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BANKING EFFICIENCY AND REGULATION: THE RELATIONSHIP BETWEEN REGULATORY MEASURES AND THE 2008 GLOBAL CRISIS WITH A SPECIAL FOCUS ON PIGS

Banking performance and regulation within the European Monetary Area

with a focus on PIGS

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I would like to dedicate this thesis to my family, especially to my mother, who always believed in me, even when I did not, and to my brother and sisters, with love and deepest appreciations.

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Abstract

The aim of this study is to examine the impact of World Governance Indicators on bank efficiency using data on over 1,500 banks across five European countries whilst simultaneously controlling for bank-specific characteristics.

The importance of studying the connection between regulatory measures and banking efficiency, stems from the simple fact that firms always demand less regulation, as they claim regulation hinders the efficiency of the financial institutions. Therefore, the link, if indeed there exists any, between regulatory measures such as regulatory quality and corruption control has much more substance to it sue to the current economic climate.

The main target is to examine the efficiency scores of banks within the Euro zone, more specifically the commercial banks of Portugal, Italy, Ireland and Spain or lately better known by the acronym PIGS.

We aim to uncover any form of relationship, positive or negatively correlated, between the banking efficiency score attained by the aforementioned members of the EMU and the World Governance Indicators we obtained from the World Bank.

The method used for achieving the efficiency scores of the said countries will be the Data Envelopment Analysis program. For the identification of the correlational link between the variables, we will use OLS multivariate regression via the econometric model calculation program Eviews.

The regression results will then be analysed to observe if any meaningful results are obtained between the dependent and independent variables. This linkage will thus be scrutinized to see if the results command any significance.

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A List of Tables and Illustrative Material Used

List of Abbreviations

1. Europe Monetary Union (EMU)

2. Ordinary Least Squares (OLS)

4. World Bank (WB)

5. United States (US)

6. European Union (EU)

7. Organization for Economic Cooperation and Development (OECD)

8. Bureau van Dijk Electronic Publishing (BvDEP)

9. International country risk guide (ICRG)

11. World Governance Indicators (WGI)

12. Federal Reserve System (FED)

13. Regulatory Quality (REG)

14. Government Effectiveness (GOV)

15.Rule of Law (RLAW)

16.Political Stability (PSTABIL)

17. Voice and Accountability (VOICE)

18. Control of Corruption (CORR)

1. Introduction

In our increasingly energetic modern age, globalization and technological advancements have rendered geographical boundaries meaningless and the mobility of financial assets virtually infinite. Financial markets, like any other establishment, have evolved into living breathing entities, and much like other living organisms, are prone to giving reactions to mismanagements towards them.

Crisis economics being the popular topic of recent times makes for copious amounts of academic material needed to sieve through in order to obtain any decent degree of understanding of banking crises and regulation. The current position of the global financial system, being in the unfortunate state that it is in, is enough to get many a speculator nervous and at the same time provide for a comparable number of silently excited pupils of the 'dull science'. Terrible though this turn of events may be, the global financial crisis of 2008 represents an extraordinary opportunity for students of World and European political economy.

Firstly, it offers a unique conscious experiment for understanding the functioning's and straining points of both the US financial system and the monetary union (EMU) under stress. Secondly, it allows us to observe the rigidity of the euro-zone area and the robustness of the EMU's diverse models of capitalism to a vast collective shock. Finally yet equally importantly, in the absence of more centralized styles of decision-making, due to incomplete integration on the part of the EU, the crisis offers a case study into the EMU's capability to provide policy co-ordination.

We are regretful to point out that it is not possible to pass on the same judgement for investors. As the sheer unpredictability of even the smallest periods and volatility of asset nature, we should think, makes for very troubled speculators.

2. Literature Review

Our modest literature review consists of the reasons and background of the 2008 global crisis, moving on to the effects it had on America and then, summarising with an EU perspective and views on European banking efficiency.

Asset prices have been on the rise ever since the end of the stagflation-harassed period of the 70's and 80's. Even as close as from the 1980s to present, continual increases of asset value from US$12 trillion in 1980 to US$196 trillion in 2007 can be observed according to McKinsey's Mapping Global Financial Markets (October 2008). The International Monetary Fund's Global Financial Stability Report (IMF, 2009a) estimate for the latter figure is even higher, at US$241 trillion. Both of these estimates have one common denominator; the unprecedented increase in post-war financial profits.

According to Blankenburg & Palma, (2009, p531) "global cross-border capital flows more than doubled between 2002 and 2007, with foreign investors holding one in four debt securities and one in five equities".

Financial diversification and innovation spiralled of control since the end of the dot.com bubble at the turn of the century, with the invention of such previously unknown products such as credit default swaps (CDOs) and derivatives. Dealing methods were also "revolutionized," as an ever more leaning tendency towards off balance sheet transactions as a source of trade and revenue became not just the exception for modern day financial players, but in essence the norm. According to (Barrell, Hurst, & Kirby, 2008), "crises often happen after periods of financial innovation or deregulation, as borrowers and lenders find themselves in situations where it is hard to evaluate the price of risk." The article however focuses on widespread credit rationing and the effects it has on the economy as both lending and borrowing are 'choked'.

Thus reaching its miraculous zenith in 2006 and consequently laying the foundation for the seemingly deepest financial crisis since the great depression. On some accounts maybe even greater, as the full cost of the fallout of the crisis will still not be fully appreciated and/or understood for a good few years to come.

The problem seems to nest within the incapability to understand the intentional complexity of some of the transactions that took place during this economic "golden age" or so to speak. Gillian Tett vividly informs us, eventually '[t]he chain that linked a synthetic CDO of ABS [a credit default obligation of asset-backed securities], say, with a ''real'' person was so convoluted it was almost impossible for anybody to fit that into a single cognitive map—be they anthropologist, economist or credit whizz' (Tett, 2009, p. 299)

A paper by Michael D. Bordo named "An Historical Perspective on the Crisis of 2007-2008", sets out a plain but sharp insight into the causes of crises, the mistakes that led to a bad situation being exacerbated into an even one worse by the Federal Reserve's naïve judgement.

The reluctance of the FED to accept the problem and respond weakly with an influx of liquidity into the markets –by way of monetary relaxation and bailout funds- has not really given the anticipated momentum to the American economy as perceived beforehand.
The article (Bordo, December 2008) points out the historical cycles of crises and assumes they are conjectural. Bearing this fact in mind the paper mostly offers piecemeal policies and interventionist guidelines that help to contain, what the author sees as an inevitable turn of fate for the future.

