial innovation and excessive securitization[84]; (v) regulatory arbitrage[85]; (vi) complexity and lack of transparency.

Among these causes the lack and the failure of regulations are thought to have played a central role. According to Blanchard, the financial crisis stemming at the end of 2007 was mainly due to a "deficient regulation of the financial system, together with a failure of market discipline"[86]. Indeed, experts and scholars have pointed out that the lack of regulation and supervision is among the causes being

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opacity in which this new network evolved allowed the real risk to be hidden and fostered the retention of toxic assets, too. Op.Cit.Pol, E (2012).

[83] Some financial institutions are labeled "too big to fail" because they are so big and so interconnected that the costs related to their failure would be higher than the ones imposed on the taxpayers in order to save them. The policy adopted by governments has triggered huge moral hazard incentives as well as having fostered a massive retention of toxic assets by banks which retained huge risks counting on financial rescue from the government.

[84] Securitization, in its pure model, can be defined as a process whereby securities are created from a future cash flow stream. It involves a double sale: banks sell their assets (e.g. mortgages), which are pulled into financial instruments, to another entity (trust or corporation) which in turn sells the assets as a fixed income security to a diversified set of end investors. It is a technique (the so-called originate-to-distribute model) that, on the one hand, allows banks to transform otherwise illiquid assets into marketable capital market securities so as to diminish liquidity risks; on the other hand, it allows the credit risk to be diversified because it is transferred to the end investors. This in turn decreases the amount of regulatory capital needed, because by securitizing its loans a bank can remove them of its balance sheet while having more capital to make further loans and to cover other risks. Op. Cit., Hull J. C. (2012), pp.121-136.

[85] This refers to a technique that allows the banks to keep less regulatory capital by repositioning the assets' categories to lower risk. Regulatory capital arbitrage opportunities have driven banks to become buyers of securitized products According to the regulation, the capital required for the "banking book", which is the part of the portfolio of a bank which consists of instruments that are held to be resold, is higher than the capital required for the "trading book". Since the tranche created from a portfolio of mortgages was kept as "trading book", the regulatory capital required was lower than it should have been for the mortgages themselves

[86] The Economist, 2009.

blamed for the crisis[87]. Moreover, what is thought to have intensified the effects of the crisis even more is the mismatch between the nature of the crisis, which was systemic and global because of cross-border implications, and the nature of the remedial tools, which were mainly national[88].

Indeed, the phenomenon of globalization also had an impact on the financial markets. The technological revolution, financial innovation and the enhanced mobility of people and capital has led to the emergence of multinational banks, financial groups, new instruments, new trading techniques and a multitude of markets. The latter are not exclusively domestic financial markets, but rather operate across jurisdictions. In the context of the financial crisis, it is a common belief that there has been a lack of coordination among regulators and supervisors as well as the absence of resolution tools at the systemic level. The quest, therefore, is for a new regulation capable of dealing with crisis phenomena at a global level, such as a crisis which crosses national boundaries and spreads worldwide. Financial markets consist of a complex and truly interconnected network in which each single component has played its role in triggering the financial crisis and, consequently, that there is not a unique cause of the crisis but rather a range of causes. This is why it is necessary for the new regulation to deal with several aspects of this network.

In the context of an analysis of the link between banking regulation and competition, the aspects of new regulation should be analyzed, since, as noted above, competition is thought to be beneficial for the economic system. These are related

[87] Op. Cit., Lastra, R. M. and Wood, G. (2010).

[88] Op. Cit., Lastra, R. M. (2011)

to the quest for more stringent capital requirements[89]. From the standpoint of new provisions about capital requirements, what is believed to be needed in the short term is the implementation of new standards, followed by an increase in the quantity and quality of bank capital. During the crisis, the rules regarding capital proved inadequate[90]. The quality of Tier 1 capital was not high enough to face rising emergencies due to the crisis, and even well-capitalized banks were unable to continue as a going concern. When the crisis erupted, the level of capital decreased very quickly, and even sound banks got to the point of needing recapitalization or government support. In particular, a significant increase in trading book capital is required since the crisis has revealed that securitized loans were not that low in risk[91] and nor to be easily sold. Moreover the level of capital required was low compared to the need resulting from the crisis and liquidity storage. In addition, there is a need for measures to avoid procyclicality, through the provision of counter-cyclical buffers, in order to offset the impact of unavoidable procyclicality. The latter refers to the factors that exacerbate swings in the economic cycle, which in turn increase volatility[92].

[89]Op. Cit., Davis, S. I (2011). And Op. Cit. FSA Discussion Paper 2009/02.

[90] Op. Cit., Lastra, R. M. and Wood, G. (2010).

[91] This is because a huge part of risks were retained by the banks themselves.

[92]During the recession period banks' lending becomes more sensitive to the capital requirement, in the sense that in order not to violate regulation, they reduce lending activities. The results are very dangerous for the economy since banks would hold less capital or overland in the upturn, when the risk of systemic crisis is greater, while they would hold too much capital or underlend in the downturn leading, when an expansion of lending is required. Op. Cit. Danielsson, J., Embrechts, P., Goodhart, C., Keating, C., Muennich, F., Renault, O. and Song Shin, H. (2001).

However higher capital requirements are both likely to raise the cost of entry into the banking industry and to raise the cost of staying in the sector. In fact, these are likely to raise banks' funding costs, considering that raising equity is costly[93]. It is feared that over-regulation could dampen economic growth at the very moment when it is needed for the economy to kick-start and grow. It has been claimed that it is doubtful that the Basel regulatory framework can ensure financial stability without imposing excessive limits on financial and economic activities[94]. Regulation, indeed, does not come without costs, and this is referred to as "regulatory burden". It is also necessary to optimize regulation by weighing its costs against its benefits[95]. On the one hand, a minimal level of regulation, although it increases the costs of entry, is needed to ensure that financial institutions behave prudently, thus enhancing stability and efficiency. On the other hand, the risk of imposing unnecessary costs should be avoided in the process so as not to restrict competition. It is known that competition among banks improves efficiency whilst not necessarily eroding the stability of the financial system. It is suggested that public policy should achieve this objective by establishing a regulatory framework which fosters the alignment of private incentives with public interest[96].

[93] Op. Cit., Baker, M. and Wurgler, J. (2013).

[94]Op. Cit., Scott, H. (2010).

[95]Jomini, P., (2011). Effects of Inappropriate Financial Regulation, European Centre for International Political Economy, pp. 1-17.

[96]Regarding this topic see: ddeSerres, A., Kobayakawa, S., Sløk, T. and Vartia, L. (2006). Regulation of Financial System and Economic Growth in OECD Countries: an Empirical Analysis, OECD Economics Studies, No. 43.And World Bank (2013).The Role of the State in Promoting Bank Competition, Global Financial Development Report, pp. 81-100.

3 Basel I and Basel II

3.1 The regulatory response to banks' financial fragility

Basel represents the prudential banking regulation issued in 1988 by the Basel Committee on Banking Supervision[97], with the aim of promoting worldwide supervision and enhancing financial stability at a global level. This regulation have become the principal regulatory response which deal with the financial fragility of banks highlighted in the previous chapter of this dissertation. The aim of this regulation is to ensure that banks keep enough capital so that they are able to manage the risks they take in carrying out their activities. It is supposed that higher quantity and quality of capital should act as a buffer against losses which may be endured by banks[98]. The function of the capital as a buffer against losses refers to the losses withstood both while the bank is a going concern, and when the bank is in a gone concern scenario. When a bank is in a going concern, both in a state of financial

[97] The Committee is not an international supervisory authority, but rather an informal group of central banks and supervisory agencies. It was initially composed by central banks and supervisory agencies of the G10 Countries (Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom and the United States). In 2009 it expanded its membership and now includes 27 jurisdictions (Argentina, Australia, Brazil, China, European Union, Hong Kong, India, Indonesia, Korea, Luxembourg, Mexico, Russia, Saudi Arabia, Singapore, South Africa, Spain and Turkey). Given the nature of the Committee, its decisions do not have any legal force. These decisions are instead general principles, supervisory standards, and recommendations for the best practice to which the states are expected to comply in order to achieve a greater degree of harmonization towards common regulatory standards. Op. Cit. Basel Committee on Banking Supervision (2014).

[98] Op. Cit. Lastra, R. M. (2004).

health and during a period of financial distress, the function of the capital is to ensure the persistency of confidence in the financial system and avoid disruptions to depositors. In a gone concern scenario, the main function of the capital is to minimize losses and protect depositors[99].

The role of the regulationis to promote the choice of the "optimal capital ratio" to be held by banks, so that they are able to face the onset of a crisis by internalizing risk management's costs[100]. In fact, banks' failures produce externalities and spillovers which represent the costs to be borne by society and which are very large, probably larger than the private costs to individual financial institutions. The choice of the optimal capital ratio is not only a regulators' concern, but also a bank managers' concern, since it allows banks to perform well. In reality, the bank's capital accomplishes a range of different functions. The excess of capital allows business enterprises to keep going even in the case of unexpected losses. In this case, banks can use internal sources of financing and avoid higher costs related to external sources[101].Moreover being well capitalized is a fundamental condition in order to achieve a high rating by the credit rating agencies, and also to face larger exposure without raising new capital. Finally, getting into the difficulty to meet regulatory provisions can weaken banks' reputation, since depositors, customers

[99]Gleeson, S. (2012).International Regulation of Banking, Capital and Risk Requirements. Oxford University Press.

[100]Op Cit., Lastra, R. M. (2004).

[101]This strategy is called "peaking order"; it is used not only within the banking sector, but also in other industries. It postulates that the cost of financing increases with asymmetric information, therefore suggesting a preference for internal financing, rather than debt; lastly, it raises equity as a "last resort".

and counterparties can see it as a negative index that the bank is about to experience financial difficulties. [102].

3.2 Elements of Basel I

Basel I was issued by the Committee in 1988, with the main purpose of managing the credit risk[103]. Basel I constitute a simple weighing system for different types of assets, and it was thought to be suitable to many banks in several jurisdictions. It requires that banks divide their exposure in few broad classes which reflect similar types of borrowers. The exposures to the same kind of borrowers were subject to the same amount of capital requirements, irrespective of the real creditworthiness and risk associated to each borrower. In 1996 the Committee amended the original Accord by the introduction of capital requirements for market risk.

Basel I is a ratio of capital to risk-weighted assets and its elements are: Tier 1 capital (equity capital plus disclosed reserves); Tier 2 capital (asset revaluation reserves, undisclosed reserves, general loan loss reserves, hybrid capital instrument and subordinated term debt)[104].While at least 50% of the total capital base capital have to be constituted by Tier 1 capital, subordinated debt cannot be more than 50 percent of Tier 1. The denominator of the capital ratio is the sum of risk-adjusted

[102]Basel Committee on Banking Supervision (2014). A Brief History of the Basel Committee available at http://www.bis.org/bcbs/history.pdf.

[103]Basel Committee on Banking Supervision (1988) 'International Convergence of Capital Measurement and Capital Standards July, available at http://www.bis.org/publ/bcbsc111.htm

[104]Op. Cit., Basel Committee on Banking Supervision (1988).

assets plus off-balance sheet items adjusted to risk. There are five credit risk weights: 0 percent, 10 percent, 20 percent, 50 percent and 100 percent and equivalent credit conversion factors[105] for off-balance sheet items.

These weights represent a compromise among differing views, and reflect historical data available at that time regarding loan performance and judgments about the riskiness of certain counterparts, guarantor or collateral. The Committee chose the optimal capital level as eight percent, because it was the median value of the amount of capital in the good practices in existence at the time Basel I was issued. Due to the simplicity of its calculation rules, the Basel proposal was well accepted by both banks and authorities, both in developed and developing countries. In fact, although it is soft law in nature, which means that it has no legal binding force, the proposal has become very effective, as it permeated into domestic legislation in most jurisdiction. Moreover, while Basel I was initially applied to internationally active banks in the G10 countries, the belief that it constituted a good benchmark of banks' solvency grew to such an extent that led to its wide implementation. It is believed that it has been implemented by more than 100 countries outside the G10 countries.

An important aspect that should be analyzed is that Basel I is, basically, a prudential framework based on simple quantitative rules. The rules of calculation of the capital charge take into account the quality of the counterparty irrespective

[105]It is a factor that converts the amount of a free credit line to an exposure at default amount.

of the quality of credit[106]. As a consequence, if sovereign bonds have 0 percent of exposure whilst corporate bonds are considered to have 100 percent exposure, banks can take advantage in terms of arbitrage opportunities, by balancing between the two different exposures. Given the 0 percent exposure of sovereign bonds, banks will have high incentives to undertake very risky lending activities with corporations in order to achieve more returns on capital. This mechanism allowed banks to circumvent the regulation itself, giving rise to unfair behavior such as regulatory arbitrage or excessive securitization.

3.3 Elements of Basel II:

In June of 1999, the Committee issued a proposal for a new capital adequacy framework to replace Besel I, with the purpose of correcting drawbacks highlighted in the previous section. This led to the Revised Capital Framework in June of 2004, which is known as Basel II. The new Accord was updated in November 2005 in order to incorporate several technical additions. Since the purpose of the Committee was to significantly develop more risk-sensitive total capital requirements (the sum of credit risk, market risk and operational risk), its publication followed six years of preparation characterized by consultations with banking sector representatives, supervisory agencies, and central banks. A more risk-sensitive calculation enables

[106]Molostova, I. (2008). Introduction to the internal ratings based approach under Basel II, Journal of International Banking & Financial Law, Vol. 23 No 1, pp 1-7.

the capital requirements to reflect the real financial features of the individual institution.

Basel II, was implemented in 2007, and it is much more complex compared to Basel I. It provides a more complete set of standards, and also combines more risk-sensitive quantitative tools, and risk calculation methods with qualitative principles that institutions are expected to comply with. With respect to market risk, Basel II has not introduced substantial of changes (it is still calculated by using the standard approach of the Value at Risk (VaR)[107], the main difference involves the mechanism of calculation of credit risk. Another novelty refers to the introduction of the operational risk.

From the point of view of its structure, Basel II consists of three complementary and mutually reinforcing pillars: minimum capital requirements (Pillar 1); supervisory review process (Pillar 2); market discipline (Pillar 3)[108].

Pillar 1

Pillar 1refers to minimum capital requirements to cover: (i) credit risk; (ii) market risk; and (iii) operational risk. It deals with the allocation of percentage capital requirements for individual capital items. The aim is to bring into alignment the regulatory requirements with "economic capital" demanded by investors and counterparties.

[107] The VaR is an index which summarizes the total risk in a portfolio of financial assets in a single number.

[108]Basel Committee on Banking Supervision - A Revised Framework Comprehensive Version (2006). International Convergence of Capital Measurement and Capital Standards, June, available at http://www.bis.org/publ/bcbs128.htm

There are three constituents of capital within Pillar 1: (i) Core capital (basic equity or Tier 1); (ii) Supplementary capital (Tier 2); and (iii) Short-term subordinated debt covering market risk (Tier 3). Basel II poses a set of "gearing" rules which fix the maximum amounts for each of the different forms of capital[109]. These rules aim to ensure that the capital used, as a specified percentage of the total requirement, is not of low quality. According to the gearing rules, while there is no limit on core Tier 1 capital, there are, however, limits on each of the other capital Tiers. At least 50 percent of total capital base (after deductions[110]) must be Tier 1 capital, while Tier 2 capital cannot exceed the total Tier 1 capital after deductions. Subordinated term debt will be limited to a maximum of 50 percent of Tier 1 elements.

Tier 1 capital consists of: (i) common stock (issued and fully paid ordinary shares/common stock, but can also include non-redeemable, noncumulative preferred equity); and (ii) disclosed reserves (or retained earnings), which are the percentage of net earnings not paid out as dividends, but retained by the bank to be

[109] Op. Cit., Gleeson, S. (2012).

[110]Deductions refer to some elements which do not account for regulatory capital, therefore are subtracted in the Basel formula. The most important deductions ate intangible assets, i. e. from Tier 1 is deducted the goodwill.

Moreover from total capital are deducted investments in unconsolidated banking and financial subsidiary companies. According with the Committee, when these are not consolidated deduction is essential to prevent the multiple use of the same capital resources in different parts of the group.In fact, the presumption is that this Framework would be applied on a consolidated basis to banking groups. And, finally, investments in the capital of other banks and financial institutions (at the discretion of national authorities). Basel Committee on Banking Supervision (2006) International Convergence of Capital Measurement and Capital Standards: A Revised Framework Comprehensive Version, available at www.financialstabilityboard.org/2006/06/cos_060601/.

reinvested in its business or to pay debt. The main characteristic of Tier 1 capital is its permanence, in that it does not count as liability for the issuer. In fact, the issuer of such an instrument must be under no obligation to redeem the instrument or to make any distribution or other payment in respect of it. Therefore, Tier 1 capital is redeemable only in the case of the issuer winding up[111].

Tier 2 capital consists of: (i) asset revaluation reserves (accounting term used when a company has to enter a line item on their balance sheet, due to a revaluation performed on an asset when the current and probable future value of the asset is higher than the recorded historic cost of the same asset); (ii) undisclosed reserves (unpublished or hidden reserves); (iii) general loan-loss reserves (which represent an expense set aside as an allowance for bad loans); (iv) hybrid debt capital instruments, (a category which encompasses a number of capital instruments which combine certain characteristics of equity and certain characteristics of debt)[112]; (v) subordinated term debt, which is a loan (or security) that ranks below other loans (or securities) with regard to claims on assets or earnings.

The last capital components is represented by Tier 3, which is the capital held by banks to meet part of their market risk. It includes a greater variety of debt than Tier 1 and Tier 2 capitals. In fact, it may include a huge number of subordinated rights, undisclosed reserves and general loss reserves.

[111]Op. Cit., Gleeson, S. (2012).

[112] For example, convertible bonds give the investor the option of convert it in common equity, therefore to buy a share of the issuer's company. Or the preference shares, which give the shareholder the right to be paid before the dividends on common stock are paid.

In order to calculate risk-based capital, Basel II, within Pillar 1, provides three risk-assessing models which are of increasing complexity: (i) the Standardized Approach, (ii) the Foundation Internal Ratings-Based Approach, and (iii) the Advanced Internal Ratings-Based Approach. Models (ii) and (iii) are known as internal ratings-based models (IRB)[113].

The standardized approach is the most basic of the three risk assessment models. It refines risk categories of the Basel I formula, and relies on external ratings. The IRB models (both foundation and advanced) represent an improvement of the previous rule contained in Basel I, which proved poorly sensitive to the quality of the credit risk faced by banks. The IRB models, instead, allow banks to calculate their credit risk-based capital by applying their internal assessment in assessing the probability of the counterparty's default. This mechanism allows for capital charge to reflect the real degree of credit risk run by banks. In particular, the most sophisticated of the three, the advanced IRB, is suitable to approximate the overall financial condition of the counterparty. In fact, it is possible to estimate not only the probability that the counterparty defaults, but also the amount of loss which the bank might suffer if the default should occur.

Under the IRB models, the responsibility of internal assessment falls on the management. The main advantage of these models is thought to be that banks can "save" a certain amount of capital tailored on the exposure to eventual losses, and this is therefore likely to be a lower amount than it would be when applying Basel I rules. In turn, this allows banks to avoid inefficient capital allocations, so as not

[113] Op. Cit., Molostova, I. (2008).

to perceive the regulation as having a detrimental effect on their business. This alignment of incentives among banks and regulators was thought to ensure higher compliance on the banks' policy to regulatory capital requirements, and to discourage banks from bearing the costs related to the violation of the regulation.

Despite these advantages, the IRB approach cannot, however, be adopted by all banks because its implementation is complex as well as costly. Certain criteria, set out by the Committee, have shown that only the larger and more sophisticated banks are suitable to adopt it. There are significant costs of compliance related to investments in data collection and IT systems and also to train new staff.

Moreover, the IRB models use mathematic models and statistic tools in order to forecast the average of both expected and unexpected losses which a bank may incur. Unexpected losses (UL) are of greater concern because they are more difficult to detect as they refer to large losses that can occur less frequently. Expected losses (EL), instead, are reasonably faced by banks on a daily basis, and therefore easily detected.

In order to calculate both EL and UL, banks have to consider three parameters: probability of default of the borrower (PD); loss given default (LGD), which is the estimate of the amount of the loss; exposure at default (EAD), which is the amount at risk in the case of default. While it is required that the PD is provided by the banks, regardless of the IRB model they have chosen, the LGD and the EAD are provided by supervisors only in the case of foundation IRB. In case of advanced IRB, the LGD, the EAD and also the remaining economic maturity of an exposure (M), need to be provided by the banks, and they are also subject to supervisory

review. In fulfilling this task, banks are heavily supervised, the calculation requires the use of both historical data and empirical evidence to support the outcomes.

Pillar 2

Pillar 2 deals with the supervisory review process of capital adequacy, and introduces the principle for a structured dialogue between banking institutions and supervisors. It looks at the internal risk control procedures in order to ensure that banks have satisfactory monitoring and risk management.

It is worth keeping in mind that, while the term regulation refers to rule-making process, supervision has to do with monitoring and enforcement. Pillar 2 refers to supervision conceived in its narrow sense (stricto sensu)[114], that is monitoring the degree to which banks comply with the regulation, and refers to of risk-monitoring and risk-control activities. The supervisory task has two dimensions: macro-prudential supervision and micro-prudential supervision. Macro-prudential supervision focuses on the safety of the financial and economic system as a whole and the prevention of systemic risk. Micro-prudential supervision focuses on the day-to-day supervision of financial institutions[115].

Pillar 2 establishes a process of prudential supervision that complements and strengthens Pillar 1 by increasing the number of instruments available to the regu-

[114] Supervision in a broad sense constitutes a process of four stages: (i) licensing and authorization; (ii) supervision stricto sensu; (iii) sanctioning; (iv) crisis management. Lastra, R. M. (2006). Legal Foundations of International Monetary Stability, Oxford University Press.

[115]Op. Cit., Garicano, L and Lastra, R. M. (2010).

lator. The real innovation of Basel II, with the inclusion of Pillar 2, is that it systematizes supervisory approaches which have been already implemented, making them more uniform and consistent[116]. Being a task which refers to the enforcement of rules, Pillar 2 should affect a bank's risk-taking. It also provides a framework for dealing with all other possible risks a bank may face. These are not easily quantifiable and require a more qualitative approach, such as reputational risk, liquidity risk and legal risk, which Basel II indicates as residual risks[117]. According to the Committee, "supervision should aim to reduce the probability and impact of a bank failure, including by working with resolution authorities, so that when failure occurs, it is in an orderly manner"[118].