The period of exceptional growth and high returns between 2001 and 2006 and the aftermath of the subsequent crisis were due to "major changes in regulation, lax oversight, relaxation of normal standards of prudent lending and a prolonged period of abnormally low interest rates" (Bordo, December 2008, p. 2). However, the aftermath of the crisis quite heavily outweighs the high yielding years of the boom-boom period.

As demonstrated by Reinhart & Rogoff, in an article named The Aftermath of Financial Crisis, systemic financial crises seem to share three characteristics, firstly asset price collapses are deep and prolonged,secondly crises generally lead to declines in output and employment and thirdly the amount of government debt goes through the roof.

A number of factors fuelled the American sub-prime mortgage crisis of 2007, which has since evolved into a global crisis and possibly the largest financial catastrophe comparable in scale only to the great depression of the 1930s. Among the reasons was the simple fact that policy interest rates were kept synthetically low to stimulate domestic spending mainly on housing, until up to two years before the crisis when the interest rates rose uncontrollably. Housing contracts that were previously reasonable instantly became unaffordable after the unassailable upsurge in policy interest rates. House prices do seem to be one of the key drivers of the 2008 crisis, which is appropriately also named the "subprime mortgage" crisis.

According to Reinhart & Rogoff (January 2009),"the housing price decline experienced by the United States to date during the current episode is already more than twice that registered in the U.S. during the Great Depression". However, housing prices are only one aspect of the problem and does not do much to answer the phase after the global contagion of the crisis.

A paper in The American Economic Review, named Liberalization, Moral Hazard in Banking, and Prudential Regulation: Are Capital Requirements Enough? Focuses on how relying solely on capital and leverage requirements, and allowing institutions to choose their own deposit rate level as means of regulation cause moral hazard to become an incentive for the banks as they are inclined to gamble with the depositors funds.

Implementing only one aspect of macro-prudential regulation does not necessarily mean the policy in general will gain any degree of success. The article then follows in suit by claiming that capital requirement ratios by themselves do not do much for regulating the banks as much as it does to incentivise moral hazard and gambling. "Financial market liberalization increases competition; competition erodes profits; lower profits imply lower franchise values; and lower franchise values lower incentives for making good loans, increasing the moral hazard problem". (Hellman, Murdock, & Stiglitz, March 2000, p. 148) The modelling of the article is such that, the authors try to determine the environment needed for gambling to take place in equilibrium. Hellman et al. then go on to analyse the trade-offs between using capital requirements and deposit-rate insurance. Finally concluding with the remark, that earlier capital requirement ratios are not as effective as they previously thought and that two forms of macro-prudential regulation should be considered. As with all things economic, there is the other hand, in which if banks are to take these measures of regulation they can only do so by sacrificing their own productivity and growth.

Another article critical about the deposit insurance scheme would be; Bank Runs: Deposit Insurance and Capital Requirements by Cooper and Ross,2001, which asserts that deposit insurance generally means less monitoring on the part of the depositor, and therefore a chance for the intermediary to engage in risky dealings for higher profit with customers assets at their disposal. According to the authors Cooper and Ross, no previous article has really tackled the question of implementing both capital adequacy and deposit insurance to ensure a Pareto efficient outcome. The apparently do confront the issue in their paper Banks

Runs; "in particular we focus on two policy instruments: deposit insurance and bank capital requirements" (Cooper & Ross, Feb 2001, p. 56).

The Cooper & Ross paper then goes on to criticise the Diamond & Dybvig model, which did not approach the problem of moral hazard but rather only included deposit insurance as a means to overcome bank runs. It then asserts that at a certain point the depositor's interest will align with that of the intermediary, and the depositor will be eager to hold higher risk portfolios effectively gambling with taxpayer money, this is all under the assumption that there is full deposit insurance. The conclusion is contrast of the introduction as the authors give some appraisal to the D&D model and the deposit insurance scheme, but also add the necessity of coupling it with capital requirement ratios.

The financial innovations of the recent period have made the mobility of financial capital nearly infinite, therefore allowing the bundles of sub-prime toxic assets in the form of mortgages to be sold by the U.S financial firms to other unwary parts of the world meant that the crisis turned into a full-blown global event. Barrell et al. (2008) use the NiGEM model in a dynamic, stochastic general equilibrium manner to investigate the claims laid down. By means of the model, the authors aim to observe the fluctuations of the shadow price of borrowing, the user cost of capital and investment.

If we were to observe the European mainland over the same period however, the outlook would seem to be much more bleak. The economists and policy makers at ECB were, like the vast majority of economists, convinced that financial innovations such as securitisation would make for a "smarter allocation of resources and risks." However, it should be stressed that securitisation has not developed in the euro area countries as much as it did in the US. Therefore, securities backed on credit issued in the Eurozone area have not had a primary role in magnifying the financial crisis.

As a joint market initiative, the EMU tried and to a degree succeeded to implement financial liberalisation and deregulation as a prerequisite for joining the European Monetary Union. Greece gives us a good example of just how deregulation and financial liberation can raise financial firms' profits as well as increase off balance sheet items. Off balance sheet transactions grew by up to 45% between 1998 and 2003. (Chortareas, Girardone, & Ventouri, 2009) More non-traditional form of transactions were being taken in to consideration as the tendency to take heightened levels of risk for higher gains spread like wild fire among the financial communities around the world.

During the run-up to the EMU Greece experienced a typical virtuous cycle between banking system modernization and liberalization on one hand and changes in the macroeconomic framework on the other. (Stournas, 2006) Also in Greece, improved competition along with lower interest rates and inflation further motivated financial innovation and leanings towards Off-Balance Sheet (OBS) transactions. (Chortareas, Girardone, & Ventouri, 2009)

In August 2007 the bailing out of IKB Deutsche Industriebank by the German government, which was one of the many European banks to incur substantial sub-prime-related losses, is seen as the starting whistle for the current financial crisis. Within a matter of days, one of France's leading financial institutions, BNP Paribas, suspended three of its investment funds,–stating a 'complete evaporation of liquidity in certain market segments of the US securitization market' (BNP Paribas, 2007). This meant BNP was unable to obtain a correct value the securities because the market for these products had completely dried up. The European Central Bank reacted to this move by immediately providing short-term funding within the region of €100 billion to financial institutions in order to guarantee uniform conditions within the euro area markets. This move would be the first of many emergency liquidity measures undertaken on behalf of the countries in the Euro zone, by the ECB and other worldwide monetary authorities.