The relevance of the supervisory review, however, is not only to ensure that banks will have enough capital to support their activities, but also to promote the design and application of better risk management models within banks. It is, in fact, the interaction between Pillars 1 and 2 which establishes that regulatory constraints do not consist of only regulatory requirements on the amount of capital, but also of appropriate measures for the recapitalization of banks. These actions include: (i) more intense monitoring of the bank; (ii) restricting the payment of dividends; (iii)

[116]Thoraval, P., (2006). The Basel II Framework: the Role and Implementation of Pillar 2, Financial Stability Review, No.9, pp. 117-123.

[117] Op. Cit. Basel Committee on Banking Supervision (2006)

[118] Basel Committee on Banking Supervision (2012) Core Principles for Banking Supervision, September, available at http://www.bis.org/publ/bcbs230.htm.

requiring the bank to prepare and implement a satisfactory capital adequacy restoration plan; and (iv) requiring the bank to raise additional capital immediately[119].

The supervisory review consists of two different tasks being carried out respectively by the bank, which provides the Internal Capital Adequacy Assessment Process (ICAAP), and the banking supervisor who delivers the Supervisory Review and Evaluation Process (SREP)[120].

The ICAAP is a process which evolves within the internal governance of a bank. The internal governance aims to ensure that the management of the institution is responsible for prompt action in performing its duties of business strategy, organization and internal control. These duties also involve the responsibility for reviewing strategies and policies in order to manage an institution's risks more efficiently, and foster strong internal control systems. The ICCAP framework should be risk-based, and it is the responsibility of the management board to develop its design, and provide its implementation and maintenance. Within this framework, the bank provides the analysis of all its risks, including those already covered by Pillar 1, and the calculation of the amount of economic capital it needs in order to cover those risks. Therefore, the key elements on which the ICAAP focuses are that: (i) the bank is able to measure and monitor the risks it is exposed to; (ii) the bank holds an internal capital in relation to its own risk profile; and (iii) the bank uses and develops risk management systems. Each institution is expected to develop

[119]Pelizzon, L. and Schaefer, S. (2005). Pillar 1 vs. Pillar 2 under Risk Management, National Bureau of Economic Research http://www.nber.org/chapters/c9614.

[120]Op. Cit. Thoraval, P., (2006).

an ICAAP as an integral part of the management process and decision making of the institution.

On the other hand, with the SREP, the banking supervisor makes a comparison between its own analysis of the bank's risk profile and the analysis conducted by the bank, in order to inform its choice of prudential measures. The latter may take the form of capital requirements which are greater than the minimum requirements, or any other appropriate technique. The supervisory authority must therefore review the precision of the ICCAP and make sure that the bank has sufficient funds to face the risks it runs. Therefore, the SREP should be elabourated in order to establish a common framework which, nevertheless, takes into account that the different institutions involved may have different management styles, strategies, or risk profiles[121].

The Committee points out the importance of interaction between banks and supervisors by fostering an active dialogue between the bank and the supervisor involved in the supervisory review[122]. This, in turn, implies that supervisors are expected to enhance opportunities for dialogue, and banks to disclose all the information needed regarding the ICAAP process, and also to exchange views on risk assessment. This ongoing interaction between the two entities allows for the practice of preventive supervision, because the bank will be able to make changes to the ICAAP in the course of the dialogue, and supervisors may intervene at an early stage so as to prevent the bank's capital from falling below the minimum.

[121]Op. Cit., Thoraval, P., (2006).

[122]Op. Cit., Basel Committee on Banking Supervision (2006).

In September 2012, the Basel Committee published a new set of "Core Principles for Effective Banking Supervision", as a review of the previous set of principles issued in 2006[123]. The principles reflect the priorities of bank regulators on a global basis after the financial crisis. The Committee identified four main issues that had emerged from the crisis and that are the object of the Core Principles. These are:

- *Systemically important banks.* The Committee points out the need of providing supervision of a higher order to banks that present systemic risk. This supervision should be commensurate with the risk profile and systemic importance of these banks.

- *Macro-prudential issues and systemic risks.* These focus on the need of more effective interaction between macro-prudential and micro-prudential supervision. For supervision to be more effective, not only should the balance sheets of individual banks be taken into account, but also the impact that macro-elements (such as the prevailing macroeconomic environment, business trends, and the build-up and concentration of risk across the banking sector) have on the risk exposure of individual banks.

- *Crisis management, recovery, and resolution*. These refer to the need for greater cooperation, even at an international level, among supervisors, regulators and banks. This type of cooperation should combine the supervisors'

[123]Op. Cit., Basel Committee on Banking Supervision (2012).

effort in limiting the probability and impact of bank failures with crisis management planning set by the regulators, and contingency funding and resolution planning set by the banks.

- *Corporate governance, disclosure, and transparency.* The Committee highlights the role of effective corporate governance as an essential element in the safe and sound functioning of banks. Finally, it promotes greater disclosure and transparency needed to maintain confidence in banks by enabling market participants to have a greater understanding of a bank's risk profile and therefore reduce market uncertainties about its financial strength.

Pillar 3

Pillar 3 is based on market discipline *via* disclosure, and it aims to improve the transparency of banks by increasing disclosure of its risk assessment procedures and capital adequacy. This also allows for a comparison of capital adequacy among institutions[124].

In broad terms, market discipline refers to a market-based incentive scheme in which investors in bank liabilities, such as subordinated debt or uninsured deposits, "punish" banks for greater risk-taking by demanding higher yields on those liabilities. Banks collect deposits and invest these funds in risky assets (loans), so market discipline is believed to be needed because banks are prone to engage in moral hazard behaviour[125]. The banking sector reveals problems which are mostly

[124]Op. Cit., Lastra, R. M., (2004).

[125]Nier, E. and Baumann, U. (2006). Market Discipline, Disclosure and Moral Hazard in Banking, Journal of Financial Intermediation, Vol. 15, pp.332-361.

idiosyncratic and associated to principal-agent dynamics, due to information asymmetries. This, in turn, generates moral hazard and excessive risk-taking behaviour[126]. In these situations, market discipline should act as a mechanism capable of aligning the agent's incentive to those of the principal, by enabling the latter to discipline the former in a more effective way. The underlying idea, therefore, is that market discipline is able to influence bank behaviour, by providing incentives for banks to limit their risk of default, and to this extent, to hold capital buffers against adverse outcomes in portfolio risk.

In the light of an increasingly complex banking system, therefore increasingly difficult to be supervised, the Committee has taken the view that enhancing market discipline is just as important as capital requirements and supervisory review[127]. This view is reflected in Pillar 3, which encourages greater bank disclosure in order to strengthen market discipline. The Committee believes that disclosing meaningful information concerning common key risks to market participants is a fundamental tenet of a sound banking system. It reduces information asymmetry and fosters comparability of banks' risk profiles within and across jurisdictions[128]. Pillar 3 is conceived as a complementary element which has the potential to enforce Pillar 1 and Pillar 2, in their aim of promoting safety and soundness in banks and financial systems. In particular, Pillar 3 aims to promote market discipline through regulatory

[126]Stephanou, C. (2010). Rethinking Market Discipline in Banking Lessons from the Financial Crisis, Policy Research Working Paper No 5227.

[127]Basel Committee on Banking Supervision (2001).Consultative Document Pillar 3 (Market Discipline). http://www.bis.org/publ/bcbs_wp7.htm

[128] Op. Cit., Basel Committee on Banking Supervision (2001).

disclosure requirements. These requirements enable market participants to make a more effective assessment of key information relating to a bank's regulatory capital and risk exposures in order to be able to promote confidence in banks' exposure to risk and overall regulatory capital adequacy. Greater transparency allows investors to check that the price paid (funding cost) by the banks to raise capital in the market reflect the level of risk undertaken by banks. Thus, the more the counterparties are informed about the financial situation of the bank, the better their position in making decisions regarding the riskiness of exposure to the bank[129].

In the light of the expected synergy of the three Pillars, if regulators can access the funding cost of the banks, they can also determine which banks have a more risky profile than others, and promptly intervene with their supervisory task.

Moreover, the Committee has pointed out that the disclosure assumes even more relevance in the light of the risk assessment models under Basel II, which allows banks to rely on internal methodology and gives them more discretion in assessing capital requirements. For this reason, it is believed that, in the case of the use of internal methodologies, separate disclosures are needed[130].

In view of this, that the Committee has developed a set of disclosure recommendations and requirements which allow market participants to assess key pieces of information regarding the scope of application, capital, risk exposures, risk as-

[129] Op. Cit., Gleeson, S. (2012).

[130]Basel Committee on Banking Supervision (2014) Review of the Pillar 3 Disclosure Requirement – Consultative Document, September, available at http://www.bis.org/publ/bcbs286.htm

sessment and management processes, and hence the capital adequacy of the institution[131]. The Committee distinguishes between core and supplementary disclosures. Core disclosures refer to vital information for all institutions and are important to the basic operation of market discipline. The core disclosure are expected to be disclosed by all institutions. Conversely, supplementary disclosures refer to information which is of great significance for the operation of market discipline with respect to particular institutions, depending on the nature of their risk exposure, capital adequacy and methods adopted to calculate the capital requirement. In cases such as these, banks are required to disclose the full range of core and supplementary information and make it available to the public[132].

In September 2014, the Committee published a Review of the Pillar 3 Disclosure Requirements[133]. This it is integral part of the Basel framework and is applicable to all internationally active banks. The aim of the review is to improve comparability across banks and consistency of reporting, by promoting a greater use of templates[134],

[131] Op. Cit., Basel Committee on Banking Supervision (2001).

[132] Op. Cit., Basel Committee on Banking Supervision (2001).

[133] Basel Committee on Banking Supervision (2014) Review of the Pillar 3 Disclosure Requirement – Consultative Document, September, available at http://www.bis.org/publ/bcbs286.htm.

[134] Templates can have a fixed format or a flexible format. In the first case banks must provide the disclosure requirements in accordance with the instructions given. If, instead the format is flexible, banks may present the information required either by following the format provided in this document or in a format that better suits the bank. Op. Cit., Basel Committee on Banking Supervision (2014).

The Committee recognizes the need of balancing the use of mandatory templates with a certain degree of flexibility for senior management to provide commentary to the market on a bank's specific risk profile. This balance is achieved by the introduction of a "hierarchy" of disclosures, which distinguishes between prescriptive templates and templates.

Prescriptive templates are proposed for quantitative information that is considered essential for the analysis of a bank's regulatory capital requirements[135]; while templates with a more flexible format are proposed for information which is considered meaningful to the market but not central to the analysis of a bank's regulatory capital adequacy[136]. Moreover, according to the paragraph 49 of the Committee's document: "banks must always supplement the quantitative information provided in templates with additional qualitative commentary to explain significant changes between reporting periods and issues of interest to market participants which may be specific to the particular bank".

[135] Banks should publish fixed format prescriptive templates which provide information specifically related to capital requirements calculations, on a quarterly basis, irrespective of the bank's normal financial reporting schedule dates.

[136] The information in the qualitative tables is required to be reported on an annual basis, unless material changes occur to such information between reporting dates.

4 The comparative analysis: the German and the UK banking system

4.1 The structure of the German banking system

The German financial system is characterized by two key features[137]. First of all, it is defined as a bank-based financial system[138]. In this type of financial system, banks play a leading role as the suppliers of external funding to non-financial firms[139]. In the German banking system bank loans account for more than 70 percent of the financial system's liabilities. In turn, this explains why medium-sized enterprises, which usually have limited access to the capital market, provide the largest share of Germany's Gross Domestic Product (GDP)[140].

The second key feature is that the banking system in Germany is a universal one with a three-pillar structure which includes: private commercial banks, public savings banks and mutual cooperative banks. These categories of banks are distinguished by their ownership, structure and business orientation. On the one hand, there exists a small number of large privately-owned commercial banks, which are

[137] Bebenroth, R., Dietrich, D. and Vollmer, U. (2008). Bank regulation and supervision in bank-dominated financial systems: a comparison between Japan and Germany, European Journal of Law and Economics, pp. 177-209.

[138] By contrast, in the Anglo-American financial system, the key source of financing are the capital markets. This explains why this kind of financial system is labelled market-based. The UK constitutes one of the most famous example of a market-based financial system.

[139] Levine, R. (2002). Bank-Based or Market-Based Financial Systems: Which Is Better? Journal of Financial Intermediation, Vol. 11, pp. 398–428.

[140] Detzer, D., Dodig, N., Evans, T., Hein, E. and Herr, H. (2013). The German Financial System, FESSUD, Development Studies in Financial Systems, No 3.

profit-oriented; on the other hand there are publicly-owned and cooperative banks, which constitute a significant part of the banking system, that are mainly oriented towards public interests, and then more risk-oriented instead[141].

A brief analysis of the magnitude of the market share held by each single group of banks may give a better insight into the German market structure[142]. Although the number of commercial banks is the smallest, the group of commercial banks holds a large market share, accounting for 36 percent of total assets in the German banking system. On the other hand, the savings banks sector accounts for 35 percent of total assets in the German banking system. Finally, the cooperative banks sector, which is characterized by a large number of small banks, amounting to approximately two-thirds of the country's institutions by number, accounts for 11 percent of total assets in the German banking industry.

What can be deducted from the above is that, due to the large number of banks and the fact that none of the groups holds a significant market share, the German banking system is fragmented.

Commercial banks

Within the group of commercial banks, the German central bank (Deutsche Bundesbank), distinguishes among three categories of private banks: (i) four large

[141] A profit-oriented institution is aimed at maximizing profits; while a risk-oriented institution is aimed at minimizing risks.

[142] International Monetary Fund (2011). Germany: Technical Note on Banking Sector Structure. IMF Country Report No. 11/370

banking groups, one of which is foreign-owned; (ii) medium and small-sized regional banks; and (iii) some branches of foreign banks.

The large banking groups are mainly universal banks, and thus operate in retail and corporate banking as well in investment banking. Their main purpose is to act as house banks to Germany's big industrial concerns by providing long-term loans.

A key feature which has always characterized the relationship between big commercial banks and firms, and which to some extent explains the dominant role of the banks in the German financial market, is their deep involvement on company supervisory boards as a result of the ownership of shares[143].

The commercial bank group includes four big commercial banks: Deutsche Bank, Commerzbank, Hypo Vereinsbank (HVB), and Postbank. Whereas Deutsche Bank and Commerzbank, whose origins can be traced back to the 19th century, traditionally constitute the core of German commercial banking. HVB and Postbank became big banks only in the late 20th century. The Deutsche Bank is by far the largest of the big banks and is the only one involved in operations at an international level[144].

The second group of commercial banks includes regional banks. This includes smaller joint-stock banks and privately-owned banks which mainly operate

[143] Detzer, D., Dodig, N., Evans, T., Hein, E. and Herr, H. (2013). The German Financial System, FESSUD, Development Studies in Financial Systems, No 3.

[144] From this point of view the Deutsche Bank may be considered a transmission channel of the effects of the crisis in the German financial system In fact, with its aim towards international expansion, this bank has pursued an aggressive policy and has undertaken subprime mortgages and opaque securitization operations in the US. Op. Cit. International Monetary Fund (2011).

on a regional level and account for around 9 percent of total assets in the German banking system.

The third group refers to branches of foreign banks. Although the number of branches has significantly increased from 20 in 1980 to 310 in 2012, this banking sector does not play a significant role in the German banking industry since its market share accounts for only 2 percent of total assets.

Savings Banks

The public sector banks includes savings banks[145]. Both local savings and state banks are companies under public law and aim at providing services to the public sector by supporting development in the respective region as well as subsidizing local public goods. This is why, although they operate according to economic principles, profit maximization is not their primary goal. These are organized in a two-tier structure which comprises a first level of local savings banks, the Sparkassen; and a second level of their associated central institutions state banks Landesbanken (LB).

The Sparkassen fund themselves through deposits of non-banks, and act as a banker to small and medium-sized enterprises (SMEs). The relationship between the Sparkassen and their customers is characterized by very close local contacts since each Sparkassen operates in a specific geographic territory and belongs to municipalities or rural regions. In particular, they are required to provide financial

[145] Savings banks emerged at the beginning of the 19th century with the aim of making savings accounts accessible to people with low income. Op. Cit. International Monetary Fund (2011).

services to citizens in all German territories by meeting all requests for a bank account. The result is a very widespread network which provides a range of universal banking activities to clients of all levels of income. It is not surprising that this sector has been very successful in the German financial system, since it is the one which provides SMEs with greater access to credit than in many other developed countries[146].

The Landesbanken are owned by the state in which they are located, by other state banks, and by regional savings banks. These authorities, however, do not have a direct influence on the business strategy which is defined by the management. Unlike the local saving banks, they are allowed to operate on both interregional and international levels. Originally, the Landesbanken were thought to perform two main functions: to act as bankers to the regional state and as central banks of the Sparkassen. However, overtime, the Landesbanken became more and more involved in a wide range of banking activities, such as wholesale funding, investment banking, and international business activities.

Mutual Cooperative Banks

The third pillar includes a large number of small cooperative banks[147]. This sector consists of two levels: the primary cooperative banks and two regional institutions. They are owned by their members whose economic activities are supposed

[146] Afanasenko, D. and Reichling, P. (2010). The German Banking System: Structure, Regulation and Basel II Implementation. In Yepifanov, A. and Shkolnik, I. (eds.) Basel II: Problems and Prospects of Usage in National Banking System.

[147] Op. Cit. Afanasenko, D. and Reichling, P. (2010).

to be supported by the cooperative company itself. In fact, the owners are usually depositors as well as borrowers. The organizational nature of cooperative banks can be understood by looking at the original rationale of the first credit cooperative companies which were founded at the end of the 19th century with the aim of providing funding to German farmers and craftsmen.

Today, cooperative banks have become universal banks and also provide banking services to the general public[148]. As with the saving banks structural organization, the mutual cooperative banks sector is composed of a large number of small cooperative banks and two regional institutions which act as central banks to the primary credit banks. In turn, the latter compete with private banks for commercial and investment bank business.

4.2 The main characteristics of the German banking system

The literature[149] dealing with the German banking system believes its fragmented structure to be one of its defining characteristic. In fact, as we have seen above, the German banking system shows itself as being made up of a huge number of small financial institutions. If we consider the total number of banks in Germany, we can conclude that each bank manages a smaller number of assets than a typical

[148] Op Cit., International Monetary Fund (2011).

[149] Op. Cit. Detzer, D., Dodig, N., Evans, T., Hein, E. and Herr, H. (2013)

bank in other countries does[150]. In particular, the public banking sector, along with the cooperative sector, is thought to be the reason why this is the least-concentrated banking system compared with other European countries[151].

In fact, despite the process of consolidation, which involved the European banking system in the aftermath of the 2007/09 financial crisis, the German banking system is still noted as being low-concentrated[152]. At the end of 2012, market concentration, which is measured as the share of the total assets held by the five largest banks, ranged from almost 90%in Estonia to just over 30% in Germany[153].

The large number of financial institutions, however, does not necessarily imply a high degree of competition. On the contrary, the German banking system is referred to as a rather uncompetitive system, because of its peculiar structure. The country's small banks, which belong to the public and cooperative sector, are indeed subject to the regional principle, of not competing with banks in other regions, and they play only a minor role at a nationwide level[154] Moreover, a protectionist policy, which is ultimately aligned with the nature of Germany's coordinated market economy has traditionally sacrificed any competitive dynamics with foreign banks, for the sake of the stability of the system.

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[150] For example, as the empirical results show, in chapter 4 of this dissertation, the average total asset is the UK banking system is larger than the in Germany. In fact, the large bank in Germany would be classified as other banks (medium and small) in the UK.

[151] Mullineux, A. and Terberger, E. (2006). The British Banking System: A Good Role Model for Germany? Anglo-German Foundation for the Study of Industrial Society.

[152] European Central Bank, (2013). Banking Structures Report.

[153] Op. Cit., European Central Bank, (2013). Banking Structures Report.

[154] Op. Cit. International Monetary Fund (2011).

Another characteristic of the overall banking system, which is also of concern to the International Monetary Fund (IMF), is that this banking system is low in profitability. In the IMF Financial Stability Assessment Report on Germany in 2003, it was noted that there was call for a restructuring of the three-pillar system (i.e. private commercial banks, public savings banks and mutual banks) in order to be more in line and competitive with other European countries[155]. The income-cost ratio of German banks has been proved to be, on average, notably higher than in other European countries and the US, and the return on equity is remarkably lower, in comparison.

This characteristic can be seen as the result of the combination of other characteristics of the German banking system: (i) the high degree of public ownership; and (ii) the lack of diversification of the banking activities.

The German banking system is also characterized by a high degree of public ownership. As we have seen in the above description, a large part of the market share is held by publicly-owned and cooperative companies, therefore they are less open to private shareholders than other European countries[156]. In turn, the high degree of public ownership determines further effects: it leads to a system which, being almost entirely functional to public interests, does not pursue the aim of maximizing its profits, therefore acting in a low interest rates environment[157]

[155] Op. Cit. Mullineux, A. and Terberger, E. (2006).

[156] Op. Cit., International Monetary Fund (2011). The share of the banking-system assets listed on a stock exchange was notably lower than average of the other European countries: less than 45 percent against the average which was 65 percent.

[157] Op. Cit., European Central Bank, (2013). Banking Structures Report.

The main public interest has always been that of maintaining the stability of the system. This goal has been pursued through public bank ownership, in order to grant the widest access to credit at a local level, also for SMEs. To this purpose, and in contrast with the rules which dominate the financial dynamics, banks in Germany charge low interest rates, even when the risk is deemed high. In other words, it seems that there is not enough consideration given to the risk premium. The German central bank defines the low-interest rate environment as a growing burden on the profitability of German banks, because it makes the net interest margin fall[158].

The great concern related to a failure in the net interest margin can be explained by the fact that the German banking system relies heavily on the net interest income as a main source of income. The latter notation brings us to the second factor which causes a low profitable environment: the lack of diversification of the banking activities. This diversification also means risk diversification, and therefore more room for further opportunities of profit. What emerges is the poor development of non-interest revenue as an alternative source of revenues, which go beyond the traditional banking activities. This is why the German central bank fears negative implications for the overall financial stability of Germany, and why there is call for a structural reform of this system[159].

[158] Deutsche Bank (2014). Financial Stability Report.

[159] Op. Cit. Deutsche Bank (2014). Financial Stability Report.

4.3 The structure of the UK banking system

The evolution of the UK banking system

Unlike the German banking system, which is still maintaining its original three-pillar structure, the UK banking system has been the protagonist of radical change in its structure aided by regulatory and economic drivers. In fact, what used to be a rather fragmented structure, in which each financial institution could only deal with a certain activity, has become a more concentrated structure based on the universal banking model[160].

In fact, up to the beginning of the 1970, the UK banking system presented a very fragmented structure, classified by the literature according to different types of institutions: (i) deposit banking[161]; (ii) secondary banks[162]; and (iii) the so-called

[160] Davies, R. and Richardson, P. (2010).

[161] The deposit banking represented the core of the banking system, mainly constituted by the so-called clearing banks, which were authorized to operate fully in the payments system. They were mainly focused on the provision of payment services, deposit-taking activities and short-term corporate lending.

[162] The secondary banks group, instead, was characterized by a heterogeneous structure constituted manly by accepting houses.

near-banks, or retail secondary banks[163]. At the center was the City of London, traditionally organized on a highly specialist basis, with the strong support of the Bank of England[164]

The common factor among the three groups of financial institutions was that all of them have been performing the core banking activity, i.e. the deposit banking.

Since 1970, the UK banking system has undergone a considerable change, driven mainly by the concern for promoting a more competitive economic environment, both within the banking sector and between banks and the non-bank financial sector, especially after the emergence of London as a truly international financial center which increasingly attracted international banks[165]. Within the banking sector, the competition in prices was limited by collusion in setting deposit rates and other customers charges, fostered by the oligopolistic banking structure. The relationship among banks and the non-bank financial sector was characterized by a competitive disadvantage which banks were bearing with respect to less-regulated non-banks financial institutions.

The evolution of the UK banking system was aimed at realizing a change in its own structure, by moving from an oligopolistic banking structure, characterized

[163] This group included: finance banks, specialized in consumer credit; building societies, which are mutualistic and non-profit institutions which perform almost exclusively perform operations of public interest, and are of importance for loans to households; and savings banks.

[164] Gola, C and Roselli (2009).The UK Banking System and Its Regulatory and Supervisory Framework, Palgrave Macmillan Studies in Banking and Financial Institutions, Series Editor: Philip Molyneux.

[165] Davies, R. and Richardson, P. (2010).

by an interest rate cartel, resulting from collusion, and a rather protective environment where banks were mainly focused towards activities of public interest, to a more open and competitive economic environment[166]. The main contribution to this change is due to a combination of different factors. In 1971 the Bank of England moved to a more market-related monetary environment under a policy, known as Competition and Credit Control, with the aim of ending collusion on interest rates and, on the other hand, at eliminating barriers between different types of intermediaries, by widening the range of activities to be run by banks[167].

In addition, the 1986 Financial Services Act started a wave of deregulation[168] of financial markets, known as the "Big Bang", which definitely contributed towards an increase in foreign banks. The "Big Bang" refers to a series of reforms aimed at eliminating anticompetitive practices in order to allow London's financial market to compete with its international competitors, especially the US. All protective measures were removed and the fixed commission charges abolished. Moreover, brokers were prevented from trading on their own account, and market makers from acting for customers[169].

[166] Op. Cit. Gola, C and Roselli (2009).

[167] Moreover, the 1979 Banking Act established a regime of banking supervision, and created a two-tier system of banks and licensed deposit-takers.

Op. Cit., Davies, R. and Richardson, P. (2010).

[168] Op. Cit., Davies, R. and Richardson, P. (2010).

[169] Op. Cit., Davies, R. and Richardson, P. (2010).

Finally, the search for the economies of scale[170]. The financial deregulation in 1970s and 1980s removed the constraints for banks to provide a wider range of services than the traditional banking activities. This raised opportunities of exploiting economies of scale, since UK banks were able to move towards the universal banking model[171]. This in turn introduced stronger competitive dynamics, since banks were able to enter new and more profitable markets offering higher margins.

Today's UK banking sector

While the German banking system operates in a bank-based financial system, the UK banking system, instead, operates in a market-based financial system. In such a financial system, the securities market plays the leading role in firms' financing choices. Most financial transactions are conducted through the market rather than the bank channels. Therefore, in this type of system, the market and the banks share the role of transforming the savings of the society to the financing of firms, exerting corporate control and easing risk management[172]. The fact that the UK has a market-based financial system is aligned with the considerable and growing financial deepening of the UK economy. It is believed that the more the financial system is well-developed, the more the economy moves towards a market-

[170] Broadly speaking, the economies of scale arise when the unit cost of providing a certain service declines as the scale of provision of that service increases, or when the unit cost of providing a mix of services jointly is lower than the sum of providing each one separately. The underlying idea is to spread fixed costs over a larger volume of output.

[171] Universal banks are characterized by the ability of providing a wide variety of financial services, including both commercial and investment services.

[172] Op. Cit., Levine, R. (2002).

based financial system[173]. However, this do not necessarily imply a marginal significance of the banking system or an underdeveloped banking system in the UK financial system. As it is explained bellow, the UK banking system, with its multifunctional financial entities, is of key importance for the UK economy. The peculiarity of the UK banking system can be seen in the nature of the banking business which has changed over time. It has moved away from the traditional banking activities to investment banking and has increased its use of innovative financial instruments, to diversify risk[174].

The UK banking system is characterized by two distinct market configurations: the retail market, which is more domestically oriented and the wholesale market, which has a more international dimension. The same intermediaries operate within this bidimensional market, but while the retail market offers credit to households and to SMEs; the wholesale market offers more complex products, which go from corporate finance to securities intermediation in the primary and secondary markets, such as broker/dealers, to giving advice regarding corporate transactions.[175]. This marketplace has some key characteristics. Firstly[176], it is highly concentrated and is based on the universal banking model. The strong competitive forces following the de-regulatory events analyzed above, have led to a double effect: (i) on the highly-concentrated structure of the UK banking system, and (ii) on

[173] Op. Cit., Levine, R. (2002).

[174] Op. Cit., Gola, C and Roselli (2009).

[175] Op. Cit., Gola, C and Roselli (2009).

[176] Bush, O., Knott, S. and Peacock, C. (2014). Why is the UK banking system so big and is that a problem? Bank of England Quarterly Bulletin Q4, pp. 385-395.

the type of activities carried out by the UK banking system, which encompass securities underwriting and trading, fund management, derivatives trading and general insurance, therefore making it a truly universal banking system[177]. This is the result of the increased competitive forces which have brought about a decline in the interest margins on retail banking activities, and therefore banks found themselves in the need of promoting efficiency gains. The latter were pursued through a cost-cutting policy on the one hand, in order to exploit economies of scale, and looking for new sources of revenues, on the other hand.

This, in turn, explains both consolidation in the UK banking industry and the expansion of banks' roles, beyond their traditional functions, towards the universal banking system[178]. In fact, in 1990, a gradual wave of consolidation started. It saw a series of mergers and acquisitions taking place, and these then led to a progressive reduction in the number of banks. This process was also undertaken through cross-border operations, such as the acquisition of foreign banks or through cross-sector operations such as the acquisition of insurance institutions by banks[179]. Nowadays, the provision of the retail banking services is highly concentrated in four large banks which are the Royal Bank of Scotland, Barclays, HSBC and Lloyds Banking Group. These four banks, along with Nationwide and Santander, together account for almost 80% of UK customers' lending activities and deposits taking[180]. The

[177] Op. Cit., Davies, R. and Richardson, P. (2010).

[178] Op. Cit., Gola, C and Roselli (2009).

[179] Op. Cit., Gola, C and Roselli (2009).

[180] Op. Cit., Davies, R. and Richardson, P. (2010).

building societies sector also underwent a sharp decline in the number of institutions in the mid-late 1990s, going from over 700 in 1960 to just 52 today[181]. Some of them were consolidated amongst themselves; whereas others, after their demutualization, became banks[182].

The quest for new sources of revenues from existing assets explains the shift from the traditional banking functions to the universal banking system which today characterizes the UK banking system. Therefore, once banks were freed from regulatory restrictions, aided by the consolidation wave, they expanded the range of their activities, entering new markets.

The shift from the "traditional" banking activities towards the universal bank model, determined that "other income" on the banks' balance sheet was higher than "interest income". Therefore, the second characteristic of the UK banking system is that non-loan assets constitute a high proportion of total UK banking assets. Nowadays, non-interest income accounts for more than 60% of banks' earnings in to UK, whilst it was just a small percentage during the 1980s[183].

The third characteristic, which is thought to be its defining feature, is its international nature. This is in line with both the globalization of the financial markets of the 1980s, and the emergence of London as a truly international financial center which began to attract international banks. This internal orientation refers, first of

[181] Op. Cit., Davies, R. and Richardson, P. (2010).

[182] For example Cheltenham & Gloucester, in 1995 (later acquired by Lloyds); Halifax, Northern Rock, Alliance & Leicester, Woolwich, all in 1997 (the latter acquired by Barclays in 2000). Bradford and Bingley was demutualized in 2000. See, Op. Cit., Gola, C and Roselli (2009).

[183] Op. Cit., Davies, R. and Richardson, P. (2010).

all, to the presence of a large number of foreign banks with both branches and subsidiaries. It reached its peak in 1990 when the level was more than 60 percent of foreign banks[184]. Today, the presence of foreign banks is still quite relevant, more than 50 percent of the total bank assets is held by foreign banks[185]. This translates in a large number operations being carried abroad. From this point of view, it is worth noticing that, because of an overseas presence and other cross-border business, the UK financial institutions' external assets were about six times the UK's GDP in 2008[186].

The above notations make it easy to understand the last characteristic of this banking system. The UK has the largest banking sector on a residency basis relative to most other major economies. Over the past 40 years, the size of the UK banking system has sensibly grown and now exceeds the other financial sectors by far. It has gone from a total assets of around 100 percent of the nominal UK GDP to around 500 percent. This means that each asset of the three of the four largest banks separately exceeds UK's GDP[187].

4.4 The German banking system vs. the UK banking system

It is without a doubt that the most important differences between the two banking systems depend on them acting in two opposite economic environments

[184] Op. Cit., Bush, O., Knott, S. and Peacock, C. (2014).

[185] Op. Cit., Bush, O., Knott, S. and Peacock, C. (2014).

[186] Op. Cit., Bush, O., Knott, S. and Peacock, C. (2014).

[187] Op. Cit., Bush, O., Knott, S. and Peacock, C. (2014).

(Coordinated Market Economies vs. Liberal Market Economies), and also in different types of financial systems (bank-based vs. market-based systems). Each of the two banking systems, in fact, reflects the "status" of being driven by different policies: the German banking system by a more protectionist approach, while the UK system by more liberal policies.

However, a further sub-classification may help to clarify what actually makes the two systems different. In fact, it can be said that the difference between the two is its being a risk-averse banking system or a risk-taking one. In other words, what emerges from the comparison between the two banking systems is, on the one hand, an extremely risk-averse German banking system focused on its own stability, at the expense of more profitable activities and competitive dynamics, and, on the other hand, the risk-taking UK banking system which focuses on profit-making activities, and which relies on truly globalized financial markets.

As noted above, there are many differences between the two systems and these derive from their own characteristics which are very different. In particular, in order to support these findings it is required to look into: (i) the nature of the ownership, mostly public in the German banking system, and private in the UK; and (ii) the function performed by the banking system in each of the two economies. The reason for this is that the other characteristics of the two systems simply come from the nature of the banks' ownership and the function performed by each banking system. The public nature of the banks' ownership, which characterizes the German banking system, reveals the public function performed by banks within the country.

The main features of public goods and services is that they are not supplied with the aim of making a profit, but rather benefit the general public. This is why they are supplied at a relatively low cost. Moreover, on the one hand, in finance the notion of risk does not always imply the negative meaning of losses (downside risk). It simply refers to "uncertainty", therefore it encompasses both losses and profits (upside risk). On the other hand, what constitutes the risk premium is the profit which is made for taking more risk for bearing more uncertainty. In other words, the greater the risk, the greater the profit[188]. The German banking system is characterized by an ownership which is mainly public. As previously noted, the main German public interest is the maintenance of the stability of the system by granting the widest access to credit at a local level, paying particular attention to the SMEs. Given the above economic notations, it is not surprising that the result in Germany has been a very fragmented banking system encompassing many small financial institutions capable of providing services at a local level. More importantly, the low-interest rate environment explains why the system exhibits such a low degree of profitability compared with the UK banking system. The German banking system it is a system which, since it is not "interested" in profit as a main objective, and it is therefore not "interested" in risk (as a profit generating opportunity). This, ultimately, describes it can be characterized as a risk-averse banking system.

The same considerations apply to the UK banking system, which is, instead, characterized by a mostly private ownership and is a system driven by the aim of

[188] Bodie, Z., Kane, A. and Marcus, A. J., (2011). Investments and Portfolio Management. MacGraw Hill Editor.

making profits. Being a profit-oriented system, means that it benefit from competitive forces, and this is why it has followed a different direction compared to Germany. In particular, the quest for new sources of income and the need for risk diversification has pushed the system to become a truly concentrated universal banking system which goes beyond the traditional banking activities to compete with foreign banks and the other financial markets. Therefore, in the light of this scenario, the UK banking system is, ultimately, a risk-taking banking system.

5 Conclusion

The aim of this research is to provide a theoretical analysis of the extent to which the implementation of the same rule, in this case the Basel regulation, leads to a different impact on the degree of competition in the banking system, if applied to systems based on economies with different characteristics, namely Germany and the UK. The question is relevant as, in the aftermath of the 2007/09 financial crisis, the international financial regulation has been moving towards stronger regulatory provisions that provide stricter capital requirements. This is thought to be needed in order to foster stability in the banking system. The point we raise is that, this is also likely to affect the competitive environment and shape the incentive of the economic players involved, namely banks. The comparison of the two systems suggests the hypothesis that as the German system is risk-oriented and the UK one is profit-oriented, then the latter is much more likely to be impacted by strict burdens on capital requirements.

This in turn suggests that the implementation of the same rule may lead to different outcomes depending on the economy in which the rule is implemented. In particular: the implementation of Basel in Germany has a lower impact on revenues, compared with the UK.

It is likely that impact of Basel in the UK is to create distance between large and other banks by making the former perform in monopolistic conditions and leaving the others to compete amongst themselves. In other words, it creates a subsample of large banks across the UK sample, which constitutes a particular category of banks. In a more stability-oriented system, such as that in Germany, which is characterized by the risk-reducing drive of its policy and regulation, the implementation of Basel is more likely to align the incentives of banks and regulators. Instead in a market-based system, such as that in the UK, we should expect the incentives of banks and regulators do not to be aligned to one another.

Therefore in this kind of economies, the impact of Basel would be of shaping banks' behaviour towards less competitive dynamics, so that to create a particular category of banks which produces in monopolistic conditions.

Chapter 3

The Impact of Basel I and Basel II on Competition in the Banking Industry: Evidence from Germany and the UK

1. Introduction

The aim of this research is to study the impact of Basel I and Basel II[189] (which will be referred to as Basel hereafter) on the degree of competition in the German and UK banking industries, and the extent to which this impact varies (if indeed it does vary) across the two economies. It is well known that the banking sector has always been heavily regulated, especially in terms of capital requirements. The rationale for banking regulation is provided by the pivotal role which the banking system fulfills in the economy[190]. Banks are, in fact, archetypal financial players: they provide an array of services and perform activities which involve

[189] Basel I (1988), Basel II (2004), and Basel III (2010) represent the prudential banking regulation issued by the Basel Committee on Banking Supervision, with the aim of promoting worldwide supervision and enhancing financial stability at a global level. To this purpose, capital requirements ensure that banks keep enough capital so that they are able to manage the risks they take in carrying out their activities.

[190] Dow, S. C. (1996). Why the Banking System Should be regulated? The Economic Journal, Vol.106, No 436, pp.698-707.

individuals (e.g. depositors and consumers) and their wellbeing[191] This implies that the interests underlying banking activities are public in nature, and this is why the main concern of those regulating them is to foster stability in the banking system[192]. The aim of the Basel is, in fact, to ensure the soundness and the stability of the banking system (Basel Committee on Banking Supervision, 2014). This aim is pursued abiding to rules regarding both the optimal level of capital that banks should hold (Pillar I), and the complementary supervisory review of the banks' compliance to the capital requirement rules (Pillar II), and also market discipline *via* disclosure with the aim of enhancing banking transparency (Pillar III).

Nevertheless, the 2007/09 financial crisis proved regulation to be somewhat inadequate. Despite such heavy regulation, the economy broke down and the crisis spread with severe consequences worldwide. This is why, in the aftermath of the crisis, there is the quest for new financial regulation so as to avoid further crisis phenomena. What is believed is that, in order to foster stability in the banking system, there is the need for stricter capital requirements and closer supervision[193]. On the one hand, however, regulation, depending on its own provisions, is likely to affect the competitive environment by either relaxing or imposing restrictions,

[191] Banks act as payment agents. A large amount of commercial transactions, the exchange of goods and services, are carried out more conveniently without having to carry around a large amount of actual currency or use cheques, debit or credit cards, instead, which are provided by the bank.

[192] Scott, H. (2010). Reducing Systemic Risk through the Reform of Capital Regulation, Journal of International Economic Law, Vol. 13, No 3, pp.763-778.

[193] Lastra, R. M. and Wood, G. (2010). The crisis of 2007-2009: Nature, Causes, and Reactions. In Cottier, T., Jackson, J. H. and Lastra, R. M. (eds.), International Law in Financial Regulation and Monetary Affairs, pp. 9-27, Oxford University Press.

which are then likely to lead to changes in the incentive the players have[194]. On the other hand, competition is known to be a good substitute for regulation, because of the discipline it exerts on the current operators. Cross-country analysis shows that higher competition provides higher incentives for banks to hold capital buffers against the risk of default[195]. Evidence also shows that it leads to a lower probability of observing a systemic banking crisis, and it is more likely to delay the arrival of one[196]

Competition is one of the indicators the literature adopts to measure the banks' performance[197].The economic literature has been paying a great deal of attention to these indices, since they also reveal information about the state of the economy as a whole. Many empirical studies on the link between regulation and competition have been conducted, showing that banks' economic performances are actually shaped by regulatory provisions[198]. This issue is important because com-

[194] Gudmundsson R., Ngoka-Kisinguh K. and Odongo M.T., 2013. The Role of Capital Requirements on Bank Competition and Stability: The Case of the Kenyan Banking Industry. KBA Centre for Research on Financial Markets and Policy. Working Paper 02.

[195] Schaeck, K., Cihak, M. and Wolfe, S. (2007). Are More Competitive Banking Systems More Stable? Journal of Money, Credit and Banking, Vol. 41, No 4, pp. 711-734.

[196] Caggiano, G., Calice, P., and Leonida, L. (2015). Bank concentration, competition and crises: A tale of two tails, INFINITI Conference paper, Prato, Italy.

[197] Bikker, J. A. and. Bos, J.W.B, (2009). A theoretical and Empirical Framework for the Analysis of Profitability, Competition and Efficiency. Routledge International Studies in Money and Banking. Bank performance.

[198] Angelini, P. and Cetorelli, N. (2003). The Effect of Regulatory Reform on Competition in the Banking Industry, Journal of Money, Credit and Banking, Vol. 35, No 5, pp 663-684.

petition in the banking sector matters, since it is thought to enhance financial stability[199]. Fostering the optimal balance between costs and production helps the efficiency of banks. In turn, this leads to a higher quality of products, and enhances innovation and stability in the banking sector[200].

This is why competition is not only a concern for economists but, because of its impact on society, it is also one of the regulators' main concerns. In fact, the current complexity of the financial markets, which constitute an extremely complex network of interconnected and truly globalized institutions, calls for a likewise complex financial regulation which is able to connect the economic and legal dimensions.

What matters in this context is that, if regulation imposes a strict burden on banks, it may significantly raise the costs of entering into, or staying in, the market and dampen competition dynamics. Indeed, cross-country analysis of the effect of regulation and supervision on competition shows a negative correlation between competition and stability-oriented regulations[201]. In this respect, Basel I and Basel II are both likely to raise the cost of entry into the banking industry and to raise the

[199] OECD Competition Committee (2010). Competition, Concentration and Stability in the Banking Sector. See also, Claessens, S. and Leaven, L. (2004). What drives bank competition? Some international evidence, Journal of Money, Credit and Banking, Vol. 36, No 3, pp. 563-583.

[200] Bikker, J. A. and. Bos, J.W.B, (2009). A theoretical and Empirical Framework for the Analysis of Profitability, Competition and Efficiency. Routledge International Studies in Money and Banking. Bank performance.

[201] deSerres, A., Kobayakawa, S., Sløk, T. and Vartia, L. (2006). Regulation of Financial System and Economic Growth in OECD Countries: an Empirical Analysis, OECD Economics Studies, No. 43, PP.78-113.

cost of staying in the sector, essentially because of the stricter capital requirement that it imposes. In fact, these are likely to raise banks' funding costs, considering that raising equity is costly[202]. In the context of this research, an extremely relevant question is posed: Which of the two banking systems, Germany or the UK, is more likely to be affected by Basel?

Germany and the UK provide the main European examples of two different types of financial system (bank-based *vs* market-based systems)[203] and act in two opposite economic environments (Coordinated Market Economies *vs* Liberal Market Economies)[204]. The German banking system is characterized by mainly public ownership. It appears to be extremely risk-averse, and it is mainly focused on its

[202] Baker, M. and Wurgler, J. (2013). Do Strict Capital Requirements Raise the Cost of Capital? Banking Regulation and the Low Risk Anomaly, the National Bureau of Economic Research, Working Paper No. 19018.

[203] Levine, R. (2002). Bank-Based or Market-Based Financial Systems: Which Is Better? Journal of Financial Intermediation, Vol. 11, pp. 398–428.
In a bank-based financial system, banks play a leading role as the suppliers of external funding to non-financial firms; while in the case of a market-based financial system, the securities market plays the leading role in firms' financing choices.