The splash on the other side of the pond did not just affect the prominent French and German banks. The ripple effect of the U.S subprime crisis in Europe claimed a high profile victim in the form of Northern Rock a UK mortgage provider heavily reliant on wholesale money markets as a source of primary finance. However when the wholesale money markets did freeze, Northern Rock was left in the cold. Unable to procure the funds it needed, the U.K giant faced serious liquidity difficulties and on the 13th of September 2007, was forced to apply to the Bank of England for emergency financial assistance, and was ultimately nationalized in 2008. (Treasury Committee, 2008).

Governments all over Europe were having to bail out banks. The nationalization of the mortgage division of Bradford and Bingley and the forced bail out of Lloyds TSB, Royal Bank of Scotland, and HBOS shows us the severity of the situation in the UK. Combined with Northern rock the cumulative damage caused by the failures of these banks helped towards deepening the financial crisis in the UK. The UK went on to undergo one of the gravest peacetime recessions of its history. Things were not much better in Germany, where for example, the government had to save a commercial-property lender called Hypo Real Estate, which was undermined by liquidity issues that were caused by Depfa Bank, its subsidiary based in Ireland.

The reluctance of EU member states to find mutual ground on which the funds of the bailouts could be accumulated meant a disparity between countries that could afford to bail out their debt ridden banks and ones that had to apply for foreign funding. Preliminary efforts to execute a co-ordinated EMU resolution to the current banking situation were born dead as Member States moved in unison to reassure domestic depositors. As Ireland moved in September 2008, to assure a 100 per cent guarantee for the liabilities of all Ireland based banks, including commercial, retail, and any inter-bank deposits that was previously restricted to the largest six of the Irish-owned banks. UK banks, which had a less generous safety net in terms of deposit insurance, would then be at an obvious disadvantage, as funds would flow into Irish banks.

3. Regulatory Aspects

3.1. Regulation

The essence of regulation is derived from the simply from the need to restrict regulate and safeguard financial markets and the competition between the firms acting within the market. The safety of consumer deposits is also one of the main objectives of bank regulation, and this is achieved by means of Federal Deposit Insurance, along with Deposit Interest Rate Ceilings, these are two of the main headings of regulatory practice. Also among the arsenal of weapons at the disposal of the regulators is regulatory monitoring of the firms, done by either governmental units or private auditing companies.

2.1 Efficiency in European Banks

The incentive of high yields obtained by higher efficiency measures have caused the characteristics of the European banking sector to transform rapidly in recent years. A study by Altu

The regulatory rating system used since 1978 is called CAMELS, (capital adequacy (C), asset quality (A), management ability (M), earning quality (E), liquidity level (L), the sixth letter stands for sensitivity to market risk (S) and was adopted in 1997. These factors have to be judged and analysed in unison, as individual scrutiny may be a cause for misleading results.

3.2 The Glass-Stegall & Dodd-Frank Acts

3.2.1 The Glass-Stegall Act of 1933

The Glass-Stegall act of 1933 was aimed at separating commercial banking from investment banking, therefore limiting the variety of transactions that could be made by commercial banks. Under the influence of the act, commercial banks' functions were limited to do such functions as underwriting and dealing with municipal government debt. Investment banks were allowed to engage in underwriting and securities based transactions, but were prohibited from taking deposits.

Reducing the amount of collusion in the financial sector was a major objective of the act. The belief of the policy makers, that a separation between the main two divisions of banking would reduce the likelihoods of bank failures in the future was also apparent. However (White,1986), who is cited in Heffernan (1996,p238), is stated in a footnote suggesting that "[White] was able to show that banks engaged in securities activities actually had a lower rate of failure than banks without a securities arm".

The Glass-Stegall act was repealed finally in 1999, with the acceptance of the Financial Services Modernization Act of the Gramm-Leach-Bliley Act. The Financial Services Modernization Act allowed for commercial banking corporations to merge with non-banking corporations such as insurers and mortgage lenders to become financial holdings, thus allowing for them to engage in an variety of financial transactions they were previously unable to undertake.

The acceptance of the abolishment the Glass-Stegall Act meant that the commercial and investment banking markets could overlap. Banks with assets $1 billion or less could engage in financial dealings though a channel of subsidiaries. The financial Services modernization act of 1999 also aimed to reduce regulatory burdens, by requiring the Federal Reserve to oversee financial regulatory processes.

The dismantling of the Glass-Stegall Act has proved to be significant in understanding of the global financial crisis, as it was American banking firms who took advantage of the Gramm-Leach-Bliley Act, and merged their commercial and banking arms togther, effectively using commercial depositors' funds to make risky investment decisions.

The Sub-prime crisis which hit America and in reflection also affected Europe, by the sales of sub-prime toxic assets and credit defualt swaps. The European debt crisis is however more intertwined with mainly the southern european countries' buying of sovereign bonds and defaulting on the loan obligations.

3.2.2 The Dodd-Frank Act of 2009

The starting flare of the 2008 financial crisis was set off when the debate for whether banks were really “too big fail”, ended with the FED allowing the mega-bank Lehman Brothers to fail. The FED wanted to send out a message to the financial community all over the world to say that no bank was too big to fail. The FED has since retracted that stance and bailed out a whole list of ailing banks, mortgage lenders, and insurance conglomerates.

One of the main objectives of the Dodd-Frank act is to end the possibility of the taxpayers money going towards bailing out debt-ridden banks, by imposing tough new regulatory measures such as leverage and capital reserve requirements that make it unwelcome to grow too big. This prompted the Dodd-Frank Act to include provisions for the safe liquidation of failed financial firms, and establish demanding standards and rigorous supervision to protect against future risk.

A financial Stability Oversight Council was put into place after the acceptance of the 2009 Reform and Consumer Protection Act, with the objective of identifying and responding promptly to risks that may emerge throughout the financial system. This systematic response to crisis situations is achieved with support from specialists at the Office of Financial Research, via collection, and analysis of financial data. Together they aim to make risks more transparent and less of a threat.

3.3 Basel Accords

Two major bank failures in 1974[1] prompted a new form of regulatory measures to be put into place. The first agreement of the Basel Committee was the *Basel Concordat* in 1975. The concordat was revised in 1983, to tackle liquidity problems the committee thought to include joint supervisory responsibility to both home and host countries in regardless of subsidiary or branch. However, joint supervisory responsibility regarding solvency was only included for the subsidiaries of banks, branches were to be supervised by the central bank of the home country.