[204] The Liberal Market Economies (LME) rely more on the market forces and in competitive market arrangements. In this kind of economies, what determinate the optimal amount of product are demand and supply conditions in competitive markets. The LMEs are characterized by large, well-developed equity markets where the relationship between shareholders and organizations is always short-term. The Coordinated Market Economies (CME), rely more on non-market relationships, like strategic interaction among firms and other actors. The equity markets are organized so that a substantial amount of equity in each company is controlled by shareholders who have a long-term commitment to the company. Vitols, S. (2004). Varieties of Corporate Governance: Comparing Germany and the UK, in Varieties of Capitalism, The Institutional Foundations of Comparative Advantage, Hall, P. A., and Soskice, D, (eds), Oxford University Press.

own stability at the expense of more profitable activities and competitive dynamics (i.e. a risk-oriented system). The UK banking system, however, is characterized by mostly private ownership. It is more risk-taking, and it mainly focuses on profit-making activities which go beyond traditional banking activities (i.e. a profit-oriented system). The likely outcome, which the comparative analysis suggests, is that as the German system is risk-oriented and the UK system is profit-oriented. Thus, latter is much more likely to be impacted by strict burdens on capital requirements. The former, however, is more likely to be already on the way to having higher capital than required because of the risk-reducing drive of their policy and regulation[205].

Given the above, the reduced potential competition resulting from the new regulation is more likely to have an impact on the UK banking system, as it is likely to drive the existing groups of large banks, which probably are more profitable, towards less competitive behavior. Where operators produce in the monopoly or natural monopoly economic environment, which is the case of banks[206], potential entrants are known to have the important role of dissipating rents[207]. If regulation is

[205] The evidence of the higher number of failures, mergers and acquisitions in the UK banking system, compared with the German system during 2007 onwards, can be seen in the light of a higher cost of adjustment to equilibrium of the former with respect to the latter, and therefore a higher cost of adjustment to Basel.

[206] Mullineux, A. and Terberger, E. (2006). The British Banking System: A Good Role Model for Germany? Anglo-German Foundation for the Study of Industrial Society.

[207] According to the "theory of dissipation of rents", the current producers, being under threat by potential entrants, have to invest their extra profits (for example in new technology) to maintain ~~the~~ dominant~~s~~ positions. In other words, competition plays a key role not only among existing players, but also among existing and potential players.

likely to raise the cost of entry into the banking industry and to raise the cost of staying in the sector, there is no need for the existing operators to dissipate their extra profits in order to maintain their dominant position. More specifically, there exists a trade-off: on the one hand, the new regulation will impact profits in the short run by imposing higher capital requirements; on the other hand, in the long run, new regulation will reduce the threat by potential entrants at no extra cost for existing banks. The latter, in fact, do not have to dissipate position-dominant rents, and that, in turn, prevents new entrants from entering into the field. The likely outcome of the combined incentives is that profit-oriented systems will invest rents in new technology, able to escape the new regulation.[208]

In this work the level of competition is measured *via* the Panzar and Rosse (1987) statistic arguing that the market power of a firm can be measured by the way in which the changes in the input prices affect the equilibrium of revenues. The measure is a simple test to discriminate between different markets. In particular it was originally proposed to identify monopoly against the alternatives of oligopoly, monopolistic competition and perfect competition with freedom to entry. The advantage of this measure is its simplicity: the statistic is the sum of the elasticities of the revenues to the input factor prices.

The remainder of the paper is structured as follows. Section two provides the theoretical background of this research and an overview of the regulatory land-

[208] Banks can, for example invest to further financial innovation. They can also, at worst, behave unethically, for example acting as a cartel.

scape; section three surveys the literature on the Germany and the UK banking systems and provides the comparative analysis of the two; section four provides data and empirical model; section five reports the estimation and results; section six provides some concluding remarks and policy recommendations.

2. Motivation

2.1. Why competition among the banking industry matters?

Competition, concentration, efficiency, productivity and profitability, are indices of banks' performance[209]. The economic literature pays a great attention to these indices in order to figure out banks' behaviour, which is not observable otherwise, and, to this purpose, uses alternative methods. In particular competition in the financial sector matters for a number of reasons[210]. The degree of competition in the financial sector is often used as measure of banks' efficiency, in terms of optimal balance between costs and production. This in turn leads to a high quality of the products and enhances innovation in banking sector. Empirical and theoreti-

[209] Bank performance. A theoretical and Empirical Framework for the Analysis of Profitability, Competition and Efficiency. J. A. Bikker and Jaap W.B. Bos, Routledge International Studies in Money and Banking, 2008.

[210] On that point: What drives bank competition? Some international evidence. S. Claessens and L. Leaven. Journal of Money, Credit and Banking, 2004

cal studies show a competitive environment enhances the stability among the financial system. The latter highlight the link between competition and stability, therefore link between stability oriented regulation, such as banking prudential regulation and competition. Cross-country analysis shows that increased competition provides incentives for banks to hold capital buffers against the risk of default. Moreover it has been shown that more competitive banking systems are less likely to incur in a systemic crisis and that time to crisis increases in a competitive environment.

The degree of competition in the financial sector is also important for the access of firms to both financial services and external financing, in turn affecting the overall economic growth.[211]. However, the competitive environment, it is likely to be affected by stability oriented regulation, such as Basel, in terms of activities restrictions, barriers to entry, therefore shaping the incentive of the economic players involved, namely banks[212] This kind of regulation may strongly affect the competition environment either relaxing or imposing restrictions which are likely to leading respectively to a decrease or an increase costs of entry, therefore the competition environment.

[211] Op Cit. Bank Competition and Bank Soundness: New Evidence Are More Competitive Banking Systems More Stable? The Relationship between Banking Market Competition and risk-taking: Do Size and Capitalization Matter?

[212] What drives bank competition? Some international evidence. S. Claessens and L. Leaven. Journal of Money, Credit and Banking, 2004.

On this, some authors[213], in studying the role of banking regulations on the degree of competition across countries, take also into account the role of prudential supervision. This refers to the indicators of the enforcement power. The empirical results show a negative correlations between competition and stability-oriented regulations.

Similar results come from a study on the relationship among regulations, competition, and risk-taking in the Central and Eastern European banking sectors between 1994 and 2005[214]. This study finds out that regulations, especially capital requirements and prudential supervision, since they strongly restrict banks activities, heavily shape the market dynamic toward less competitive environment.

2.2. The German banking system vs the UK banking system

Which of the two banking systems, Germany or the UK, is more likely to be affected by Basel?

Germany and the UK provide the main European examples of two different types of financial system (bank-based *vs.* market-based systems) [215]and act in two

[213] A. de Sierres, S. Kobayakawa, T. Slok and L. Vartia, 2006. Organisation for Economic Co-operation and Development. Economic Department Working paper No. 506. Regulation of Financial System and Economic Growth.

[214] M.E. K. Agoraki , M. D. Delis, F. Pasiouras, 2008. University of Bath School of Management, Working Paper Series. Regulations, Competition and Bank Risk Taking in Transition Countries.

[215] While in a bank-based financial system, banks play a leading role as the suppliers of external funding to non-financial firms; in a market-based financial system, the securities market plays the leading role in firms' financing choices.

opposite economic environments (Coordinated Market Economies *vs.* Liberal Market Economies)[216]. However, a further sub-classification may help to clarify what actually makes the two systems different: risk-averse and risk-taking banking systems. In fact, from the comparison between the two banking systems emerges that while the German banking system is extremely risk-averse, the UK banking system is a risk-taking one, instead. The German banking system focused on its own stability (i.e. a risk-oriented system), at the expense of more profitable activities and competitive dynamics. The public nature of the banks' ownership, which characterizes the German banking system, reveals the public function performed by banks within the country. Services are not supplied with the aim of making a profit, but rather benefit the general public. This is why they are supplied at a relatively low cost. The UK banking system instead, focuses on profit-making activities, and relies on truly globalized financial markets.

That system is characterized by a mostly private ownership and is a system driven by the aim of making profits (i.e. a profit-oriented system). Being a profit-oriented system, it has followed a different direction compared to Germany. In particular, the quest for new sources of income and the need for risk diversification has pushed the system to become a truly concentrated universal banking system, which goes beyond the traditional banking activities to compete with foreign banks and the other financial markets. In the light of this scenario, the UK banking system is a risk-taking banking system. Given the above remarks it is not surprising that the

[216] The Liberal Market Economies rely more on the market forces and in competitive market arrangements. The Coordinated Market Economies, rely more on non-market relationships.

German system exhibits such a low degree of profitability compared with the UK banking system.

The likely outcome which the comparative analysis suggests is that in a bank-based system, such as that in the German, is more likely to be already on the path of having higher capital than required because of the risk reducing drive and polices. In this kind of system the implementation of Basel is likely to have the impact of aligning the incentives of banks and regulators. In a market-based system, such as that in the UK, instead, the impact of Basel may shape banks' behaviour towards less competitive dynamics.

Large banks may colludes to exploit the barriers of entry, created by regulation, without dissipating rents[217], in order to fortify its dominant position in the market and have more room to re-invest the extra rents in new technology which allows them, for example, to escape regulation. This suggests that existing groups of large banks have an incentive for being in favour of regulation, but only for their private interests.

[217]According to the "theory of dissipation of rents", the current producers, being under threat by potential entrants, have to invest their extra profits (for example in new technology) to maintain dominant positions.

2.3. How to measure competition?

Competition cannot be measured directly. The lack of detailed information on prices and costs of the different banking products does not allow for it.

There are two empirical tests that have been mainly applied in order to study the degree of competition in the financial sector[218]: the model of Bresnahan (1982) and Lau (1982), as expanded in Bresnahan (1989); and the model of Panzar and Rosse. The model of Bresnahan uses the condition of general market equilibrium. The basic idea is that profit-maximizing firms in equilibrium will choose prices and quantities such that marginal costs equal their (perceived) marginal revenue, which in turn is the demand price under perfect competition or with the industry's marginal revenue under perfect collusion. The model consists in estimating a simultaneous equation system where parameter to be estimated is λ, which provides a measure of the degree of imperfect competition, varying between perfect competition ($\lambda = 0$) or market power ($\lambda = 1$). Assuming that all the banks are equal, the main practical advantage is that it is only needed the use industry aggregate data. The mark-up of price (average revenue) over marginal cost and the distance between price and perceived marginal revenue for the Bresnahan measure is the Lerner index[219]. The latter refers the difference between the price (interest rate) and marginal cost as a percentage of prices, this indicated the monopoly banks' behavior. It has

[218] For a more detailed review on that point, see: Bank performance. A theoretical and Empirical Framework for the Analysis of Profitability, Competition and Efficiency. J. A. Bikker and Jaap W.B. Bos, 2008.

[219] Cross-Country Comparisons of Competition and Pricing Power in European Banking. S. Carbó, D. Humphrey, J. Maudo and P. Molyneux. Journal of International Money and Finance, 2009.

been argued[220] that the Lerner Index is a more direct measure of competition, because it focuses on the pricing power.

The alternative approach is Rosse and Panzar (1977), developed by Panzar and Rosse (1982) and Panzar and Rosse (1987) (further explained in Methodology). This methodology, uses firm (or bank)-level data. It investigates the extent to which a change in factor input prices is reflected in (equilibrium) revenues earned by a specific bank.

As summarized by S. Cleassens and L. Leaven[221] looking at empirical studies the difference between the two methods appears do not to be large, since the empirical results of the two methodology are consistent between each other. On this evidence the authors compare the studies conducted by Shaffer (1993) and Nathan and Neave (1989) to assess competition in the Canadian banking sector.

Both the studies reject the hypothesis of monopoly, and find a quite concentrate market which lays between perfect competition and monopolistic competition.

Bikker and Haaf (2001) use both the Panzar and Rosse model and as the Breshanan model, to study 17 European and six non-European (US, Japan, Korea, New Zealand and Canada) markets, and find out similar results. They reject both perfect competition and monopoly for the whole banks' sample (small and large), but cannot reject perfect collusion for Australia and Greece with respect to small banks

[220] The Role of Capital Requirements on Banking Competition and Stability: The Case of the Kenyan Banking Industry. R. Gudmundsson, K. Ngoka-Kisinguh and M. T. Odongo. Centre for Research on Financial Markets and Policy, 2013.

[221] S. Claessens and L. Leaven, 2004. Journal of Money, Credit and Banking. What drives bank competition? Some international evidence.

only. They also find that in general, competition seems to be higher in EU-Countries.

The main critic to the Panzar and Rosse framework is that, in order for the method to work it is necessary the economy is in the long run equilibrium. Therefore it is needed a two steps-procedure. Before testing for competition it is necessary to test for equilibrium, thus that the returns rates across the banks are not correlated with the input prices, because they are equalize across firms in a competitive market. Operationally this can be done regressing an indicator of the firm return on the factor prices of the firm, and estimate the null hypothesis of equilibrium. This hypothesis is not rejected if H is equal to 0. The explanatory variables for the equilibrium test regression are identical to those of the contestability regression underlying the Panzar and Rosse model, but the dependent variable now is the log of the return on asset (*lnROA*).

Some authors[222] in an independent research showed that in case of non-long run equilibrium, the H statistic can be biased toward zero, failing to discern to the monopolistic competition and the monopoly. However a method to solve this problem is to develop a dynamic model that can capture the competition effect without starting from the assumption of equilibrium, but including the adjustment of the sector towards equilibrium[223]. In this model the revenues are explained also by the revenues of the previous period, and where the coefficient of the lag measure the

[222] J. Goddard and J. Wilson and J.O.S. Tavakoli, 2007. Journal of Banking and Finance. European banking: an overview.

[223] J Goddard and J. Wilson, 2009. Journal of Banking and Finance. Competition in Banking: A disequilibrium Approach.

adjustment process. Theoretically this improvement can be implemented on the Panzar and Rosse framework, in order to see that, if including the lag of the dependent variable, it can be reached the same results, without needing the long run equilibrium hypothesis.

Some other author argues that the Panzar and Rosse method is overestimated and that the tests on both monopoly and perfect competition are biased, therefore leading to a misspecification[224]. The authors argue that this misspecification is due to the dependent variable underlying the Panzar and Rosse model, and used in the majority of the studies concerned that topic. That variable is interest income or total income, of which, most of the studies, use the scaled version working with revenues divide by total asset this is the lending rate or "price". According to this view the problem is that this scaling transform the nature of the model passing from a revenues equation to a price equation. Since the input price elasticities in a price equation sum to one, then basing the H statistic on a price equation instead of a revenues equation will cause a bias toward one. Starting from this approach the authors find out empirical results different from the ones resulting using the scaled Panzar and Rosse approach. Using a sample of 18,467 banks in 101 countries over 16 years, covering a total of 112,343 bank-year observations, they find out that the monopolistic competition is the usual structure of the market.

[224] J. A. Bikker, Laura Spierdijk and Paul Finnie, 2007. Netherlands Central Bank, Research Department, Working Paper 114. Misspecification of the Panzar-Rosse Model: Assessing Competition in the Banking Industry

However the majority of the literature addresses that topic by applying the Panzar and Rosse approach.

A study on the degree of competition in 50 countries' banking systems over the period 1994-2001[225], find that the less the regulatory restriction of banks activities, barriers to entry (even for foreign banks), the higher the degree of competition.

Same methodology has been used to investigate the effects of cross-border ownership among Italian banks on competition in the national banking sector[226] By applying the Panzar and Rosse methodology the author measures and compares the degree of competition between banks characterized by cross-border ownership and banks that are not. The empirical results on a sample of 503 banks over the period 1996-2000 show first of all that the banks, considered as a whole, operate under monopoly conditions. Moreover, comparing the banks linked with a cross-ownership with the other credit institutions, not involved in the same phenomenon, empirical evidence shows that the former behave less competitively than the latter.

Through the Panzar and Rosse approach has been also investigated the competitive conditions in the UK between 1980 and 2004[227]. The analysis is carried on using the "two step approach", which involves the empirical test for equilibrium.

[225] Op. Cit. What drives bank competition? Some international evidence.

[226] F. Trivieri, 2005. Journal of International Financial Markets, Institutions & Money. Does Cross-Ownership Affect Competition? Evidence from the Italian Banking Industry

[227] K. Matthews a, V. Murinde and T. Zhao, 2007. Journal of Banking & Finance. Competitive Conditions Among the Major British Banks.

The authors find out that the market in the U.K. banking system is best characterized by monopolistic competition rather than both perfect competition (perfect contestability) and pure monopoly.

An interesting study investigates the role of capital requirements (Basel) on bank competition and stability in Kenya for the period 2000-2011 after the Central Bank of Kenya (CBK) has implemented a requirement that all banks need to build their core capital with an increasing of KES by December 2012[228]. By estimating both the Lerner index and the Panzar and Rosse H-statistic as a measure of competition in Kenya's banking industry, the authors find that competition in the Kenyan banking sector seems to decline in the analyzed sample.

3 Methodology

3.1 The Panzar and Rosse Statistic

The hypothesis under examination is that The German and UK economies have a different approach while meeting the Basel requirements. In particular that the implementation of the Basel weakens the degree of competition across large banks if the financial system is market-based. The model posits that if the market is contestable, entry to and exit from the market will be easy, so that prices will be

[228] R. Gudmundsson, K. Ngoka-Kisinguh and M. T. Odongo, 2013. Centre for Research on Financial Markets and Policy. The Role of Capital Requirements on Bank Competition and Stability: The Case of the Kenyan Banking Industry.

set equal to marginal costs[229]. In this work the level of competition measured *via* the Panzar and Rosse (1987) statistic arguing that the market power of a firm can be measured by the way in which the changes in the input prices affect the equilibrium of revenues. The measure is a simple test to discriminate between different markets, in particular it was originally proposed to identify monopoly against the alternatives of oligopoly, monopolistic competition and perfect competition with freedom to entry. The advantage of this measure is its simplicity: the statistic is the sum of the elasticities of the revenues to the input factor prices. In the following model:

$$(1)\ (\log)\text{Revenues}_{\text{it}} = \beta_1(\log)\text{Personnel expenses}_{it} + \beta_2(\log)\text{Physical capital expense}_{it} + \beta_3(\log)\text{Average funding rate}_{it} + \mu_i + \mu_t + \varepsilon_{it},$$

where μ_i, μ_t and ε_{it} are the individual effect, the time effect and the random error term, respectively. The Panzar and Rosse statistic is calculated as the sum of the parameters β_1, β_2 and β_3; the degree of competition is calculated as:

$$(2)\ \beta_1 + \beta_2 + \beta_3 = 1 \ \rightarrow Perfect\ Competition$$

$$(3)\ \beta_1 + \beta_2 + \beta_3 = 0 \ \rightarrow Monopoly$$

$$(4)\ \beta_1 + \beta_2 + \beta_3 \in (0,1) \rightarrow Monopolistic\ Competition$$

[229] Matthews, K., Murinde, V and Zhao, T. (2007). Competitive Conditions Among the Major British Banks, Journal of Banking & Finance, Vol 31, pp. 2025-2042.

The idea is that, under perfect competition, an increase in input prices raises both marginal costs and total revenues by the same amount as the rise in costs. Under monopoly, an increase in input prices will increase marginal costs, reduce equilibrium output and consequently reduce total revenues.

The model is based on revenues function of individual firms, in its reduced form, in which the only essential variables are indications on input factor prices, instead of much more complicated structural model[230]. As dependent variable, the output of the bank I, the most common variable used is the ratio of the total interest revenue to the total asset. The most important independent variables are the unit prices of the input factors. Operationally, these can be considered as: the ratio of the annual interest expenses to total funds (average funding rate); the ratio of personnel expenses to the total balance sheet (price of personnel expenses) or the ratio of the personnel expenses to the number of the employees, and the ratio of physical capital expenditure and other expenses to fixed assets (price of capital expenditure).

The H statistic is valid if the industry is in the long run equilibrium. Empirical evidence show indeed that in case of non-long run equilibrium, the H statistic is biased toward zero[231]. In order to address this problem, a two steps-procedure is typically proposed. Before testing for competition it is necessary to test for equilibrium, thus that the returns rates across the banks are not correlated with the input

[230] Bikker, J. A. and. Bos, J.W.B, (2009). A theoretical and Empirical Framework for the Analysis of Profitability, Competition and Efficiency. Routledge International Studies in Money and Banking. Bank performance.

[231] Goddard, J. and Wilson, J. (2009). Competition in Banking: A disequilibrium Approach. Journal of Banking and Finance 33, 2282-2292.

prices, because they are equalize across firms in a competitive market. To this aim the explanatory variables for the equilibrium test regression are identical to those of the contestability regression, nut the dependent variable now is the log of ROA:

$$(5)\ (\log)\mathrm{ROA}_{it} = \alpha_1(\log)\text{Personnel expenses}_{it} + \alpha_2(\log)\text{Physical capital expense}_{it} + \alpha_3(\log)\text{Average funding rate}_{it} + \tau_i + \tau_t + \omega_{it}.$$

Equilibrium is argued to hold if the hypothesis $\alpha_1 + \alpha_2 + \alpha_3 = 0$ is not rejected.

Eq. (1) is of help in testing the hypothesis under examination. Indeed, it is easy to augment the model to study the direct impact of the Basel framework on the revenues, and its indirect impact on competition. To this aim, consider the following model, where we augment the set of regressors using the (log of) the Basel variable and its interaction with cost variables:

$$(6)\ (\log)\mathrm{Revenues}_{it} = \beta_1(\log)\text{Personnel expenses}_{it} + \beta_2(\log)\text{Physical capital expense}_{it} + \beta_3(\log)\text{Average funding rate}_{it} + \beta_4(\log)\mathrm{Basel}_{it} + (\log)\mathrm{Basel}_{it} \times [\beta_5(\log)\text{Personnel expenses}_{it} + \beta_6(\log)\text{Physical capital expense}_{it} + \beta_7(\log)\text{Average funding rate}_{it}] + \mu_i + \mu_t + \varepsilon_{it}.$$

If β_4 is statistically significant we cannot reject the null hypothesis that the Basel affects the banks behavior. Moreover, if its interaction with costs are statistically significant, we study the impact upon competition stricture of the banking sector using the so-called augmented completion tests:

(7) $\beta_1 + \beta_2 + \beta_3 + \beta_5 + \beta_6 + \beta_7 = 1 \ \rightarrow Perfect\ Competition$

(8) $\beta_1 + \beta_2 + \beta_3 + \beta_5 + \beta_6 + \beta_7 = 0 \ \rightarrow Monopoly$

(9) $\beta_1 + \beta_2 + \beta_3 + \beta_5 + \beta_6 + \beta_7 \in (0,1) \rightarrow Monopolistic\ Competition.$

Eq. (5) is estimated using the within group estimator, where the revenues are taken as the endogenous variable, and costs are taken as being the exogenous determinants. Over the wide literature which applies the Panzar and Rosse methodology to assess the competitive conduct of firms, not controlling for endogeneity appears to be the standard approach. The only example where a different estimator is adopted is Goddard and Wilson (2009) that generalize the model to disequilibrium dynamics by adding the lagged dependent variable to the set of regressors, and estimating the model using the two-Step GMM approach. However, despite the possibility of controlling for endogenous costs using internal instruments, the latter are still taken as exogenous variables.

The above is at a first glance somewhat surprising. It is however related to the nature of the Panzar and Rosse framework, where the statistics does not ask to look for determinants in a strict sense, but it is more related to a comparative static exercise. A different task would be looking at whether the extent to which costs and revenues are jointly determined. If this was the case, the exercise would be made

difficult by the use of balance sheet variables which, being internal to the bank, are difficult to take as exogenous in any case. Despite theoretically attractive, the use of internal instruments would not solve this question, as results are known to depend heavily on the set of instruments and to results in large variance - indeed Goddard and Wilson are unable to reject both competition and monopoly. A further complication is that, being the approach I propose a comparison, I would need the same set of instruments, with likely different correlation with the endogenous regressors, and it would be difficult to find variables as the right instruments for both the UK and Germany.

The final, and possibly the most important point, is that I already propose a change in the standard Panzar and Rosse framework by adding the Basel variable. If I change the estimator, it would be difficult to understand the extent to which the change in the results are due to the change in the estimator and the change in the specification of the model to be estimated.

4 Empirical analysis

4.1 Data description

Figure 1 reports results from a non-parametric analysis of the distribution of (the log of) assets, for UK (Panel a) and Germany (Panel b) (Johnson, J. and Di Nardo, 1996). Results suggest that the shape of the distribution of size is different across the two samples. More specifically, the distribution of size in Germany in

unimodal; the UK distribution is characterized by a strong bimodality. It is known that, when this is the case the sample under analysis is likely to have two distinct groups of firms. More specifically, the two modes in the distribution represent groups of banks that are likely to behave differently from each other, and hence clustered around the two modes. Results hence suggest that there exists of a sub-sample of large banks[232] across the UK sample, which constitutes particular category of banks. This is not the case for the German sample.

[232] Other banks, instead, refer to medium along with small.

Table 1
List and description of variables

Variable	Description
Revenues	In the P-R model the dependent variable is revenues, which indicates the total income and includes non-interest revenues.
Personnel expense	The ratio of annual personnel expenses to total assets is used as an approximation of the wage rate. The variable indicates the cost of labour.
Physical capital expenditure	The ratio of other non-interest expenses to fixed assets, is used as proxy for the price of physical capital expenditure. The variable indicates the funds used to buy physical assets.
Average funding rate	The ratio of interest expense to total funding is a proxy for the average funding rate. The variable indicates the cost of fund.
Credit risk	The ratio of customer loans to total assets, indicates the credit risk. The variable represents the exposure of the bank the counterparty's default.
Leverage	The ratio of equity to total assets accounts for the leverage. The variable indicate the corporate governace adopted by the bank.
Funding mix	The ratio of customer deposits to the sum of customer deposits and short-term funding. The variable indicates important features of the funding mix.
Basel	The total regulatory capital ratio. The variable represents the ratio of capital to risk-weighted assets.
Size	The total asset. The size is given by the amount of total assets held by the banking system in a economy.

This is somewhat confirmed by the analysis of the descriptive statistics reported in Table 2. The UK and the German banking system appear to be quite different.

The UK banking system is larger than the German one in size, and it is more profitable. By splitting the sample in "large banks" and "other banks", in the UK banking system, it appears that there is a small number of large banks that hold the largest portion of the total assets. Large banks appear to be more profitable than other banks. This is likely to be due to the more profitable activities with which are engaged the large banks, and which go beyond the traditional making-loans activities. In addition, large banks face lower costs of the input factor prices, than other banks. This is not surprising, since large banks exploit economies of scales. Finally, it is interesting to note that large banks retain a sensibly lower amount of regulatory capital than the other banks. This is aligned with the aim of Basel II, which introduced the internal models (IRB) of risk calculation which makes banks able to calculate as much regulatory capital as it is their real risk exposure[233].

In the German banking system the differences between the two subsamples are much less. The difference in size between large banks and the others is, in fact, not as large as the in the UK. Moreover, it is interesting that in the German banking system other banks behave similarly to large banks. The amount of regulatory capital kept by the two subsamples of banks is roughly the same. However, unlike the UK banking system, the German large banks hold more regulatory capital than

[233]It is not a surprise that the large banks retain lower amount of regulatory capital that the others, since, only large and more sophisticated banks are suitable to adopt the IRB models.

other banks. This may be related to the most public ownership, which characterizes other banks, and which grants government aids to these financial institutions (i.e. mutual guarantee schemes).

By comparing the two systems as a whole emerges that, the German banking system has a larger number of banks. However, it can be noticed a great difference in size: the average total asset is the UK banking system is larger than the in Germany. The entire German banking system account for 19 percent of the UK banking system. Interestingly, the large bank in Germany would be classified as other in the UK.

The UK banking system is also more profitable that the German one. From the analysis of the descriptive statistics, the total amount of revenues of the German banking system is equal to a fraction, that is the 28 percent, of the UK banking system revenues. It is interesting to notice that the UK banking system keep a larger amount of regulatory capital, compared with the German one. This may depend on the differences in the type of risk ran by banks as well as the amount of exposure of banks to risks.

The nature of these differences in the two systems may depend on two factors: the sources of funding and the sources of revenues. By looking at the value of the leverage, it appears that the UK banking system is mainly financed with debt. This is ultimately in line with the characteristics of the two systems. The UK banking system is deeply involved in securities activities and it is likely to have more debt financing than the German banking system does. The sources of revenues are also different. While the German banking system relies more on interest revenues, the

UK banking system, instead, relies also on alternative source of revenues, which go beyond the traditional banking activities. In fact, the amount of credit risk in the UK banking system is lower with respect of the German one. Therefore it is likely that, even if it the exposure to credit risk system appears to be lower, the UK banking faces a larger exposure to market risk and liquidity risk.

Finally, by interacting the variable Basel, it is interesting to notice that, not only the cost of the input factors price increases in both in the UK and in Germany, but also the risk measures. In particular, the cost of funding is remarkably higher in the UK banking system. However, and this is of great interest to the extent of this research, while in the German banking system the cost of funding is larger for large banks, the UK large banks take a notable advantage from the regulation. In fact after the interaction the cost of funding for large banks become smaller than the one of other banks. By looking at the value of the leverage, it increases in both systems. However it has an increase notably higher in the UK, almost double, than Germany. The analysis of the statistic suggests that the introduction of the regulation leads banks towards risker behaviour. In particular by splitting the sample in "large banks" and "other banks", in both system the exposure to credit risk has a higher increase in others banks, rather than the larger banks.

4.2 Empirical results

Results for the UK banking sector are reported in Table 3. All models are estimated using a two way fixed effect model. Standard deviation are robust to autocorrelation and heteroschedasticity. Column (1) reports the analysis associated to the equilibrium test. Following the literature, the estimating model includes a number of bank-specific factors as control variables, namely balance-sheet ratios that reflect bank behavior and risk profile: the ratio of customer loans to total asset (credit risk); the ratio customer deposit to and short term funding (which captures important features of funding mix); the ratio of equity to total asset (as a proxy of leverage). The null hypothesis of joint significance of the parameters of interest is rejected at the 99% c. l. The evidence supports the long run equilibrium hypothesis.

Column (2) to (4) reports results for the basic contestability analysis. Results reported in Column (2) show that the value of the contestability parameter is 0.583. Both the hypotheses of monopoly and perfect competition are both rejected at the 1% significance level. Results suggest that the UK banking sector is best characterized by monopolistic competition. If the set of regressors is expanded to include the (log of) the Basel variable, the PR coefficient is 0.732. Results from the testing procedure suggests that monopoly and competition are still rejected; however le latter at the 5% c. l., in line with the hypothesis the variable Basel improves the degree of competition in UK. As expected the variable Basel has a remarkably strong negative impact on revenues. More importantly results suggest that, if the set of regressors is further expanded to include the full set of interaction terms, these

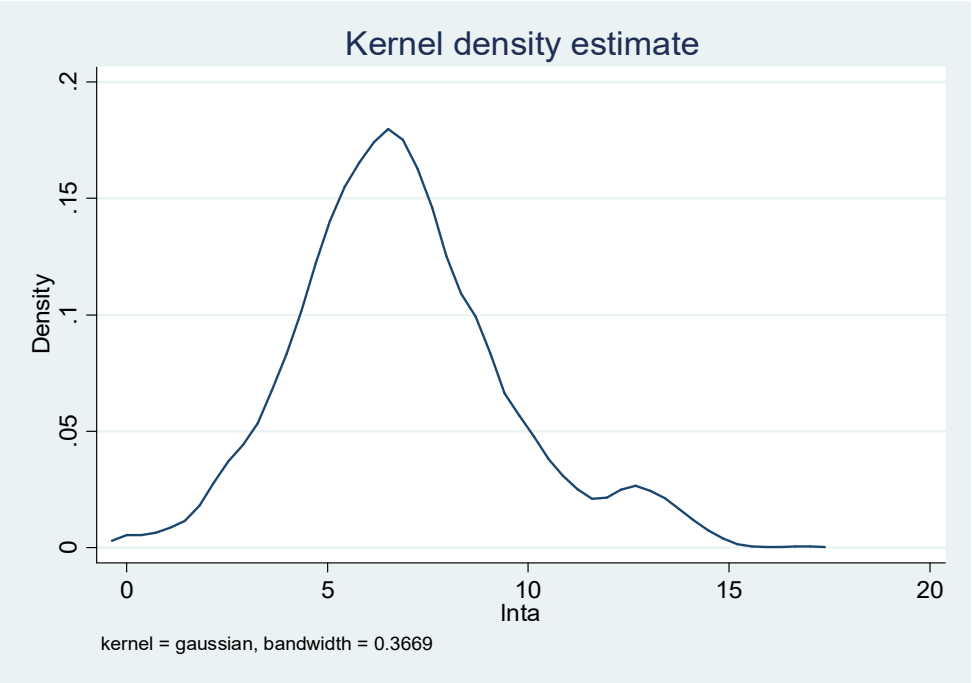
are all statistically significant; moreover the hypothesis of perfect competition cannot be rejected both if the standard test and its augmented version is considered.

Results are considerably different if the analysis considers the subsample of large and other banks. In Table 2, Columns (1) to (3) report results for large banks; Columns (4) to (6) report the analysis for the remaining banks. The large subsample of banks has a very low impact of the Basel variable upon revenues; on the contrary, other banks have a much stronger impact. Very interestingly, the interaction analysis shows that the introduction on the Basel variable in the analysis makes the former makes in monopoly; and makes the remaining in competition. Results for the entire sample are, hence, the average of these the very different behavior w.r.t. the Basel variable of the two clusters of banks reported in Figure 1.

Results for Germany are very different (Table 5). The impact of the Basel variable is remarkably lower than in the UK; moreover, the system is in monopolistic competition. The interaction analysis shows that, once the impact of the Basel variable is taken into account the system moves toward competition. However, this is not results of averaging different behaviours across subsamples: both the large and the other sample of banks move toward competition. Differently from the UK large banks, the Basel variable makes them competing against each other.

Figure 1
Distribution of size across samples

Panel a. UK banks



Panel b. German banks

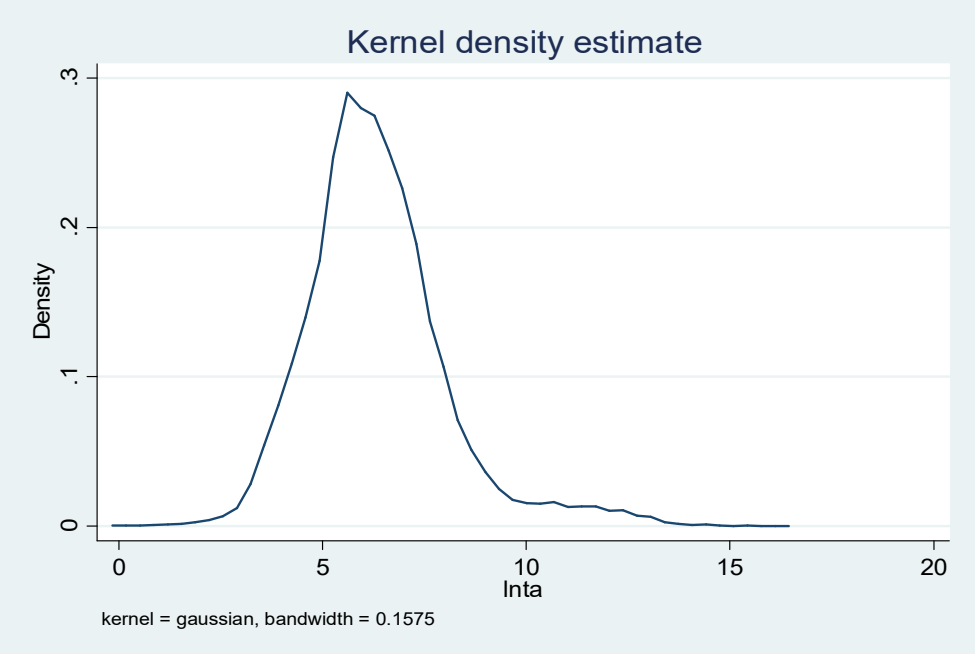


Table 2
Descriptive statistics

UK Banks

Size:	All banks		Large banks		Other banks	
Variable	Mean	s.d.	Mean	s.d.	Mean	s.d.
(log) $Revenues_{it}$	3.61	2.49	8.33	2.08	3.14	1.99
(log) $Personnel\ expense_{it}$	-4.49	1.46	-5.44	1.44	-4.38	1.42
(log) $Physical\ capital\ expenditure_{it}$	3.86	2.59	8.29	1.57	3.23	2.02
(log) $Average\ funding\ rate_{it}$	-3.49	1.24	-4.41	1.51	-3.39	1.17
(log) $Credit\ risk_{it}$	-1.35	1.42	-1.26	1.37	-1.35	1.43
(log) $Leverage_{it}$	4.07	1.10	3.83	1.02	4.09	1.10
(log) $Funding\ mix_{it}$	-0.56	1.12	-0.83	1.40	-0.54	1.09
(log) $Basel_{it}$	2.84	0.51	2.70	0.33	2.87	0.54
$Size_{it}$	55509	557458	688791	1914483	3474	7947
# of observations		6111		464		5647

German Banks

Size:	All banks		Large banks		Other banks	
Variable	Mean	s.d.	Mean	s.d.	Mean	s.d.
(log) $Revenues_{it}$	3.37	1.68	8.87	1.04	3.22	1.43
(log) $Personnel\ expense_{it}$	-4.31	0.67	-5.12	1.25	-4.29	0.63
(log) $Physical\ capital\ expenditure_{it}$	2.60	1.60	7.69	1.43	2.45	1.35
(log) $Average\ funding\ rate_{it}$	-3.58	0.48	-3.80	1.04	-3.58	0.46
(log) $Credit\ risk_{it}$	-0.62	0.56	-0.84	0.68	-0.62	0.56
(log) $Leverage_{it}$	3.45	0.72	3.05	0.97	3.46	0.71
(log) $Funding\ mix_{it}$	-0.32	0.58	-0.53	0.67	-0.32	0.57
(log) $Basel_{it}$	2.77	0.30	2.75	0.40	2.77	0.29
$Size_{it}$	10507	129661	340290	731890	1719	5127
# of observations		32554		845		31709

Table 3
Panzar and Rosse analysis for the UK. Full Sample

Model:	(1)	(2)	(3)	(4)
Dependent variable:	(log) ROA_{it}	(log) $Revenues_{it}$		
(log) Personnel $expense_{it}$	0.300**	-0.404***	-0.643***	-0.185
	(0.125)	(0.102)	(0.120)	(0.496)
(log) Physical capital $expenditure_{it}$	-0.237*	0.582***	0.701***	0.647***
	(0.139)	(0.073)	(0.110)	(0.209)
(log) Average funding $rate_{it}$	0.056	0.405***	0.673***	0.555
	(0.073)	(0.076)	(0.075)	(0.461)
(log) Credit $risk_{it}$	0.080	0.224**	0.065	0.041
	(0.181)	(0.126)	(0.100)	(0.106)
(log) $Leverage_{it}$	-0.378***	-0.016	-0.011	-0.015
	(0.055)	(0.014)	(0.013)	(0.014)
(log) Funding mix_{it}	0.174*	-0.105	-0.395***	-0.330***
	(0.105)	(0.072)	(0.119)	(0.086)
(log) $Basel_{it}$			-0.451***	-1.101
			(0.136)	(0.828)
(log) Personnel $expense_{it}$ x (log) $Basel_{it}$				-0.154
				(0.169)
(log) Physical capital $expenditure_{it}$ x (log) $Basel_{it}$				0.015
				(0.041)
(log) Average funding $rate_{it}$ x (log) $Basel_{it}$				0.037
				(0.145)
R^2	0.163	0.943	0.935	0.946
Test for joint significance of :				
$H_0: \beta_1 \; and \; \beta_7 \; and \; \beta_8 = 0$				7.040***
$H_0: \beta_2 \; and \; \beta_7 \; and \; \beta_9 = 0$				17.210***
$H_0: \beta_2 \; and \; \beta_7 \; and \; \beta_9 = 0$				41.870***
Panzar and Rosse analysis. Coefficient:	0.119	0.583	0.732	0.914
Equilibrium test $\alpha_1 + \alpha_2 + \alpha_3 = 0$	0.430			
	(0.512)			
Monopoly $\beta_1 + \beta_2 + \beta_3 = 0$		27.53***	48.460***	3.460*
		(0.000)	(0.000)	(0.069)
Competition $\beta_1 + \beta_2 + \beta_3 = 1$		14.08***	6.520**	0.010
		(0.000)	(0.014)	(0.976)
Augmented monopoly $\beta_1 + \beta_2 + \beta_3 + \beta_8 + \beta_9 + \beta_{10} = 0$				6.750**
				(0.012)
Augmented competition $\beta_1 + \beta_2 + \beta_3 + \beta_8 + \beta_9 + \beta_{10} = 1$				0.060
				(0.807)

Table 4
Panzar and Rosse analysis for the UK. Analysis by size

Model:	(1)	(2)	(3)	(4)	(5)	(6)
Sample:	Large Banks			Other Banks		
(log) Personnel expense$_{it}$	-0.625***	-0.576***	-0.874*	-0.403***	-0.656***	0.508
	(0.061)	(0.075)	(0.445)	(0.118)	(0.129)	(0.563)
(log) Physical capital expenditure$_{it}$	1.091***	1.134***	1.146***	0.541***	0.517***	0.081
	(0.090)	(0.101)	(0.227)	(0.083)	(0.079)	(0.254)
(log) Average funding rate$_{it}$	0.506***	0.336***	-0.436	0.399***	0.748***	0.465
	(0.081)	(0.065)	(0.402)	(0.076)	(0.082)	(0.484)
(log) Credit risk$_{it}$	0.130	0.193**	0.205**	0.224*	0.102	0.083
	(0.096)	(0.091)	(0.074)	(0.134)	(0.073)	(0.097)
(log) Leverage$_{it}$	0.007	0.016	0.013	-0.018	0.001	-0.004
	(0.008)	(0.010)	(0.012)	(0.019)	(0.023)	(0.022)
(log) Funding mix$_{it}$	-0.170*	-0.256**	-0.222**	-0.106	-0.497***	-0.424***
	(0.099)	(0.110)	(0.094)	(0.074)	(0.092)	(0.091)
(log) Basel$_{it}$		-0.147*	1.947		-0.503***	-2.406**
		(0.070)	(1.952)		(0.146)	(1.016)
(log) Personnel expense$_{it}$ x (log) Basel$_{it}$			0.144			-0.393**
			(0.188)			(0.172)
(log) Physical capital expenditure$_{it}$ x (log) Basel$_{it}$			-0.022			0.137*
			(0.109)			(0.078)
(log) Average funding rate$_{it}$ x (log) Basel$_{it}$			0.273*			0.100
			(0.135)			(0.142)
R^2	0.958	0.969	0.912	0.889	0.782	0.768
Test for joint significance of :						
H_0: β_1 *and* β_7 *and* $\beta_8 = 0$			43.95***			11.96***
H_0: β_2 *and* β_7 *and* $\beta_9 = 0$			123.0***			17.29***
H_0: β_2 *and* β_7 *and* $\beta_9 = 0$			16.47***			58.500***
Panzar and Rosse analysis:	0.972	0.894	0.230	0.537	0.609	0.898
Monopoly $\beta_1 + \beta_2 + \beta_3 = 0$	163.5***	206.0***	0.140	16.16***	25.04***	4.920**
	(0.000)	(0.000)	(0.718)	(0.000)	(0.000)	(0.033)
Competition $\beta_1 + \beta_2 + \beta_3 = 1$	0.140	2.900	6.800**	12.04***	10.320**	0.010
	(0.714)	(0.107)	(0.018)	(0.000)	(0.000)	(0.911)
Augmented monopoly $\beta_1 + \beta_2 + \beta_3 + \beta_8 + \beta_9 + \beta_{10} = 0$			0.700			8.27***
			(0.414)			(0.000)
Augmented competition $\beta_1 + \beta_2 + \beta_3 + \beta_8 + \beta_9 + \beta_{10} = 1$			7.860**			0.110
			(0.012)			(0.746)