Towards the end of the 80's regulators became aware of the need to coordinate capital for banks across the globe. Hence in 1987meetings were held by the main OECD including the U.S, Japan, and western European countries in Basel, Switzerland. An agreement was struck under the supervision of the Bank for International Settlements (BIS) to provide the groundwork on which a more-or-less uniform agreement was struck between the 12 participating countries on how to regulate capital requirements, later to be known as the Basel I Accord. The Basel Accords are reliant on definitions called Tier-1 and Tier-2 capital. Capital requirement ratios encompass both Tier-1 and Tier-2.

[1] The German Bankhuas Herstatt went bankrupt in 1974 due to losses in the FOREX market and the Franklin National Bank went bankrupt in 1974 due to also large foreign exchange losses and rapid expansion.

Tier-1 and Tier-2 Capital

Tier-1 (Core) Capital:

Common Stock

Retained Earnings

Capital Surplus (amount received from sale of common stock or preferred stock in excess of par)

Disclosed Capital Reserves (reserves set aside for cash dividends not declared plus amounts for unforeseen contingencies)

Tier-2 (Supplementary) Capital:

Loan and Lease loss allowance

Preferred stock with maturity of at least 20 years

Subordinated Obligations (both stock and debt) With and Original Average Maturity of at least 7 Years

Undisclosed Capital Reserves

Hybrid Capital Instruments

Total Capital

Tier-1 Capital + Tier-2 Capital

Figure I.

Tiers of Capital

(Greenbaum & Thakor, 2007,p458-9)

3.3.1 Basel I Accord

The newly proposed ratio standards were to be fully imposed by the participating countries' banks by 1993. This new agreement was dubbed a herald of a "level playing field" by many groups.

The definitions of the Tier-1 Capital requirements that are incorporated into the Basel I Accord are given in Fig. III. The Basel I Accord relates the required quantity capital to the composition of the banks' assets. Therefore capital requirement ratios are stated as a percentage of risk-weighted asset rather than the total asset of the bank.

The clearest segment of the Basel accord has to be the minimum overall risk-weighted asset capital ratio of to the 8%, with at least 50% in the form of Tier-1 capital. Parties of the Basel I Accord were free to impose even higher ratios of required capital ratios within their own sovereignties.

The implementation of the Basel I Accord together with the FCICIA in 1991 can be deemed as a success due to a significant rise in the capital ratios of the banks and a huge decline in bank defaults. "[t]here were less than 10 commercial banks failures each year during 1995-2001"according to Greenbaum & Thakor, (2007,p465).

Minimum Overall Capital ratio: 8 % Mix in Capital Ratio: No more than 50% Tier-2 Capital Requirements Against Specific Assets

Asset Risk Category	Conversion Factor in Percentage	Qualifying Assets
1	0	Cash (inc. Foreign currency), claims on Federal Reserve Banks, direct obligations of the U.S with a maturity of up to 91 days, claims on OECD central government and banks and loan commitments with maturities less than 1 year.
2	10	Longer-term federal government debt, loans secured by government paper or deposits at the official lending institution, and Federal Reserve System bank stock.(at book value)
3	20	Claims on domestic depository institutions, short-term claims on foreign banks in OECD countries, cash items in the collection process, obligations of or claims guaranteed by federal entities, claims backed by the full faith and credit state of local governments, and the lowest-risk standby letters of credit.
4	50	Government obligations whose repayment is not backed by the full faith and credit of the issuing entity (revenue bonds and similar paper) residential mortgages, unused loan commitments with maturities exceeding 1 year, note issuance facilities, and medium-risk standby letters of credit.
5	100	Claims on corporations (including loans and bonds), guaranty type instruments, sale subject to repurchase agreements and other credit substitutes, and certain standby letters of credit.

Figure II

Qaulifying Assets for Basel I Accords

(Greenbaum & Thakor, 2007,p461-2)

3.3.2 Basel II Accord

Heralded by many as the successor to the first Basel Accord, the Basel II Accords were accepted and actively endorsed by the G10 (Group of Ten) OECD countries, and was announced by means of a press release in June of 2004. The "International convergence of capital Management and Capital Standards: A Revised Framework" or otherwise known as Basel II was henceforth accepted. The application of the main body of the regulatory framework was to be completed by the end of 2006, and more advanced approaches to be implemented by the end of 2007.

The Basel II Accords had several objectives, such as making sure capital adequacy regulation does not become a source of disadvantage (level playing field argument), and to ensure diversity within the regulatory framework as not to solely rely on capital adequacy. Another important target is adopting more specific risk-sensitive capital requirement methods.

Basel II also has such aims as covering a more wide-ranging set of risks; including credit risk, interest rate risk, and operational risk, and being able to overcome the mitigation efforts put forth by the intermediaries. Finally making sure the frame work is adaptable to progressive in the face of future encounters is incremental for regulatory policy makers. Whilst Basel I focused solely on Capital requirement ratios, Basel II moves a step forward in a more broad approach and defines the "three pillars" of regulation to guarantee more subtle risk-taking by financial intermediaries. The three pillars are as follows:

1. First Pillar: Minimum Capital Requirements

2. Second Pillar: Supervisory Review Process

3. Third Pillar: Market Discipline

The first pillar is similar to the capital adequacy requirements of Basel I, but with a more wide-ranging array of risks such as interest rate risk. The total capital ratio must be no lower than 8 per cent, whilst Tier-2 capital is limited to 100% of Tier-1 capital. The definition of eligible regulatory capital is stated in Greenbaum & Thakor, 2007, as similar to the 1988 Basel I Accord but with minor modifications. The definition of risk-weighted assets however, are Total Risk-Weighted Assets = [Risk-Weighted assets determined by credit risks]+ [12.5 x Capital requirementfor market and operational risks].

The second pillar accounts for the supervisory process put forth by the Basel II Accord. This section is more about the reviewing and supervision of the banks, and encourageing them to develop and implement their own techniques in monitoring and risk management.

The third and final pillar of the Basel II regulations is market discipline, this pillar incorporates the analysis of financial institutions as an added complement to state supervison. Theoretically making for a much more thorough scrutinized aspect of regulation, however accordign to Greenbaum & Thakor, 2007, this section is where the Basel II Accord is getting criticised the most, as apart from repeating the need for transparency the Accord does not tell on how to implement the third pillar.