Table 5
Panzar and Rosse analysis for Germany. Full Sample

Model	(1)	(2)	(3)	(4)
Dependent variable:	(log) ROA_{it}	(log) $Revenues_{it}$		
(log) $Personnel\ expense_{it}$	0.047	-0.257***	-0.132***	-0.090
	(0.038)	(0.023)	(0.040)	(0.088)
(log) $Physical\ capital\ expenditure_{it}$	-0.040**	0.509***	0.263***	0.441***
	(0.019)	(0.018)	(0.031)	(0.076)
(log) $Average\ funding\ rate_{it}$	-0.089*	0.265***	0.272***	0.237**
	(0.046)	(0.022)	(0.030)	(0.101)
(log) $Credit\ risk_{it}$	0.018	0.098***	0.025	0.023
	(0.053)	(0.032)	(0.076)	(0.065)
(log) $Leverage_{it}$	-0.773***	-0.025***	-0.019**	-0.019**
	(0.020)	(0.004)	(0.007)	(0.007)
(log) $Funding\ mix_{it}$	0.194	-0.208***	-0.153***	-0.163***
	(0.148)	(0.037)	(0.048)	(0.051)
(log) $Basel_{it}$			-0.130***	0.040
			(0.026)	(0.188)
(log) $Personnel\ expense_{it}$ x (log) $Basel_{it}$				-0.014
				(0.028)
(log) $Physical\ capital\ expenditure_{it}$ x (log) $Basel_{it}$				-0.065***
				(0.022)
(log) $Average\ funding\ rate_{it}$ x (log) $Basel_{it}$				0.011
				(0.031)
R^2	0.465	0.968	0.962	0.957
Test for joint significance of:				
$H_0: \beta_1\ and\ \beta_7\ and\ \beta_8 = 0$				4.310***
$H_0: \beta_2\ and\ \beta_7\ and\ \beta_9 = 0$				25.82***
$H_0: \beta_2\ and\ \beta_7\ and\ \beta_9 = 0$				32.41***
Panzar and Rosse analysis. Coefficient:	-0.082	0.517	0.403	0.520
Equilibrium test $\alpha_1 + \alpha_2 + \alpha_3 = 0$	1.340			
	(0.248)			
Monopoly $\beta_1 + \beta_2 + \beta_3 = 0$		218.8***	41.430***	10.050***
		(0.000)	(0.000)	(0.000)
Competition $\beta_1 + \beta_2 + \beta_3 = 1$		191.2***	91.170***	4.930**
		(0.000)	(0.000)	(0.027)
Augmented monopoly $\beta_1 + \beta_2 + \beta_3 + \beta_8 + \beta_9 + \beta_{10} = 0$				14.960***
				(0.000)
Augmented competition $\beta_1 + \beta_2 + \beta_3 + \beta_8 + \beta_9 + \beta_{10} = 1$				12.740***
				(0.000)

Table 6
Panzar and Rosse analysis for Germany. Analysis by size

Model:	(1)	(2)	(3)	(4)	(5)	(6)
Sample:	Large Banks			Other Banks		
(log) Personnel expense$_{it}$	-0.469***	-0.503***	-0.875***	-0.249***	-0.106***	0.096
	(0.097)	(0.101)	(0.156)	(0.023)	(0.036)	(0.162)
(log) Physical capital expenditure$_{it}$	0.607***	0.562***	1.058***	0.503***	0.240***	0.357***
	(0.094)	(0.101)	(0.152)	(0.018)	(0.029)	(0.059)
(log) Average funding rate$_{it}$	0.545***	0.572***	0.912***	0.242***	0.234***	0.160
	(0.068)	(0.063)	(0.213)	(0.021)	(0.028)	(0.109)
(log) Credit risk$_{it}$	0.194	0.207	0.161*	0.098***	-0.037	-0.027
	(0.136)	(0.132)	(0.084)	(0.032)	(0.057)	(0.056)
(log) Leverage$_{it}$	-0.015***	-0.019**	-0.026**	-0.022***	-0.007	-0.007
	(0.007)	(0.009)	(0.010)	(0.004)	(0.007)	(0.007)
(log) Funding mix$_{it}$	-0.050	-0.056	-0.003	-0.257***	-0.287***	-0.288***
	(0.082)	(0.089)	(0.100)	(0.039)	(0.055)	(0.056)
(log) Basel$_{it}$		-0.077	1.382**		-0.103***	-0.232
		(0.055)	(0.691)		(0.026)	(0.275)
(log) Personnel expense$_{it}$ x (log) Basel$_{it}$			0.135**			-0.074
			(0.059)			(0.056)
(log) Physical capital expenditure$_{it}$ x (log) Basel$_{it}$			-0.165***			-0.043**
			(0.043)			(0.018)
(log) Average funding rate$_{it}$ x (log) Basel$_{it}$			-0.120*			0.025
			(0.065)			(0.034)
R^2	0.781	0.673	0.792	0.940	0.918	0.915
Test for joint significance of :						
H_0: β_1 *and* β_7 *and* β_8= 0			15.09***			4.280***
H_0: β_2 *and* β_7 *and* β_9= 0			18.65***			24.00***
H_0: β_2 *and* β_7 *and* β_9= 0			30.09***			28.250***
Panzar and Rosse analysis:	0.684	0.632	0.945	0.496	0.368	0.521
Monopoly $\beta_1 + \beta_2 + \beta_3 = 0$	35.52***	32.84***	18.06***	201.6***	35.31***	7.53***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Competition $\beta_1 + \beta_2 + \beta_3 = 1$	7.610***	11.13***	0.140	208.1***	104.130**	2.990*
	(0.000)	(0.000)	(0.712)	(0.000)	(0.000)	(0.084)
Augmented monopoly $\beta_1 + \beta_2 + \beta_3 + \beta_8 + \beta_9 + \beta_{10} = 0$			25.81***			11.10***
			(0.000)			(0.000)
Augmented competition $\beta_1 + \beta_2 + \beta_3 + \beta_8 + \beta_9 + \beta_{10} = 1$			0.090			9.350***
			(0.767)			(0.000)

5 Conclusion

The aim of this research is to assess the extent to which the implementation of the same rule, in this case Basel, leads to a different impact on the degree of competition in the banking system, if applied to systems based on economies with different characteristics, namely Germany and the UK.

The issue is important because in the aftermath of the 2007/09 financial crisis the international financial regulation has been moving towards stronger regulatory provisions, which provide closer supervision and stricter capital requirements. This is thought to be needed in order to foster stability in the banking system. However, this is likely to affect the competitive environment and shape the incentive of the economic players involved, namely banks. The degree of competition in the banking sector is important because it is beneficial for the stability of the banking system and therefore it is also thought of as a good substitute for regulation.

The comparison of the two systems suggests the hypothesis that as the German system is risk-oriented and the UK one is profit-oriented, then the latter is much more likely to be impacted by strict burdens on capital requirements. From the empirical analysis there are a number of interesting results which to some extent confirm the above hypothesis. The empirical results suggest that the implementation of the same rule may lead to different outcomes, depending on the economy in which the rule is implemented. In fact, the implementation of Basel has different impacts in Germany and the UK. The implementation of Basel in Germany has a lower impact on revenues, compared with the UK. The German banking system is

in monopolistic competition, but regulation has the effect of ameliorating the competitive dynamics of the whole banking system. In fact, the interaction analysis shows that, once the impact of the Basel variable is taken into account, the system moves towards competition.

The UK banking system is characterized overall by monopolistic competition, but the implementation of Basel does not ameliorate the competitive dynamics. The impact of Basel in the UK is to create distance between large and other banks by making the former perform in monopolistic conditions and leaving the others to compete amongst themselves. In other words, it creates a sub-sample of large banks across the UK sample, which constitutes a particular category of banks. From the above we can conclude that in a more stability-oriented system, such as that in Germany, which is characterized by the risk-reducing drive of its policy and regulation, the implementation of Basel has the impact of aligning the incentives of banks and regulators.

In a market-based system, such as that in the UK, the incentives of banks and regulators do not seem to be aligned to one another. Here, the impact of Basel shapes banks' behaviour towards less competitive dynamics. In fact it creates a particular category of banks which produces in monopolistic conditions. This suggests that existing groups of large banks have an incentive for being in favour of regulation, but only for their private interests. More interestingly, it is likely that this group of banks colludes to exploit the barriers of entry, created by regulation, without dissipating rents, in order to fortify its dominant position in the market. This then means that they have more room to re-invest the extra rents in new technology

which allows them, for example, to escape regulation. Therefore, it would be easier (and more beneficial) to use competition to enhance regulation in the banking system, especially if the latter is profit-oriented.

Appendix

1. The panel data approach

The parameters are estimated via the fixed effect within estimator. A dataset is known as a panel data or longitudinal data when data involve both time series and cross-sectional observations. Hence, the panel data provides information across both time and space, by keeping the entities and measuring variables over time. From the econometric point of view the model is represented by the following equation:

$$y_{it} = \alpha + \beta x_{it} + u_{it},$$

where the $y_{it}$is the dependent variable, α is the intercept term, β is the $k \times 1$ vector of parameters to be estimated associated to the explanatory variables, and $x_{it}$is a $NT \times k$ matrix of observations associated to the explanatory variables, with $t = 1, \ldots, T$ and $i = 1, \ldots, N$.

The simplest way to deal with the above setup of data would be to estimate a pooled regression, estimating a single equation on all the data together. In that way the dataset for *y* is contained a single column containing all the cross-sectional and time-series observations. This happens as well for all of the observations on each explanatory variable, therefore this equation would be estimated by using OLS.

However, there is some drawback with this approach, the more important of which is that when we pool the data in this way we are assuming implicitly that the average values of the variables and the relationships between them are constant both

over time and across the cross-sectional units contained in our sample. Moreover, if we estimate separate time-series regressions for each entity, the result could be sub-optimal since this approach would not take into account any common structure eventually present in the series of interested data. The same may happen if we estimate separate cross-sectional regressions for each of the time periods, if there exists the case of common variation in the series over time.

Instead, there are several advantages[234] that make panel data a suitable instrument: first of all, they allow us to address a greater range of issues and more complex problem than it could be done by using pure time-series or pure cross-sectional data alone. Second it can be used to deal with heterogeneity in the micro unit. Heterogeneity refers to case in which any micro unit may differ from one another in unmeasured or unobserved way. In any cross-section there are several explanatory variables that can affect the behavior of the entities under analysis and omitting some of these variables can bias the estimation. Panel data are able to deal with the problem of the omitted variable, correcting it. Another advantage connected with the use of the panel data is that they allow better analysis of the dynamic adjustment process. In case of cross-sectional data we cannot figure out any information about dynamics; in case of time series it is needed a long run of data to get a sufficient number of observations for a significant test hypothesis. This allows first of all to examine how the variables, or the relationship between them, change dynamically over time. This is because by combining both cross-sectional data and time series, is it possible to increase the degrees of freedom and therefore the power of the test.

[234] P. Kennedy, 2005. A guide to econometric.

Finally, the higher variability introduced by the use of panel data may mitigate the problems that may raise in case of multicollinearity.

Moreover it is worth to say that the panel of observation can be balanced or unbalanced. The former is characterized of having the same number of time-series observations for each cross-sectional unit, while an unbalanced panel would have some cross-sectional elements with fewer observations or observations at different times to others. In both cases are used the same techniques and in case of missed observations will automatically taken into account by the estimator itself in doing the estimation.

Broadly speaking in doing research on financial topics there exist two classes of panel estimator approaches that are available: fixed effects models and random effects models. In the simplest kind of fixed effects while the intercept differ cross-sectionally but not over time, the slopes remain fixed both cross-sectionally and over time.

2. The fixed effects model

The empirical analysis is carried on using fixed effects model. In order to understand how this model works, we can decompose the disturbance term, u_{it}, into an individual specific effect, μ_i, and the 'remainder disturbance', v_{it} , that varies over time and entities (taking everything that is left unexplained about y_{it})[235].

[235] C. BROOKS, 2008. Cambridge. Introductory Econometrics for Finance.

$$u_{it} = \mu_i + v_{it}.$$

So that we can write:

$$y_{it} = \alpha + \beta x_{it} + \mu_i + v_{it},$$

We can read μ_i as an element that captures all of the variables that have some effect on y_{it} cross-sectionally but do not vary over time (for example a person's gender) This model could be estimated using dummy variables, where $D1_t$ is a dummy variable that takes the value 1 for all observations on the first entity (for instance the first bank) in the sample and zero otherwise, $D2_i$ is a dummy variable that takes the value 1 for all observations on the second entity (for instance the second bank) and zero otherwise, and so on and so forth. In order to avoid perfect multicollinearity between these dummy variables and the intercept, the latter (α) has been removed from our equation.

$$y_{it} = \beta x_{it} + \mu_1 D1_i + \mu_2 D2_i + \mu_3 D3_i + \cdots + \mu_N DN + v_{it}.$$

In that case to test the hypothesis that the panel approach is necessary we need to put the restriction that all of the intercept dummy variables have the same parameter. If this null hypothesis is not rejected, the data can be pooled together and can be used OLS estimator, otherwise a panel data estimator must be used. However estimate so many dummy variable parameters could be a problem for any regression package if *N* is large. To avoid that problem it is needed a transformation known as

the within transformation (because the subtraction is made within each cross-sectional object), that is made by subtracting the time-mean of each entity away from the values of the variable, both for the time-mean of the observations on *y* for cross-sectional unit *i*, and the means of all of the explanatory variables, thus obtaining a regression which contains demeaned variables only. This regression does not need the intercept because the dependent variable will have zero mean because of its construction. The model with the demeaned variables is:

$$y_{it} - \bar{y_i} = \beta(x_{it} - \bar{x_i}) + u_{it} - \bar{u_i}$$

which can be rewritten as:

$$\ddot{y}_{it} = \beta\ddot{x}_{it} + \ddot{u}_{it}$$

where the double dots above indicate the demeaned values. Another way is known the between estimator which involves to just run a cross-sectional regression on the time-averaged values of the variables.

Another model is known as time-fixed effects model. This model is used in case of belief that the average value of y_{it} changes over time but not cross-sectionally (for example we can think about a regulatory environment that changes through a sample period). In that case we have that the intercepts vary over time but it is assumed do not to vary across entities at each point in time.

A time-fixed effects model could be written as:

$$y_{it} = \alpha + \beta x_{it} + \lambda_t + v_{it}$$

where λ_t is a time-varying intercept that captures all of the variables that have some effects on y_{it} and that vary over time but are constant cross-sectionally. Even in that case it could be used a dummy variable model, but now it will capture time variation instead of cross-sectional variation. As we saw above as well in that case we can avoid estimating a model containing all T dummies, by realizing a within transformation. As in the fixed effects approach, the random effects approach suppose different intercept terms for each entity and as well these intercepts. are assumed to be constant over time, with the relationships between the explanatory and explained variables assumed to be the same both. cross-sectionally and temporally. The random effect model assumes that the intercept varies randomly with the observations. However, the random effects estimator should be used whenever we are confident that its composite error term is uncorrelated with the explanatory variables, a case that is unlikely to hold in my empirical set up. I therefore prefer to resort to the panel fixed effects model.

3. Derivation of the Panzar and Rosse statistic

Under profit maximization condition, we have the marginal cost is equal to the marginal revenues

$$R_i'(x_i, n, z_i) - C_i'(x_i, w_i, s_i) = 0 \qquad (1)$$

where i stands for the i_{th} firm, R' is the marginal revenue; $C'$is the marginal cost; x_i represents the output; n is the number of firms; z_i is a vector of exogenous variables which impact the revenues function; w_i is a vector of prises of m inputs ($k=1,....,m$) and s_i is a vector of exogenous variables which impact the cost function.

On the other hand a firm in a perfectly competitive market in the long-run it will have economic profits of zero. Therefore, we have that in equilibrium:

$$R_i^*(x^*, n^*, z) - C_i^*(x^*, w, s) = 0 \tag{2}$$

Panzar e Rosse (1987) show that the market power of a firm is given by the variation of the revenues in equilibrium (dR_i^*) with respect to the variation variation in the input factors prices (dw_{k_i})

According to Panzar e Rosse (1987) the H statistic is the measure for competition, and it is equal to the sum of the elasticities of the revenues to the input factor prices.

$$H = \sum_{k=1}^{m} \frac{\partial R_i^*}{\partial w_{k_i}} \frac{w_{k_i}}{R_i^*} \tag{3}$$

If we assume that:

(i) the function cost is homogeneous of degree one in input prices;

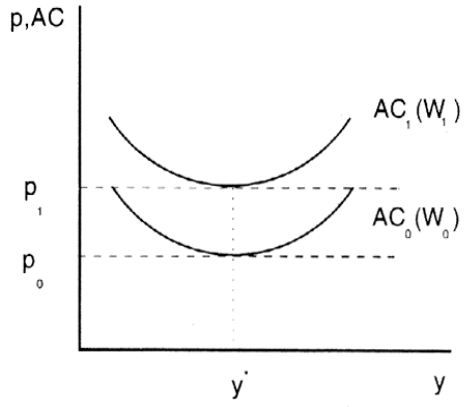
(ii) exogenous input prices;

(iii) that the elasticity of the demand each firm faces does not diminish if the number of competitors increases;

(iv) free entry in and exit from the market;

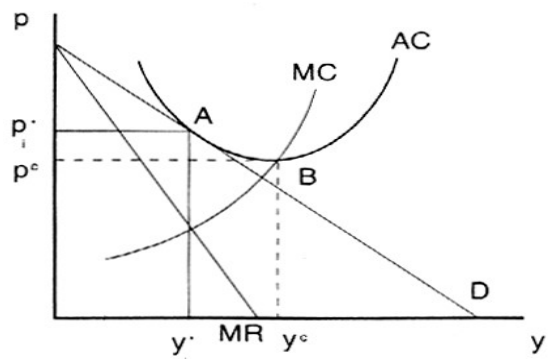
then Panzar e Rosse show that in a perfectly competitive market, H is equal to 1. This is because, in the long run equilibrium, in case of perfectly competitive market, firms operate at the point where average cost (AC) is minimum and equal to the market price (p). An increase in the input factors (W), leads to a proportional increase of marginal costs (MC) and average costs (AC), without any change of the equilibrium output (y*).

If some firms leave the market, the demand will be faced by the remaining firms, therefore each firm will exploit an increase in prices and revenues, proportional to the raise of costs (H=1), shown in the graph below.



In case of monopoly or collusive oligopoly, if the input factors price raise, then the marginal costs will raise and the equilibrium output will reduce, therefore also the revenues will reduce. In that case, H is negative or equal to zero.

Finally, the H will be between zero and one in case of monopolistic competition, without barriers to entry the market (Chamberlinian model). This market is characterized by excess capacity and the price exceeds the marginal cost. This means that firms maximize the profits when the level average costs is higher than their minimum level. Therefore, in this kind of market, monopolistic competition, without barriers to entry, each firm has a market power equal to the difference the price and the marginal cost (Lerner index). However, the profit are lower than that the monopoly, and Panzar e Rosse (1987) show that the H will be positive but less than one (see the graph).



The H statistic is an increasing function of the demand elasticity with respect to the price, this means that the less the market power, the higher the value of the H. This makes the H not only a tool for discriminating among different markets, but also a continuous measure of competition, such as the higher the value of the H, the higher the level of competition.

The scheme below summarizes the interpretation of the Panzar and Rosse measure.

Figura IV.3 – Interpretation of the H measure

$H \leq 0$	Monopoly or collusive oligopoly
$0<H<1$	Monopolistic Competition
$H=1$	Perfect Competition

Chapter 4

Institutional environments and isolation of the CEO knowledge: Evidence from Germany and the UK

1. Introduction

In strategic management studies the Chief Executive Officer (CEO hereinafter) compensation is a highly debated research topic. The executive compensation is typically composed of a fixed component, namely the base salary, and its variable component, namely the annual bonus and the so-called long-term pay. The literature has first looked at the total amount of compensation and it then has paid particular attention to its variable component in order to capture differences across different economies[236]. This is why, the CEO compensation has been traditionally conceived as a mean of mitigation of the principal-agent conflict, which characterizes the manager-shareholders relationship. It is supposed, that the annual bonus aligns managers' and shareholders' incentives, towards the well-functioning of the firm.

There are two main strands of literature which are related to the CEO compensation. A number of studies argues that executive compensation is affected only by the concern of mitigating the so-called agency problems between managers and

[236] Conyon, M. J., Peck, S. I., Read, L.E. and Sadler, G. V. (2000). The Structure of Executive Compensation Contracts: UK Evidence, Long Range Planning, 33, pp. 478-503.

shareholders. These studies are based upon the principal-agent[237]. Another stream of literature adds a new element to the pure principal-agent theory: the institutional environment, the firm operates in. Because affecting the corporate governance of the firm, the institutional environment is thought to play a crucial role in shaping the executive compensation (institutional theory)[238].

However, there are important aspects of the design of the CEO compensation which do not emerge looking only at the variable component of the CEO compensation, and, therefore, they are not adequately considered by the literature on that topic. It is looking at the fixed component, instead, that it can be shed a light on important aspects which are related to job mobility across borders, the management of human capital and, finally, the transfer of knowledge across economies, because of different wages and different institutions.

To this purpose, this paper looks at this relationship in the light of the knowledge-based theory of the firm[239], highlighting some implications for the human capital management task, as well as and the concern of creating isolating mechanisms able to reduce the incentives for the CEO to migrate toward other economies, in order prevent the knowledge transfer and protect the competitive advantage

[237] Core, J. E., Holthausen, R. W. and Larcker, D. F. (1999). Corporate Governance, Chief Executive Officier Compensation, and Firm Performance, Journal of Financial Economics, 51, pp. 371-406.

[238] Bruce, A., Buck, T. and Main, B. G. M. (2005). Top Executive Remuneration: A View from Europe, Journal of Management Studies, 42, pp. 1493-1506.

[239] Grant, R. M. (1996). Toward a Knowledge-Based Theory of the Firm, Strategic Management-Journal, 17, pp.109-122.

of the firm[240]. In that context, knowledge is meant to be "know-how" rather than information. "Know-how is the accumulated practical skill or expertise that allows one to do something smoothly and efficiently"[241]

Are institutional environments in different economies able to design CEO compensation s so that there is no incentive for the CEO to migrate? In what follows, by "institutional environment" I mean types of economy, corporate governance, labour market institutions and regulations. The underlying hypothesis is that the more flexible the economy and its labour markets and regulations, the higher the wage. This will ultimately lead to higher competition at the international level. In order to answer this question, four hypothesis will be tested.

Hypothesis 1: There exists an incentive, for the CEO that operates in a less flexible institutional environments, to move towards more flexible economies and therefore to export his/her knowledge? Thus, other things being equal, is there any pay gap (premium for CEO hereinafter) across economies in the CEO compensation?

Hypothesis 2: To what extent the estimated pay gap depends on the personal characteristics of the CEO?

Hypothesis 3: To which extent the premium for the CEO position depends upon the institutional environment where the firm operates?