4. Methodology

The samples of banks consist of all of the commercial banks of each of the countries known by the acronym PIGS or also known as the agents of the Euro-zone sovereign debt crisis. We have accumulated data from Portugal, Italy, Ireland, Greece and Spain.
We then intended to compute the efficiency levels of these banks, using the Data Envelopment Analysis Program or otherwise known as DEAP. Owing to the employment of a mathematical programming technique to measure the relative efficiency of multi-product DMUs (in our case the banks of the PIGS commercial banks), the DEA allows us to interpret specific input and output data concurrently.

The efficiency frontier is determined by connecting the "well-managed" banks into the sample through piecewise linear combinations that lie over the observations, thereby 'enveloping' the data. The fully technically efficient banks are situated on the best-practice boundary and all the others are technically inefficient relative to them and hold values between 0 and 1 according of their respective efficiency.

The sample is believed to be somewhat representative of the banking systems in the aforementioned countries, as they signify large section of the banking field within their own particular countries. Another of the procedures was to keep the sample broad, by choosing a higher sample number in order to achieve more meaningful results.

For the process within the DEA program we selected bank specific variables to suit our macro-prudential regulatory analysis. As our inputs we chose such variables as personnel expenses, total fixed assets, deposits and short-term funding, and for our outputs we believe that total loans, total other earning assets, and off balance sheet items will provide the robustness needed to make for a more competent analysis.

The author believes they have successfully satisfied a general rule of thumb, which states that nonparametric DEA indicates that the number of observations in the dataset should outnumber the over-all number of input and output variables by no less than threefold. (Cooper, Seiford, & Tone, 2000)

The results obtained from the manipulations within the DEAP program are then regressed alongside more macro bank specific variables such as total assets (TA), returns on average equity (ROAE), and equity over total assets (E/TA). The 7 year averages of the variables would then be calculated in order for the regression the represent the whole time period. Using regression program such as e-views or stata, the averages of the variables would be subject to regression. The outcome will then be analysed in terms of significance towards the hypothesis.

Then the following regression will be computed;

Efficiency $= \alpha + \beta$ *(Bank Specific Variable)* $+\lambda$ *(Governance indices)*

The results will then be interpreted and incorporated into a meaningful analysis that will form the conclusion. The analysis will be of how cost efficient each of the banks regressed within the sample and whether this bears any correlation to capital adequacy requirements in place due to the Basel Accords.

In this thesis, an input-oriented DEA model with Variable Returns to Scale (VRS) is used - instead of the original Charneset et al.'s Constant Returns to Scale (CRS) model- which in in turn allows the possibility that the production technology of DMUs (Decision Making Units) may display diminishing, constant and increasing returns to scale. The VRS condition adds a convexity constraint and should be calculated as:

$$min_{\theta,\lambda}\theta$$

$$s.t - y_i + Y\lambda \geq 0$$

$$N1'\lambda = 1$$

$$\lambda \geq 0$$

where θ is a scalar; λ is an N x 1 vector of constants; and $N1'\lambda$ is the convexity constraint, where N1 is an N x 1 vector of ones. This requires solving the linear programming model N times, one for each Decision Making Unit (DMU) in the chosen sample. The acquired value of θ is the efficiency score for the foresaid firm and it must satisfy $\theta \leq 1$ as it is a percentage score, with a value of 1 indicating a point on the frontier, i.e. a technically efficient bank. These frontier banks are then used to set the benchmark for the analysis of the sample. Scale efficiencies are measured by running the same dataset through both the VRS and CRS models. They are calculated by dividing the CRS efficiency score by the matching score of the VRS model and the obtained value must satisfy $0 \leq \theta \leq 1$. Slack variables are also analysed and these variables indicate excess input mixtures, in non-best practice banks (less efficient banks) in relation to the high scoring banks, which have a score nearer to the efficiency frontier.

To be able to make sense of the greater image of cost efficiency analysis of commercial banks, the importance of including OBS (Off Balance Sheet) transactions in the banks' input/output classification for the estimation is undisputable. As sometimes -as seen in the case of Enron (2001) - OBS transactions, namely securities and derivatives, may account for a chunk of the firms revenue, and respectively efficiency. Overlooking such an important aspect may prove costly for the integrity of any cost efficiency analysis.

5. Variables and Data

The author uses individual bank data, derived from retail banks' financial statements, derived from Bankscope by Bureau van Dijk a subsidiary of Fitch Ratings. The data used for the analysis falls between the years 2004 and 2011. Whilst a longer period may have explained the theory in a broader context, the fact that pre-2004 data becomes sporadic and that it would have skewed results, forces the author's hand into using data from only as back as 2007.

The DEA program is a non-parametric mathematical programming technique designed to calculate frontiers over the data points, so that all of the data points lie either on or below the frontier. We will be using the input orientated method under the assumption of constant returns to scale, meaning that the inputs used will determine the efficiency of the observation group data. We have selected three inputs and three outputs for the estimation of the efficiency frontier by the Data Envelopment Analysis program.

The cost efficiency method assumes that banks accumulate reserves, using labour and physical capital, to transform them into loans and other earning assets. To account for the increasing involvement of banks' recently acquired services comprising of such transactions as derivatives and sub primes the author has also felt the need to include the Off balance sheet items as an output to better get a compelling description of the state of the banks.

Within our regressions we have accumulated data from 42 of Greece's, 142 of Ireland's, 1049 of Italy's, 78 of Portugal's, and 315 of Spain's commercial banks. This gives us 1587 European commercial banks of the foresaid countries, which we can regress and are confident we will obtain meaningful results.

The DEA program will compute the efficiency of the aforementioned banks using variables comprising of three inputs and three outputs. The first three are the inputs like personnel expenses of the banks totalling the amount paid to the employees by the banks (m$), total fixed assets of the banks also meaning the non-earning assets such as the buildings etc. and deposits and short term funding the main source of the revenue generated by the banks. Our three outputs are total loans, total other earning assets, and Off balance sheet items.

Together with the data accumulated from Bankscope, we also have data on the governance indicators of the PIGS countries with such indices such as corruption, political stability, government effectiveness, and regulatory quality, rule of law, and finally voice and accountability. These indices will be independently regressed, and subsequently observed to see if they make any difference towards the outcome of the analysis.

After the initial phase of running the inputs and outputs in the Data Envelopment Analysis program, the efficiency frontiers were then used in the regression done in the Eviews program. The following equation was regressed;

$$Efficiency = \alpha + \beta\ (Bank\ Specific\ Variable) + \lambda\ (World\ Governance\ Indicators) + Ui$$

The bank specific variables consist of Total Assets, Non-performing loans, Returns on Average Equity, and Equity over Total Assets for the entire observation group. Every piece of available data was used to hopefully ensure a more wholesome examination.