[240] Cambpell, B. A., Coff, R. and Kryscynski, D. (2012). Rethinking Sustained Competitive Advantage From Human Capital, Academy of Management Review, 37, 3,pp. 276-395.

[241] Von Hippel, E.(1988). The Sources of Innovation. Cambridge: MIT Press.

Hypothesis 4: Can the designing of the CEO compensation be conceived as an ex-post isolating mechanism mechanisms able to reduce the incentives for the CEO to migrate toward other economies, in order prevent the knowledge transfer and protect the competitive advantage of the firm?

The paper provides a comparative assessment of the determination of the CEO compensation in Germany and the UK, that represent two examples of different economies, organization of corporate governance and labour market institutions and regulations.

In what follows, it is applied a combination of quantitative and qualitative information that operates at different stages, and it is based on the Oaxaca (1973) decomposition.

The rest of the paper is organized as follows: section two provides the theoretical background on the base of which are developed the four hypothesis underlying the research question; section three provides the research design and methodology. Section four provides the discussion the empirical results based on the EU-SILC cross-sectional survey that provides information on 440,400 individuals living in 26 European economies; section 5 provides some concluding remarks, and highlights some practical implications of this study.

2. Theoretical background

2.1. The Chief Executive Officer compensation

In strategic management studies, the Chief Executive Officer (CEO) compensation is a highly debated research topic[242]. The compensation contract can be designed to provide monetary incentives for the CEO to remain with the company[243]. In general, for the offer to be attractive, it should exceed CEO's opportunity costs, which refer to either his/her current compensation or the compensation being offered by another competitor for his/her services. The compensation package includes both fixed and variable components. Fixed components might include salary, and benefits, such as employer paid life insurance, health care, and pensions. The variable component, namely the annual bonus and the so-called long-term pay. The long-term pay consists of share (or stock) options and long-term incentive plans (LTIPs). In turn, stock options consist of the right (but not the obligation) to purchase shares at a fixed price at some date in the future.

The literature on executive compensation has mainly focused upon the argument of mitigating the agency problem, thus mainly paying a great attention to the variable component of the compensation package. There are two main strands of literature which are related to the CEO compensation. A number of studies argue

[242] Ozkan, N., (2007). Do Corporate Governance Mechanisms Influence CEO Compensation? An Empirical Investigation of UK Companies, Journal of Multinational Financial Management, 17, 5, pp. 349-364.

[243] Balsam, S. (2002). An Introduction to Executive Compensation. Academic Press.

that the only concern, in designing the CEO compensation package, is to mitigate the so-called agency problems between managers and shareholders. These studies are based upon the so-called principal-agent theory. According to this view, the corporate governance uses the executive compensation as a mean to mitigate the agency problems between managers and shareholders on the base of the pay-performance sensitivity[244]. Corporate governance refers to the way in which firms are directed and controlled. Company shareholders (owners) delegate decision-making authority to a management team (agents). An agency problem exists when the objectives of the two parties diverge. According to the principal-agent theory the basic idea is motivating the CEO of the corporation (the agent) to act in the best interest of the shareholders (the principal)[245].

Empirical evidence[246] shows that there exist a relationship between the CEO compensation and the firm performance. By looking at the variable component of the CEO compensation, the authors find: (i) there is a positive relationship between earnings measures of firm performance and CEO cash compensation; (ii) there is a positive relationship between market returns on the firm's stock, and option grants for the CEO. Garen (1994) finds out that the designing of the CEO compensation

[244] Core, J. E., Holthausen, R. W. and Larcker, D. F. (1999). Corporate Governance, Chief Executive Officier Compensation, and Firm Performance, Journal of Financial Economics, 51, pp. 371-406.

[245] Garen, J. E. (1994). Executive Compensation and Principal-Agent Theory, Journal of Political Economy, 12, 6, pp. 1175-1199.

[246] Veliyat, R. and Bishop, J. W. (1995). Relationship Between CEO Compensation and Firm Performance: Empirical Evidence of Labour Market Norms, The International Journal of Organizational Analysis, Vol. 13, No 3, pp. 268-283.

is consistent with the principal-agent model. His results show that the covariance of the firm and market returns influence CEO compensation. Other studies analyze the role of the board directors in designing the CEO compensation. Boyd (1994) describes the board as a key internal control mechanism. His founding is that the CEO compensation is inversely related to levels of board control. Similarly Core et al. (1999) and Ozkan (2007) find that both board-of-director characteristics and ownership structure are associated with the level of CEO compensation. In particular, with respect to the board-of-director variables, the CEO compensation is higher when the CEO is also the board chair, the board is larger, there is a greater percentage of the board composed of outside directors, and the outside directors are appointed by the CEO. With respect to ownership structure, the CEO compensation is a decreasing function of the CEOs ownership stake.

However, it is recognized known that, despite being important, the conflict of interest between the CEO and the shareholder is able to provide an important but anyway partial picture of the determinants of the CEO compensation, since it needs to be contextualized in its institutional environment (Bruce, Buck, and Main, 2005). According to that, another stream of literature argues that the principal-agent theory, in its pure version, fails to take into adequate account the institutional environment where the firm operates. Because affecting the corporate governance of the firm, the institutional environment is thought to play a crucial role in shaping the executive compensation. These studies are based upon the so called institutional theory.

Empirical evidence in a cross-country analysis (Giannetti, 2003), shows differences in corporate governance due to differences in institutional environment across European firms. Conyon and Schwalbach (2000) in a comparative study of Germany and the UK identify a positive relationship between the variable component of the CEO compensation and the firm performance. Interestingly this study show that, even if there is similarity between the UK and Germany regarding the relationship between cash compensation and company performance, however the main difference appears to be in the structure of pay, due to the different institutional environment of the two countries.

However, there are important aspects of the design of the CEO compensation that, in our opinion, the current debate does not consider adequately, and ultimately involve the human capital management in terms of knowledge transfer across different economies. The aim of this research paper is therefore to answer the following question: Are institutional environments in different economies able to design compensations, which acts as isolating mechanism, so that there is no incentive for the CEO to migrate? In what follows, by "institutional environment" we mean types of economy, corporate governance, labour market institutions and regulations.

This research question is crucial, as it can give important insights on the relationship between job mobility and human capital management with respect to knowledge transfer and safeguard of the firm's competitive capabilities (Bishara, 2006), at the international level. The underlying hypothesis is that the more flexible the economy and its labour markets and regulations, the higher the wage and this

will ultimately lead to higher competition at the international level. In order to answer the question above, we test four hypothesis.

Hypothesis 1: Other things being equal, there exists an institutional premium for CEO.

As we have seen above the literature on executive compensation has mainly focused on to the variable component of the compensation package, as a mean of mitigation of the agency problem. Therefore it is not surprising that (i) the impact of institutions on these packages, in turn mainly dependent on the firm's performance either on the productivity and/or on the financial side, is negligible[247] and (ii) there is not much difference in the structure (not the amount) of these packages across economies[248].

In reality, in addressing the CEO compensation package design, also looking at fixed component, gives us interesting insights of the company-CEO relationship. In fact, each component has its own function within the organization of the company which is designing the compensation package, because each of them can differently shape the CEO behavior. The fixed components are included to reduce the risk to the CEO and guarantee a standard of living, whereas the variable components are included to provide incentives and to align the interests of managers and shareholders.

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[247] Ozkan, N., (2007). Do Corporate Governance Mechanisms Influence CEO Compensation? An Empirical Investigation of UK Companies, Journal of Multinational Financial Management, 17, 5, pp. 349-364.

[248] Conyon, M. J., Schwalbach, J. (2000). Executive Compensation: Evidence from the UK and Germany, Long Range Planning, 33, pp 504-526.

The optimal CEO compensation design should provide the incentive of the CEO do not to leave the corporation by balancing the risk aversion of the CEO, through the fixed components, with the need of the firm of providing incentives and align the interests of CEO and shareholders, through the variable (or conditional) components. Put another way, although a large compensation package may be attractive for the CEO, it may not provide the proper incentive to remain within the firm because its design does not realize the optimal balance between the CEO and the firm interests.

The above remark highlight that, although the fixed component is not likely to be the higher fraction of the compensation package, it performs an important function within the firm's policy on the design of the compensation package. This is because the design of the compensation package is ultimately able to affect the CEO decision of staying or leaving the firm. Thus it is a crucial task for the firm deciding how much of the fixed and variable component to include into the compensation package, and what form they should take.

Given these arguments, we focus our analysis on the fixed component of the CEO compensation, as this is more likely to be affected by the institutional environment where the firm operates and then to vary across economies. Therefore it can be conceived as an efficient isolating mechanism able to protect the competitive advantage of the firm. If the executive compensation designing may depends on the institutional environment the firm operate in, also the extent to which a CEO is able or willing to leave the firm and export knowledge may depend on this institutional

environment, thus the ability of a firm to well managing its human capital refers to the ability of the firm to deal with this institutional environment.

2.2. The institutional context: Germany and the UK

It is likely that differences in type of economy, corporate governance, labour market institutions, regulations, to which in this paper we refer as "institutional environment" can lead to different outcomes when a cross-country analysis on the CEO compensation is of interest. European economies have evolved different institutional environments. In particular the UK and Germany provide two extremely different examples of economies and corporate governance, labour market institutions and regulations, thus it is interesting to see whether these differences lead to different executive pay outcomes.

It is widely recognized[249] that companies in the UK and Germany operate within radically different environments of corporate control. The literature indicate two different models of corporate governance: (i) the "shareholder" model; (ii) the "stakeholder model". According to the shareholder model the maximization of shareholder value is the primary goal of the firm and only shareholders enjoy strong formalized links with top management. In the case of the stakeholder model, in-

[249] Vitols, S. Varieties of Corporate Governance: Comparing Germany and the UK, in The Institutional Foundations of Comparative Advantage, Hall, P. A., and Soskice, D, (eds), 2004 Oxford University Press.

stead, a variety of firm constituencies, including employees, suppliers and customers, and the communities companies are located in, enjoy "voice" in the firm. In that model all these interests need to be balanced against each other in management decision-making.

These two types of corporate governance can be better understood in the light of the concepts of liberal market economy (LME) and coordinated market economy (CME), which provide them with an institutional context. The German economy provides an example of CME. The corporate governance literature indicates Germany as one of the foremost examples of the stakeholder model, since the different firm constituencies enjoy a strong formal "voice" in decision-making, through representation on company boards. The equity markets are organized so that a substantial amount of equity in each company is controlled by shareholders who have a long-term commitment to the company. The UK economy represents an example of LME. The UK is one of the main examples of the shareholder model of governance, due to the weak formalized role of constituencies other than shareholders in firm decision-making. It is characterized by large, well-developed equity markets where the equity in each company is controlled by the shareholders.

These are institutions or private investors who are not closely involved with the firm. The market for corporate control disciplines the management team[250].

The above differences in characteristics are mirrored by the different board systems and corporate constitutions. German large companies are characterized by

[250] Conyon, M. J., Schwalbach, J. (2000). Executive Compensation: Evidence from the UK and Germany, Long Range Planning, 33, pp 504-526.

a pluralist system whereas the British companies are characterized by a CEO-dominated. The pluralism in large German companies is realized by the dual company board system. Strategic decisions such as major operations, mergers and acquisitions, dividend policy, changes in capital structure, and appointment of top managers are made by the supervisory board (Aufsichtsrat). The day-by-day running of the company in contrast is the responsibility of the management board (Vorstand). Top managers have a great deal of autonomy in their individual areas of responsibility. The separate appointment of managers by the supervisory board reduces the dependency of individual members on the chair/speaker.

Large British companies in contrast are generally run by a CEO-dominated single board. This CEO is often also the chair of the board and either hand-picks or plays a major role in choosing the other members of the board. From the point of view of the labour market institution and regulation the UK is among the countries with the least restrictive employment protection legislation, while Germany has relatively strict employment protection[251]. Dismissals or redundancies in Germany are costly in terms of time, money, and procedural complexity. Higher firing costs in Germany may lead to lower mobility and more screening, as it is more costly for firms to hire bad workers. Moreover, unlike the UK, Germany has a tight corporatist labour market, with centralized wage negotiations. Although there are no legal minimum wages in Germany, the union membership is able to affect the wage.

[251] Dustmann, C. and Pereira, S. C. (2008). Wage Growth and Job Mobility in the United Kingdom and Germany, Industrial and Labour Relations Review, 61, 3 pp. 374 393.

In the UK instead the wage is overall less regulated, there is no minimum wage and the impact of the collective bargaining is very low. These differences can lead to differences in the returns to tenure and experience, since unions tend to be associated with reduced wage dispersion in general and lower returns to labour market experience in particular.

The above overview of the two systems under study suggests our second hypothesis.

Hypothesis 2: The institutional premium varies across different economies.

Moreover, which is even more interesting, the corporate governance literature on managers' fixed effects empirically shows that the managers fixed effects matter for a wide range of corporate decisions. In particular, after controlling for firm-level characteristics, it has been shown that the individual characteristics of managers are significantly related to manager fixed effects in performance, and that managers with higher performance fixed effects receive higher compensation. Therefore the CEO is a key factor in the determination of corporate practices and affects with his/her own "style" a wide range of corporate variables[252]. This brings us to the third hypothesis:

Hypothesis 3: The difference institutional premium across different economies depends upon the personal characteristic of the CEO.

[252] Bertrand and Schoar (2007).Managing with Style: the Effect of Managers on Firm Policies, The Quarterly Journal of Economics, Vol. 118, No 4, pp. 1169-1208.

2.3. Institutional premium as an isolating mechanism

To the purpose of this paper we look at the relationship between job mobility and human capital management with respect to knowledge transfer and safeguard of the firm's competitive capabilities, in the light of the knowledge-based theory of the firm[253], highlighting some implications for the human capital management task and the concern of creating isolation mechanisms able to prevent the knowledge transfer, in order to protect the competitive advantage of the firm[254]. Fundamental to knowledge-based theory of the firm is the assumption that the critical input in production and primary source of value is "knowledge"[255]. Human capital is defined as worker level knowledge, skills, and abilities which are embedded to people[256]. It can be firm-specific human capital and have limited applicability outside the focal firm, such that it limits individuals' mobility, acting by itself as isolating mechanism. By contrast the general human capital refers to worker skills that are broadly applicable outside the focal firm, thus posing concerns about its protection.

The definition of human capital suggests that knowledge, skills, and abilities are a sort of personal characteristics of the worker. In that context, knowledge is meant to be "know-how" rather than information. In fact, according to Von Hippel:

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[253] Grant, R. M. (1996). Toward a Knowledge-Based Theory of the Firm, Strategic Managemen Journal, 17, pp.109-122.

[254] Porter Liebenskind, J. (1996). Knowledge, Strategy and the Theory of Firm, Strategic Management Journal, 17, pp. 93-107.

[255] Nonaka, I. (2007). The Knowledge-Creating Company, Harvard Business Review, pp.162-171.

[256] Cambpell, B. A., Coff, R. and Kryscynski, D. (2012). Rethinking Sustained Competitive Advantage From Human Capital, Academy of Management Review, 37, 3,pp. 276-395.

"know-how is the accumulated practical skill or expertise that allows one to do something smoothly and efficiently"[257]. The pivotal word in this definition is "accumulated", which implies that know-how must be learned and acquired[258]. This suggests that the know-how is easy to be exported to a rival firm, and difficult to be protected by the law. Because of its characteristic of being a worker level knowledge, skills, and abilities which are embedded to people, human capital is not owned, or even fully controlled, thus the regimes of appropriability cannot provide it with protection. Patent and intellectual property protection can support the firm as long as the knowledge is fully and completely codified so rivals cannot use the knowledge (Coff, 2003). In fact, human capital is not suitable to be protected by patent law. Patent law specifies statutory categories which refer truly novel technical innovations.

Neither it can be protected by the trade secret law, which protect any information that gives you advantage, has commercial value because it is secret and has been subject to measures taken by the owner to keep the secrecy of the information259. Trade secret is information that you do not want the competition to know about. The law generally protects not just secret formulas and designs, but even simple facts, such as the features that might be introduced in to a product. The above remarks highlight that the management of human capital is a crucial task in

[257] Von Hippel, E.(1988). The Sources of Innovation. Cambridge: MIT Press.

[258] Kogut, B and Zander, U. (1992). Knowledge of the Firm, Combinative Capabilities and the Replication of Technology, Organization Science, 3, 3, pp. 383-397.

[259] Art. 39, Section 7 (Protection of Undisclosed Information). Agreement on trade aspects of intellectual property rights. 1995.

the firm's organization in order to safeguard its competitive advantage, since the protection of human capital can only be achieved through its efficient management. According to the strategy theory, for human capital to be source of sustained competitive advantage is crucial to place isolating mechanisms which avoid the transfer of knowledge and skills to rival firms, by preventing workers from taking their valuable knowledge and skills to rival firm[260]. Therefore the isolating mechanisms can be conceived as ex post impediments of competition in a market[261].

The concern of limiting employee mobility in safeguarding competitive advantage is well known by the strategic literature, especially with respect to the general human capital, which being broadly applicable, has high use value, thus high exchange value. Since human capital consists of knowledge and skills embedded to people and cannot be owned or controlled, by the firm, it can be isolated only to the extent to which the employees have little ability (or willingness) to leave the firm[262].

Now, the CEO status implies a high degree of ability and knowledge, therefore the CEO constitutes human capital which has high use value, thus high exchange value. This makes them more likely to be able and willing to leave the firm,

[260] Cambpell, B. A., Coff, R. and Kryscynski, D. (2012). Rethinking Sustained Competitive Advantage From Human Capital, Academy of Management Review, 37, 3,pp. 276-395.

[261] Bach, S. B., Judge, W. Q and Dean, T. J. (2008). A Knowledge-based View of IPO Success: Superior Knowledge, Isolating Mechanisms, and the Creation of Market Value, Journal of Managerial Issues, Vol. 20, No 4, pp. 507-525.

[262] Cambpell, B. A., Coff, R. and Kryscynski, D. (2012). Rethinking Sustained Competitive Advantage From Human Capital, Academy of Management Review, 37, 3,pp. 276-395.

then to threaten its competitive advantage, also at the international level the latter remark brings to our fourth hypothesis.

Hypothesis 4: The designing of the CEO compensation is an isolating mechanism that reduces the incentives for the CEO to migrate toward other economies and to prevent the knowledge transfer and protect the competitive advantage of the firm.

3. Empirical methodology

The methodology we adopt builds upon the Oaxaca (1973) decomposition of the mean. The approach builds upon qualitative and quantitative information and techniques, where a measure of income or wage, is taken as being a function of a number of exogenous determinants. To this aim, I build a qualitative variable defined as CEO both for Germany and the United Kingdom, and estimate the following wage equation:

$$Ln(wage_i) = \alpha + \beta_1 Age_i + \beta_2 Age_i^2 + \beta_3 Education_i + \beta_4 Parttime_i + \\ + \beta_5 Permanent_i + \beta_6 Union_i + \beta_7 CEO_i + \sum_{j=1}^{12} \gamma_j Sector_{j,i} + \varepsilon_i, \quad (1)$$

where Ln (wage) indicates the dependent variable the (ln of) monthly net wage. The explanatory variables are the traditional human capital variables (Baluu and Khan, 1996a). In particular, Age and its square are used as a proxy of experience; the squared value of Age is added to the set of regressors to capture the effect of experience over time. Education, is the variable for education; Part time and Permanent

refer to the type of contract; Union takes into account institutional constraints; and Sector relates to the type of industry, where j=1,…,12. If $H_0: \beta_7 = 0$ is rejected, I use the qualitative information the CEO dummy variable gives by removing these observations from the sample, and estimate the following wage equation:

$$Ln(wage_i) = \alpha + \beta_1 Age_i + \beta_2 Age_i^2 + \beta_3 Education_i + \beta_4 Parttime_i + \\ + \beta_5 Permanent_i + \beta_6 Union_i + \sum_{j=1}^{12} \gamma_j Sector_{j,i} + \varepsilon_i. \quad (2)$$

Because CEOs have been excluded from the sample, I can use parameters from Eq. (2) to forecast the wage that CEOs would have given their characteristics but outside the CEO position:

$$\widehat{w}_{\text{counterfactual}}^{\text{CEO}}. \quad (3)$$

The premium for the CEO position is easily calculated as the difference between the actual average wage CEOs earn, and the estimate in Eq, (3):

$$\text{Premium} = w_{\text{actual}}^{\text{CEO}} - \widehat{w}_{\text{counterfactual}}^{\text{CEO}}. \quad (4)$$

At this point, it is the case to note that Oaxaca decomposition takes the variables for which the decomposition is made as exogenous, typically the observation's gender. However, being a CEO is unlikely to be independent from the wage that the CEO position offers. In addition, there exists the problem of controlling the

parameters for the presence of unobservable skills[263]. CEOs are indeed likely to self-select in their position because of their skills.

If individual skills between CEOs and other employees systematically differ because the former self select into more rewarding tasks, then the premium I estimate is actually an (unknown) combination of both the premium to supervision and the reward for the skills the individual is endowed with. The problem is related to the likely failure of the conditional independence assumption determined by the individuals' self-selection either into the labour market or into the CEOs position based on unobservable variables.

The former is the known case raised in the gender wage gap literature, where the decision about participating to the labour market is different for men and women (Heckman, 1979). This is not the relevant issue in our case, as there is no reason to expect that those that will be CEOs self-select into the labour market differently from those that will not. Actually, the premium is an amount for a particular task, hence the assumption that all the individuals enter the labour market first, and then decide/try to become CEO or not can be treated as a weak hypothesis. The problem of selection into groups is instead a relevant problem, as none of the variables I am using in our analysis is of help in controlling the estimated parameters for the impact of unobservable skills. The literature on the gender wage gap suggests to deal with this problem by adopting the panel data approach. However, this approach in

[263] Card, D. (1999).The Causal Effect of Education on Earning. O. Ashenfelter and D. Card (Eds.) Handbook of Labour Economics, 3, pp. 1277-1366.

our context is unfeasible as the survey data I am using, the EU-SILC, is a cross section.

We note that the methodology has been used also to measure the gender pay gap across countries in comparative studies[264]. In this case, working in one economy or in the other economy is the variable for which the decomposition is made. At a close look, the decision on whether to move from a country to another one for working reasons is hardly independent on the wage, as well. To say it in short, the issue is not only related to our paper, but it is actually relevant to the relevant literature. The discussion calls for an instrumental variables approach, where a measure of the individual skill is added to the set of regressors. Ideally, the variable for which the decomposition is made, in our case being a CEO, is modelled in a probability model where a measure of individual skills, for example wage, is added to the set of regressors. In turn, wage should be controlled for endogeneity and, finally, the estimated probability should be added in the estimating model in a Heckman style approach.