6. Regression Results

The Null hypotheses (Ho) of our regressions are always that each independent variable is having no effect (obtaining a coefficient score of zero). The alternative hypotheses (H_A) state that the independent variables do actually have some meaningful effect towards the dependent variable (in this case banking efficiency).

6.1 Regulatory Quality

We began the regression process by starting with the Regulatory Quality variable. Represented in the equation with the abbreviation REG. Regulatory quality can be put as, the ability of the incumbent government to articulate and apply effective and comprehensive regulations that permit and promote both public and private sector development and inhibit any risks that they may face.

Regulation does not necessarily mean making life any harder for the actors within the economy, but rather a safety net in which, certain laws and norms can be enforced for the benefit of all, such as labour market policies; like enforcement of the employment law, providing flexibility in wages and price controls as well as hiring and firing employees. Another example of the benefits of regulation could be shown as extensive enforcement of legal rules and regulations within the banking, finance, and securities sectors. As we all know what kinds of socio-economic problems deregulation led to, the question should rather how much regulation should be enacted, rather than to debate if regulation should or should not be implemented.

The calculation of regulatory quality also includes investment appeal; presence of prohibitions or harsh investment licensing requirements, and financial regulations on foreign investment and capital such as transaction tax. Legal restrictions on ownership of business and equity by non-residents of country in question also effect the governance indicators they receive.

Ho: Regulation does not affect efficiency β (reg) = 0

Ha: Regulation does affect efficiency β (reg) $\neq$ 0

$$EFF = \alpha + C + NPL + E/TA + ROAE + REG$$

0.904849	9.36119	0.05687	0.09811	-0.665726

The result of this particular regression will show us if regulation has any effect on banking efficiency. The results showed that with EFF as the dependent variable, REG managed to get a coefficient score of -0.665726. In other words for every one unit regulation goes up banking efficiency will go down by 66 per cent. The regression also gave us a prob(F) score of 0.020371 making the outcome significant The t-statistic is also in similar correlation with the prob score, equalling 2.180547 in absolute terms. We therefore reject the Null hypothesis and accept the alternative hypothesis for the variable REG. Stating that according to our regression regulation negative affects efficiency.

6.2 Government Effectiveness

Our second regression was on Government Effectiveness with data obtained from the World Bank. Government effectiveness, according to the (World Bank, 2012), "captures insights of the quality of public services, the quality of civil service, as well as the degree of independence of the civil service from political pressure, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies."

Some of the factors used to evaluate government effectiveness indicator include; A government's ability to accomplish political changes, without the need for drastic policy changes or interruptions in basic government services. Also effective in the calculation of governmental effectiveness is the degree to which the ruling political leadership of the country sets and maintains strategic priorities and how effectively they implement reforms.

Ho: Government effectiveness does not affect efficiency β (reg) = 0

Ha: Government effectiveness does affect efficiency β (reg) $\neq 0$

EFF = α +	C +	NPL +	E/TA +	ROAE +	GOV
	0.07153	17.9262	1.06774	-0.16499	-0.111922

The results of this particular regression are that the variable Government Efficiency managed to earn the value -0.111922 from the OLS regression. The coefficient is negative; therefore, it is safe to say that the relationship between banking efficiency and Government efficiency will also be negative. This result by itself implies that a one-unit increase in

Government Efficiency will reduce banking efficiency by eleven per cent. A Prob(f) statistic score of 0.0736 also suggests that the regression was healthy and is giving us significant results as the psychological threshold was set at prob(f) = 0.10. The t statistic equalled to 0.462603 meaning a 46 per cent significance rate, which although is not as high as the other tests that were conducted, is enough to signify the results. Therefore again reject the Null and accepting the alternative hypothesis, to say that governmental efficiency does have an effect on banking efficiency.

6.3 Rule of Law

The aim of the next regression is to analyse the relationship between efficiency and the rule of law. Using the abbreviation RLAW, we were able to regress the equation between the between rule of law and banking efficiency.

The Rule of Law indicator measures the degree to which individuals and firms alike have sincere faith in and abide by the norms laid down by society; it particularly measures public confidence in the police forces, and judicial system, especially impartiality of the legal system. The functioning and independence of the judicial system is extremely important for the establishment of the rule of law. The protection of civil rights as well as to protection of intellectual property and private property rights are also incremental for the liberties of the public. The enforcement of government and private contracts and the probability of violence and crime are subsections that relate to aims like diminishing crime and creating more freedom for all. These are all part of the liberties taken for granted by many a democratic country citizen. In addition, the size of the informal economy and the prevalence of tax evasion and insider trading in financial sectors are used as benchmarks to the degree a country is run by law.

Ho: Rule of Law does not affect efficiency β (reg) = 0

Ha: Rule of Law does affect efficiency β (reg) $\neq 0$

EFF = α +	C +	NPL +	E/TA +	ROAE +	RLAW
	-0.94147	16.6678	2.9414	-0.36316	0.8408

The results of the regression for RLAW were quite unexpected as the strong correlation showed us just how important the rule of law is for the stable functioning of the financial sector. The variable RLAW ended up with a 0.840782 coefficient, meaning that for every one unit rise in the rule of law, banks would enjoy a 84 unit rise in efficiency. The Prob(f) statistic is well below our 10 per cent frontier at mere 5.07 per cent. This makes for a very healthy 95 per cent significance rate.

The high positive correlation was a result we were naturally expecting due to the logical link with law and order and the nature of finance, but the high coefficient did manage to surprise us. The standard error was also low in this regression as it turned out to be 0.0410 points, meaning that the deviation from the mean is one that can be ignored. We therefore must again accept the alternative hypothesis, which claimed that the variables had some effect on the dependent variable; banking efficiency. We have to reject the Null hypothesis as it stated that there would be no meaningful relationship between the variables.

6.4 Control of Corruption

Passing on to the next governance indicator used as an independent variable; Corruption Control. The levels of corruption are generally correlated with the degree to which the power of the community is manipulated for private grain. The abundance of major and minor forms of corruption at all levels of government, and the said government's willingness to enforce anti-corruption law and policies all determine how firmly immersed a country is within the grasp of corruption.

Finally, the "capture" of the state by private interests and elites effectively turning it into an oligarchy, is also an evaluation to which the Control of Corruption is benchmarked by. The rule of thumb generally being, that the faith if the public in government is negatively correlated with the amount of corruption in that said government and its institutions.

Our regression equations were as the following;

Ho: Control of Corruption does not affect efficiency β (reg) = 0

Ha: Control of Corruption does affect efficiency β (reg) $\neq$ 0

The regression brought about the following equation,

$$EFF = \alpha + \underset{0.09878}{C} + \underset{16.3032}{NPL} + \underset{-1.2940}{E/TA} + \underset{-0.3926}{ROAE} + \underset{-0.98326}{CORR}$$

The results regression states that the control of corruption is negatively correlated with banking efficiency. If Control of Corruption was to be zero then the Constant term would equal to .0987 units. However, for every one unit one increase in the control of corruption, banking regulation will decrease by 0.98326. This regression had an F statistic of 0.054065 meaning the results are within the range of the probability frontier of 10 per cent. The standard deviation came at around 0.041909 meaning that the chance of deviation from the mean was around 4 per cent which is acceptable.

Therefore, we must accept the Alternative hypothesis, which assumes a relationship between the variables, and reject the Null hypothesis, which assumes no relationship between the dependent and independent variables.

6.5 Voice and Accountability

Next, we have the Voice and Accountability variable, which measures how freely the citizens of a country can express themselves as well as how effective they are in selecting their government. Freedom of media is also a criteria, although, it is not just the government that that media needs impartiality from but also pressure groups and powerful elites.

The criteria of evaluation countries include; the independence and integrity of the electoral process , the presence of free and fair elections, equal campaigning opportunities for all parties participating in the election, and the existence of clear legal mechanisms for the systematic transfer of power from one government to another. The stability of democratic institutions plays a huge role in the transference of power.

The confidence of the populace in the honesty of elections, and the lengths to which governments go to, to make sure journalists are protected from profession based intimidations and threats, due to the nature if the occupation. Needlessly long detentions detention periods and subjective arrests of the accused are also taken into account when the Voice and Accountability score of a said country is calculated.

Freedom of religion, speech, and demonstration all seem inconsequential in context to governmental practices, but are all fundamental in securing the basis for human happiness. The freedom to choose where one, resides, works and travels as well as the liberty to determine ones marriage partner are all embedded within the constitutional laws or norms of modern day western society but this does not necessarily mean the rest of the world shares the same values.

We laid out our hypotheses as such:

Ho: Voice and accountability does not affect efficiency β (reg) = 0

Ha: . Voice and accountability does affect efficiency β (reg) $\neq 0$

After we ran the regression using the Eviews program we obtained the following equation.

EFF = α +	C +	NPL +	E/TA +	ROAE +	VOI CE
	0.001892	16.163	0.58128	0.04124	0.005230

This regression result points out that there is a correlation between the dependent and independent variables and that it is positive. Although, saying that the numerical outcome is rather surprising as one would have expected a variable such as Voice and Accountability to have more affect over banking efficiency.

In analytical terms for every one unit of increase in voice and accountability there will be a 0.005 unit increase in banking efficiency.

The standard deviation also attained a low score in this example, coming in at, 0.0341 meaning a three per cent deviation may occur form the sample mean, which may mean the test is healthy or just that the regressed variables are dispersed over a smaller data range.

The F probability statistic also had similar tendencies, giving us the value 0.02962, making the outcome significant, which helps to conclude that the health of the observation is intact.

The T statistic, which is appreciated somewhat more if it commands a higher numerical worth, indicated a value of 1.73531 also helping towards understanding of the overall health of the analysis.

6.6 Political Stability and Absence of Violence

Now for our last regression variable, Political Stability and Absence of Violence, which according to (Alesina, Ozler, Roubini, & Swagel, 1996, p. 3) is "the propensity in the change of an executive either in a "constitutional" or "unconstitutional" means." Meaning that the frequency of the change of a government, whether lawful or unlawful, affects the political stability of a country. The higher the tendency of immature change regarding governmental office, the more political instability that country will have to endure. This can also bring about the argument, that according to the assumption made by Alesina et.al, dictatorships can be assessed as the most stable types of government as the frequency of change is limited to the death of the dictator, a foreign interference, or uprising.

Governments that are uncertain about their future are more likely to engage in policies that end up achieving suboptimal output levels

Another scalar important in assessing the political stability of a country is dominance of the pressure groups over the actions of the government. An interventionist military, economic elites and oligarchies, unfriendly foreign powers, radical or totalitarian domestic political parties, or any other powerful pressure groups that have sway over personal and countrywide political choices, certainly affect the psyche of the incumbent government.

Political stability flourishes in the habitat provided by countries with political systems that democratically electable candidates to run for office, where pressure groups only have bargaining, not removal power against the government,. In addition, the presence of a legal framework of the transference of power between political parties laid down in the country's constitution helps to strengthen the hand of the democratically elected government, and remove any inference of intervention due to the non-functioning of governmental institutes such as parliament.

The basic needs and demands of society in terms of services may come to a halt altogether due to, an imbalance in the budget, or the trade deficit of the country. This leads to cutting down in the public services of the said country and means people will be more inclined to show their discontent by means of violence. Therefore it is a safe assumption, we think, to say that political stability and the absence of violence are negatively correlated. We will however not be regressing to see the relationship between political stability and the absence of violence but rather banking efficiency.

The absence of violence can also be connected with political stability in the context that, violence being a indirect descendant of anarchy and needs non-functioning of governmental institutes and a lawless environment to stay alive, both of which are the fallouts of political instability.

These independent sections of political society can adverse effects on the government's forecast on its spell in office, and result in non pareto optimal outcomes of governance policies.

Our regression hypotheses for the variable Political Stability and Absence of Violence;

Ho: Political stability does not affect efficiency β (reg) = 0

Ha: Political stability does affect efficiency β (reg) $\neq$ 0

The regression gave us the following equation;

$$EFF = \alpha \;+\; C \;+\; NPL \;+\; E/TA \;+\; ROAE \;+\; PSTABIL$$

0.38052	15.5238	-0.822347	-0.70330	0.44002

The analysis of this regression is that there is a correlation between political stability and banking efficiency. The correlation is positive, as to say, that as political stability rises so does banking efficiency, which is by our accounts logical. The other outcomes, such as the probability (F) test, give us the numerical value of 0.0133. This in essence means that the probability of the regression being meaningful is around 99 per cent, which we might add is a very high approval rate for such analyses. The t statistic of PSTABIL attained the value of 2.7017, which in absolute numerical terms also signifies the outcome of the test. The standard error of the test is 0.02603, which indicates that there is a 2.6 per cent variation possibility of the estimate from the sample mean.