Put it another way, the problem is that of finding one or more credible instruments. Addressing this issue is challenging in our context because the instruments must be valid (and the same) for all the economies under investigation. The literature suggests adopting variables measuring individual's health. It is indeed suggested that poor health has substantive effects on compensations and participation to the labour market. It is also suggested that the relationship between the health

[264] Blau, F. D. and Kahn, L. M. (1996). Wage Structure and Gender Earnings Differentials: An International Comparison, Economica, New Series, Vol. 63, No. 250, pp. S29-S62.

status and the task the individual performs is not strong. The idea is that health condition is likely to affect all the tasks the individual chooses to perform in a similar manner (Currie and Madrian, 1999). In the EU-SILC survey physical well-being is measured through the limitation in activities due to health problems and general health (including health status and chronic illness or condition) and summarised by a variable going from 1 to 5, with higher values indicating poorer health condition. Biagetti, Leonida and Scicchitano (2013) tried an exercise using this instrument, and find no statistical difference, possibly because the instrument is poor.

The authors follow Picchio and Mussida (2011) and use the International Standard Classification of Occupations (ISCO-88 hereafter). This variable is associated to the type of job an individual chooses; the classification goes from jobs where skills required are relatively low, as plant and machine operators and assemblers up to jobs requiring higher skills, such as professionals, legislators, senior officials and CEO/non CEO positions. The variables, 4 dummy variables measuring the skills required for the task, explicitly refer to the level of skills required for the job:

> "the basis for the classification in the ISCO-88 scheme is the nature of the job itself and the level of skills required. A job is defined as the set of tasks and duties to be performed. Skills are the abilities to carry out the tasks and duties of a job. Skills consist of two dimensions: skills level and domain specialization" (EU-SILC 2009).

I take advantage of the above and, in an attempt of reducing the impact of the skills on the premium for CEO I am going to estimate, I will not use all the individuals in the analysis. I will instead select the subsample of all the individuals defined as managers in Germany and the United Kingdom, and into the 4th dummy above.

Ideally indeed, the use of the Oaxaca decomposition is that, once individuated the aim of the research, it is necessary to have two groups of individuals that are similar in all the characteristics but the one the analysis focuses upon. The hypothesis I make is that all individuals declaring to be in a management position, the so-called middle managers, are endowed with particular skills. Should the CEO position be relevant in determining the wage, I split this sample between CEOs and Supervisors.

I will use the approach above for Germany and the United Kingdom independently. The difference between the premium estimated for Germany and the premium estimated for the United Kingdom is a measure of the total impact the economy has on the premium for the CEO positions:

$$\text{Country effect} = \text{Premium}^{\text{UK}} - \text{Premium}^{\text{Germany}}. \quad (5)$$

The above is a premium that the German CEO would earn if moving to the United Kingdom. This can be imagined as being the sum of the amount the UK system pays for his/her individual characteristics (not necessarily the same as the amount Germany pays) and the amount the institutional context pays.

To disentangle the two effect, I repeat the previous exercise (that is done within each country) across the two economies. I firstly group only observations from CEOs from the two economies, and estimate the following wage equation:

$$\begin{aligned} Ln(wage_i) = \quad & \mu + \theta_1 Age_i + \theta_2 Age_i^2 + \theta_3 Education_i + \theta_4 Parttime_i + \\ & + \theta_5 Permanent_i + \theta_6 Union_i + \theta_7 UK_i + \sum_{j=1}^{12} \vartheta_j Sector_{j,i} + \varepsilon_i, \end{aligned} \quad (6)$$

where the variable UK is a qualitative dummy variable taking value 1 if the CEO is employed in the UK and zero otherwise. This variable allows to take into

adequate account the impact of the UK institutional environment in determining the CEO compensation.

As before, in the case that $H_0: \theta_7 = 0$ is rejected, I use this qualitative information the dummy variable gives by removing all the observations from Germany from the sample, and estimate the following wage equation:

$$Ln(wage_i) = \mu + \theta_1 Age_i + \theta_2 Age_i^2 + \theta_3 Education_i + \theta_4 Parttime_i + \\ + \theta_5 Permanent_i + \theta_6 Union_i + \sum_{j=1}^{12} \vartheta_j Sector_{j,i} + \varepsilon_i. \quad (7)$$

Because German CEOs have been excluded from the sample, I can use parameters from Eq. (7) to forecast the wage that German CEOs would have given their characteristics but if they were working in the UK:

$$\widehat{\mathrm{w}}_{\text{counterfactual}}^{\text{German CEO working in the UK}}. \quad (8)$$

I can use the quantity above in two respect. I can calculate:

$$\text{Premium} = \mathrm{w}_{\text{actual}}^{\text{German CEO}} - \widehat{\mathrm{w}}_{\text{counterfactual}}^{\text{German CEO working in the UK}} \quad (9)$$

as being the total premium German CEOs would have if moving to the UK, and

$$\text{Premium} = \mathrm{w}_{\text{actual}}^{\text{UK CEO}} - \widehat{\mathrm{w}}_{\text{counterfactual}}^{\text{German CEO working in the UK}} \quad (10)$$

as being the fraction of the premium that is due to the individual characteristics of the German CEOs.

4. Data and empirical results

4.1. Data

Our analysis is based on the EU-SILC cross-sectional survey that provides information on 440,400 individuals living in 26 European economies. The dataset has three main advantages over similar datasets. First empirical results associated to different economies are easily comparable as the survey adopts the same questionnaire, guidelines, definitions and procedures. Second, the dataset provides the updates of all the indicators contained in the European Community Household Panel (the dataset that EU-SILC has replaced). Finally, the new dataset contains information on both old and some new entrants in the European Union. The countries surveyed are the following: Austria, Belgium, Cyprus, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Netherlands, Norway, Poland, Portugal, Sweden, Slovenia, Slovakia and the United Kingdom.

As common in papers aiming at studying the determinants of wages, I discard from the analysis individuals such as students, those compulsorily serving in the army, self-employed workers, and those outside the 25 65 age range. I also remove individuals having missing values for any of the variables. I use in our exercise.EU-

SILC defines the supervisor as the employees whose role: "includes formal responsibility for supervising a group of other employees (other than apprentices), whom they supervise directly, at times doing some of the work they supervise. It implies that the supervisor or foreman takes charge of, directs the work and controls that it be properly done" (EU-SILC, 2009). I define the CEO as, among supervisors, those individual sitting in the Board of Directors. I only keep information associated to supervisors and CEOs from Germany and the UK only. These criteria provide me with 4736 observations, of which 1223 are in the CEO position and 3513 supervisors.

Table 1 reports results from a simple descriptive analysis. More specifically, in Panel a I report the percentage of CEO and the total number of observations in the two economies; in Panel b I report the average of (the ln of) net monthly wage and standard error for CEO and supervisors and, finally, in Panel c I report (i) the unconditional difference in wages between CEO and Supervisors in the two samples; (ii) the unconditional difference in wages between CEO in United Kingdom and CEO in Germany and (iii) the unconditional difference in wage between supervisors in United Kingdom and supervisors in Germany.

Results suggest that the United Kingdom has a number of CEOs that are more than twice with respect to Germany. Despite this evidence, the average wage for CEO is higher in the former economy than in the latter. In line with the hypothesis that CEOs are more likely to migrate then other supervisors, the difference in the wage for the former is lower than the same quantity for the latter. As expected, there

exists a positive difference between the average wage for CEOs and the average wage for the other supervisors.

Table 1
Summary statistics

Panel a. reports the percentage of CEO and the total number of observations; Panel b. the average of (the ln of) net monthly wage and standard error for CEO and Supervisors; Panel c. reports (i) the unconditional difference in wages between CEO and Supervisors in the two samples; (ii) the unconditional difference in wages between CEO in United Kingdom and CEO in Germany and, finally, (iii) the unconditional difference in wage between supervisors in United Kingdom and supervisors in Germany.

Panel a. Structure of the sample	Germany	United Kingdom
CEO/Supervisors	0.152	0.348
Number of observations	2176	2560
Panel b. (ln of) Net monthly wage for:		
CEO	8.319	8.354
Supervisors	7.920	8.045
Panel c. Unconditional difference in wages between:		
(i) CEO-Supervisors	0.399	0.309
(ii) CEO (Germany-UK)		0.035
(iii) Supervisors (Germany-UK)		0.125

5. Results and discussion

The differences reported above cannot be taken as the premium for the CEO position I am interested in estimating, as they do not take into account the difference in the personal characteristics the CEOs are endowed with, and those the control group has. This is why the Oaxaca (1973) decomposition depicted above is called for. Results from are reported in Table 2 and Table 3.

In Column (1) and (2) of Table 2 I report the analysis for Germany, and in Column (3) and (4) I report the corresponding analysis for the UK. These results are obtained by treating the two sample independently. For each model, I report coefficients, the heteroskedasticity-consistent standard errors, the F-statistics associated to the null hypothesis of statistical irrelevance of 12 sector dummies, the adjusted R2and the number of observations.

Results reported in Column (1) suggest that the model fits the data reassuringly well. All the regressors but unionization are statistically significant and display the expected sing. Experience has a positive but non-linear impact on the wage; education has a positive impact on the average wage of supervisors. The type of contract also matter, as part time employee have a lower than average wage, and full time employee have correspondingly a higher than average wage.

As expected, the qualitative dummy variable for being in the CEO position is statistically significant, and show the expected sign. I use this evidence to discriminate between groups. I therefore remove CEOs form the sample, and estimate the wage equation again. Results are reported in Column (2). Results from the model

are qualitatively similar and therefore are not commented. I use this model to forecast the average wage that CEO observations would have had given their characteristics. Such average wage is reported at the bottom of Columns (1) and (2), with standard deviation.

I adopt the same strategy to produce an estimate of the counterfactual average wage for the United Kingdom. Results from Column (3) show that the model adapts sufficiently well to the observations. The impact of experience is slightly lower w.r.t. the parameter estimated for Germany; the opposite hold for the parameter estimated for education. As in the case of the German sample, the qualitative dummy variable is statistically significant and shows the expected sign. I use again this information to discriminate between groups. I therefore remove the observations from CEO individuals and estimated the wage equation. Results are reported in Column (4), and the counterfactual average wage for CEOs is reported at the bottom of Columns (3) and (4), with standard deviation

To perform our decomposition I also need the counterfactual average wage the German CEOs would have should they be employed in the UK. I have therefore built a sample where only the CEOs are enclosed, and created a qualitative dummy variable for the UK. I use this sample to estimate the wage equation whose results are reported in Column (5) of Table 2. As expected, result suggest that the intercept lies in between the model estimate for the UK and the model estimated for Germany.

Table 2
Regression analysis

Sample	Germany		United Kingdom		CEO	
Model	(1)	(2)	(3)	(4)	(5)	(6)
Constant	5.019***	4.681***	6.17***	6.415***	5.846***	5.490***
	(0.286)	(0.309)	(0.212)	(0.223)	(0.396)	(0.424)
Experience	0.077***	0.083***	0.050***	0.028***	0.08***	0.097***
	(0.012)	(0.013)	(0.009)	(0.009)	(0.017)	(0.020)
$Experience^2$	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	0.000
Education	0.262***	0.279***	0.303***	0.295***	0.264***	0.295***
	(0.023)	(0.024)	(0.019)	(0.021)	(0.030)	(0.036)
Part time contract	-0.857***	-0.865***	-0.693***	-0.678***	-0.743***	-0.736***
	(0.048)	(0.050)	(0.037)	(0.041)	(0.080)	(0.091)
Permanent contract	0.367***	0.441***	0.037	0.074	0.081	-0.073
	(0.110)	(0.061)	(0.100)	(0.114)	(0.172)	(0.199)
Unionisation	-0.039	-0.027	0.062***	0.060***	0.055***	0 .061***
	(0.046)	(0.040)	(0.011)	(0.013)	(0.022)	(0.023)
CEO (Dummy)	0.255***		0.254***			
	(0.032)		(0.022)			
United Kingdom					0.782*	
					(0.047)	
Sector 1-Sector 12	15.84***	10.38***	24.13***	20.34***	14.17***	12.46***
(F-statistic)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
# of observations	2176	1844	2560	1669	1223	891
Adj-R^2	0.409	0.404	0.376	0.394	0.272	0.286

Counterfactual wage for German CEO if not in the CEO position in Germany (with s.e.):
8.069 (0.355)

Counterfactual wage for British CEO if not in the CEO position in the United Kingdom (with s.e.):
8.074 (0.337)

Counterfactual wage for German CEO if employeed in the United Kingdom (with s.e.):
8.399 (0.312)

The dependent variable is (the ln of) monthly net wage. Standard errors robust to heteroskedasticity are reported in parenthesis. *** (**) [*] stands for statistical significance at 1% (5%) [1%] level.

More importantly for our exercise, the dummy UK is statistically significant and it shows the expected sign, in the sense that the UK is found to pay a higher premium for the CEOs position. I therefore use this information to estimate the counterfactual wage for German CEOs. In the spirit of the exercise above, I remove the German CEOs form the sample, and estimate the model using UK observations only. I then use this model to forecast the average wage for individual having the characteristics the German CEOsare endowed with. Result from this exercise is reported at the bottom of Columns (5) and (6), with standard deviation.

Table 3
Counterfactual Analysis

Panel a. reports (i) the wage premium for CEO; (ii) the differences among premia; (iii) the impact of Germany on the premium for German CEO; (iv) the impact of individual characteristics on the premium and (v) the impact of the German institution on the premium; Panel b. reports the distribution of some selected characteristics across the two samples.

Panel a. Wage premium for:	Germany	United Kingdom
(i) CEO	0.250	0.280
(ii) CEO in UK w.r.t. Germany		0.030
(iii) German CEO in UK w.r.t. CEO in Germany		0.080
(iv) German CEO in UK w.r.t. CEO in UK		0.045
(v) Impact of German institutions		0.035

Panel b. Personal characteristics	CEO	Supervisors	CEO	Supervisors
(i) Experience	46.292	44.978	44.145	43.582
(ii) Education	4.404	4.115	3.790	3.866
(iii) Part time contract	0.045	0.152	0.058	0.138
(iv) Permanent contract	0.949	0.953	0.988	0.984

From these quantities it is immediate to perform the decomposition we are interested in. Results from this analysis are reported in Panel a. of Table 3. I report results for Germany and for the United Kingdom separately. Results suggest that both Germany and the UK pay a substantial higher wage for the CEO position; the UK however, pays a higher premium. Results are therefore in line with the hypothesis that a more flexible institutional environment needs to pay more talents.

How much of the difference is due to the institutional environment? To answer this question, I use the estimated counterfactual wage the German CEOs would earn if, all else being equal, they would work in the United Kingdom. Results suggest that German CEOs would earn an 8% more of the fixed component of the wage. Apparently surprisingly, should the German CEO be employed in the UK, s/he would a higher wage than the UK CEO. I say apparently because it is clear that the German CEO is, on average, more skilled than the British one. I report some selected variables in Panel b. of Table 3. The UK systems pays these characteristics more than what the Germany pays. The difference between these quantities, about 3.5%, can be taken as the impact of the institutional environment on the international pay gap.

6. Conclusion

Despite the great deal of literature on the CEO compensation topic, some important aspects of the design of the CEO compensation has not been considered

adequately. In fact the two main strands of literature respectively based on the principal-agent theory and the institutional theory, has been mainly focusing on the CEO compensation as a corporate governance mean to mitigate the agency problems, thus paying attention to the variable component of the CEO compensation, which is firm performance sensitive and it is likely not to vary across economies.

This paper aims to investigate if the institutional environments in different economies are able to design compensations so that there is no incentive for the CEO to migrate. By taking onboard the idea underlying the institutional theory, it goes further and considers other implications related to the designing of the CEO compensation, namely the relationship between job mobility, management of human capital with respect to knowledge transfer and the safeguard of the firm's and the economy's competitive capabilities. The final intent is to provide both a theoretical and empirical framework on which base individuate a new isolating mechanism able to prevent knowledge transfer across economies, given that no legal protection is suitable to be applied to human capital.

To this extent we analyze the fixed component of the CEO compensation, as this is more likely to be affected by the institutional environment where the firm operates, and can provide a suitable isolating mechanism in order to protect the competitive advantage of the firm.

We provide a comparative assessment of the determination of the CEO compensation in Germany and UK that, according with the varieties of capitalism thesis, represent two examples of different economies, organization of corporate governance and labour market institutions and regulations. The underlying hypothesis is

that more flexible the economy and its labour markets and regulations, the higher the wage and this will ultimately lead to higher competition at the international level.

The results suggest that, other things being equal, there exists a pay gap in the fixed component of the CEO compensation across the two economies. In particular, both Germany and the UK pay a substantial higher wage for the CEO position; the UK however, pays a higher premium. Results are therefore in line with the hypothesis that a more flexible institutional environment needs to pay more talents.

From the estimated counterfactual wage the German CEOs would earn if, all else being equal, they would work in the UK, results suggest that German CEOs would earn an 8% more of the fixed component of the wage, which, surprisingly, is higher than the UK CEOs wage. The analysis, suggests that this is partially due to the UK paying a higher premium for the characteristics the German CEO is endowed with, and partially to the difference to the institutions and regulations the two economies have in place.

In particular, provided that the German CEO is, on average, more skilled than the British one and that UK systems pays these characteristics more than what the Germany pays, the difference between these quantities, about 3.5%, can be taken as the impact of the institutional environment on the international pay gap. Therefore we can conclude that more flexible institutional environment can provide a strong incentive for CEOs, operating in a less flexible institutional environment, to migrate. This means that the institutional environment plays an important role in designing the CEO compensation, especially with respect to its fixed component.

This in turn highlight that the design of the CEO compensation may be a crucial factor in managing human capital, and its mobility across economies. Thus it may has a potential for acting as isolating mechanism able to prevent the transfer of knowledge toward competitor economies.

Chapter 5

Conclusion

This thesis aims at analyzing how different economic environments may shape the behavior of the economic actors when differences in the type of economy, financial system, corporate governance, labour market institutions, regulations are involved. The main theoretical framework is based on the varieties of capitalism thesis which individuates two opposite institutional environments: the Germany and the UK.

In particular the thesis focuses on Germany and the UK which are two European systems often under study, because of their opposite institutional environment. This has made them very attractive as object of study by scholars from different point of view.

The UK and Germany provide two extremely different examples of economies, banking systems, and corporate governance, labour market institutions and regulations, thus it is interesting to see whether these differences lead to differences in the economic dynamics.

The thesis has been developed into three main parts.

The first part which develops the theoretical background, based on the comparative analysis of the two systems, highlighting the factors that makes them very different.

The second part develops the empirical comparative analysis of the two systems from the point of view of the competitiveness of the banking system. The analysis develops the empirical framework in order to check what is the impact of the Basel Accords on the competition dynamics, once applied across countries, provided the different characteristics of their economic systems. The comparison of the two systems suggests the hypothesis that as the German system is risk-oriented and the UK one is profit-oriented, then the latter is much more likely to be impacted by strict burdens on capital requirements. From the empirical analysis there are a number of interesting results which to some extent confirm the above hypothesis. The empirical results suggest that the implementation of the same rule may lead to different outcomes, depending on the economy in which the rule is implemented. In fact, the implementation of Basel has different impacts in Germany and the UK. The implementation of Basel in Germany has a lower impact on revenues, compared with the UK. The German banking system is in monopolistic competition, but regulation has the effect of ameliorating the competitive dynamics of the whole banking system. In fact, the interaction analysis shows that, once the impact of the Basel variable is taken into account, the system moves towards competition.

The UK banking system is characterized overall by monopolistic competition, but the implementation of Basel does not ameliorate the competitive dynamics. The impact of Basel in the UK is to create distance between large and other banks by

making the former perform in monopolistic conditions and leaving the others to compete amongst themselves. In other words, it creates a sub-sample of large banks across the UK sample, which constitutes a particular category of banks. From the above we can conclude that in a more stability-oriented system, such as that in Germany, which is characterized by the risk-reducing drive of its policy and regulation, the implementation of Basel has the impact of aligning the incentives of banks and regulators.

In a market-based system, such as that in the UK, the incentives of banks and regulators do not seem to be aligned to one another. Here, the impact of Basel shapes banks' behaviour towards less competitive dynamics. In fact it creates a particular category of banks which produces in monopolistic conditions. This suggests that existing groups of large banks have an incentive for being in favour of regulation, but only for their private interests. More interestingly, it is likely that this group of banks colludes to exploit the barriers of entry, created by regulation, without dissipating rents, in order to fortify its dominant position in the market. This then means that they have more room to re-invest the extra rents in new technology which allows them, for example, to escape regulation. Therefore, it would be easier (and more beneficial) to use competition to enhance regulation in the banking system, especially if the latter is profit-oriented.

The last part studies if differences in the institutional environment lead to differences across economies of the CEOs compensation. The results suggest that, other things being equal, there exists a pay gap in the fixed component of the CEO compensation across the two economies. In particular, both Germany and the UK

pay a substantial higher wage for the CEO position; the UK however, pays a higher premium. Results are therefore in line with the hypothesis that a more flexible institutional environment needs to pay more talents.

From the estimated counterfactual wage the German CEOs would earn if, all else being equal, they would work in the UK, results suggest that German CEOs would earn an 8% more of the fixed component of the wage, which, surprisingly, is higher than the UK CEOs wage. The analysis, suggests that this is partially due to the UK paying a higher premium for the characteristics the German CEO is endowed with, and partially to the difference to the institutions and regulations the two economies have in place.

In particular, provided that the German CEO is, on average, more skilled than the British one and that UK systems pays these characteristics more than what the Germany pays, the difference between these quantities, about 3.5%, can be taken as the impact of the institutional environment on the international pay gap. Therefore we can conclude that more flexible institutional environment can provide a strong incentive for CEOs, operating in a less flexible institutional environment, to migrate. This means that the institutional environment plays an important role in designing the CEO compensation, especially with respect to its fixed component. This in turn highlight that the design of the CEO compensation may be a crucial factor in managing human capital, and its mobility across economies. Thus it may has a potential for acting as isolating mechanism able to prevent the transfer of knowledge toward competitor economies.

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