7. Conclusion

In our concluding remarks, we understand the importance of acknowledging the World Governance Indicators and their effect towards banking the banking efficiency of PIIGS as a whole, whilst at the same time dissecting the analysis into smaller, deeper sections for observational scrutiny. The tests on a whole brought to light a strong connection between banking efficiency of the troubled Euro zone periphery countries and topics such as rule of law, political stability, regulatory quality, and government effectiveness, control of corruption, and voice and accountability.

Considering the results from an analytical point of view is generally not enough by itself, as anything that come into contact with humans must be assessed psychologically and sociologically. Therefore, considering the impartiality of the data at hand and the crudeness of our methods and calculations, we hope that our analysis bears resemblance to the real world.

All of the regressed variables that are made up from data obtained from world governance indicators had some sort of relationship with the dependent variable, whether negative or positive. Some of the outcomes where rather surprising such as the coefficient for Control of Corruption, which attained a value of -0.98326. This value means that the Control of Corruption variable is almost unit for unit, in negative terms. Meaning a one unit increase in corruption control equals a .983 decrease in banking efficiency. Also the negativity of the coefficient was also a surprise as one would like to think that as corruption decreases banking efficiency would increase, but as the results show this is not the case.

Although not necessarily required when doing statistical analysis, the fact that significant relationships were struck between the dependent and independent variables did make us feel like it was a little more worth the work.

8. Shortcomings and scope for future research

Like almost all empirical studies, the primary challenge we faced was access to suitable data to test our hypotheses. The BvDEP system only gave had data up to 2004, and even then most of subsidiaries classed banks and the smaller commercial banks had some of their data missing. As far as we could tell, the missing data did not cluster in specific countries. The WGI reports however did go back to 1996 and had upper and lower bounds for any of the topic headings for specific year.

So barely have we scratched the surface of such an important issue, that I dare not even whisper that we have even an inkling of the relationships between the behaviour of our regulatory bodies and governing entities, and the way they affect how our financial system reacts.

Stating there is room for further research would be an understatement. Nevertheless, we are confident that with the recent popularity of regulation, that soon be articles of real substance will start to circulate around the economic community.

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10. Appendices

10.1 Appendix A

Data from World Governance Indicators

PORT	REG	GOV	CORR	RLAW	VOICE	PSTABIL
2004	1.244266	1.1364	1.13162	1.250222	1.26678	1.235962
2005	1.20625	1.065386	1.109738	1.230756	1.479845	0.935235
2006	1.267002	1.033099	1.052963	1.185807	1.606425	0.942703
2007	1.079777	0.787421	0.959884	0.998379	1.403156	0.876887
2008	1.100908	0.849099	0.95959	1.009774	1.395004	0.772508
2009	1.112856	1.020095	0.995876	1.022617	1.443735	0.968177
2010	1.050323	1.176665	1.056226	1.043503	1.36032	0.779911
2011	0.818324	1.038269	1.031154	1.041145	1.336587	0.680014

IRELAND	REG	GOV	CORR	RLAW	VOICE	PSTABIL
2004	1.615695	1.552275	1.476642	1.446147	1.26678	1.357924
2005	1.587259	1.605939	1.314063	1.508679	1.479845	1.174634
2006	1.517855	1.755204	1.58938	1.571419	1.606425	1.301566
2007	1.845406	1.662982	1.726399	1.728255	1.403156	1.161801
2008	1.843268	1.65759	1.748098	1.7747	1.395004	1.172953
2009	1.923951	1.564831	1.772389	1.746515	1.443735	1.202316
2010	1.719819	1.31804	1.754036	1.734987	1.36032	1.041655
2011	1.651595	1.313234	1.66739	1.762804	1.336587	0.997483

ITALY	REG	GOV	CORR	RLAW	VOICE	PSTABIL
2004	1.048711	0.841425	0.524443	0.623853	0.914431	0.451876
2005	1.0777	0.743842	0.41093	0.550431	1.147115	0.328262
2006	0.958488	0.626797	0.212542	0.458784	0.98998	0.471129
2007	0.89984	0.487314	0.30248	0.279476	1.055995	0.550474
2008	0.872242	0.301832	0.217021	0.372347	1.09213	0.461452
2009	0.901299	0.379353	0.181713	0.350741	1.021637	0.546684
2010	0.908949	0.491261	-0.013	0.354405	0.995919	0.394081
2011	0.848397	0.515159	-0.04291	0.38213	0.927388	0.47341

GREECE	REG	GOV	CORR	RLAW	VOICE	PSTABIL
2004	1.017116	0.755964	0.419952	0.781533	0.987588	0.57949
2005	0.847917	0.830653	0.487418	0.927361	1.121356	0.464302
2006	0.933417	0.732583	0.375371	0.773749	1.073308	0.50272
2007	0.826097	0.718986	0.363384	0.825407	0.98949	0.591372
2008	0.870938	0.642618	0.261481	0.801913	0.957578	0.493775
2009	0.851555	0.652143	0.099436	0.789464	0.916743	0.258936
2010	0.821795	0.582542	0.053181	0.628386	0.847396	-0.18142
2011	0.653079	0.520816	-0.12084	0.615029	0.898248	-0.11366

SPAIN	REG	GOV	CORR	RLAW	VOICE	PSTABIL
2004	1.315389	1.877874	1.352563	1.251501	1.23535	0.17718
2005	1.319014	1.365536	1.341729	1.152007	1.303384	0.131255
2006	1.288878	1.481671	1.280792	1.095855	1.10294	0.348683
2007	1.160637	0.885786	1.115383	1.069392	1.053976	-0.02487
2008	1.213828	0.953507	1.001353	1.099153	1.097945	-0.1548
2009	1.238069	0.896776	1.114314	1.130919	1.163579	-0.25048
2010	1.207873	0.927213	1.011685	1.153701	1.181084	-0.31564
2011	1.191188	0.98351	1.011311	1.194552	1.140779	-0.1772

10.1 Appendix B

Regression Results from Eviews in the order of

10.1.1 Regulatory Quality

Dependent Variable: EFF
Method: Least Squares
Date: 10/18/12 Time: 01:05
Sample: 2004 2011
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.904849	0.446530	2.026401	0.1358
ETA	-0.056874	0.931046	-0.061086	0.9551
ROAE	0.098116	0.325070	0.301830	0.7825
NPL	9.361198	4.530481	2.066270	0.1307
REG	-0.665726	0.305302	-2.180547	0.1173

R-squared	0.958826	Mean dependent var	0.279000
Adjusted R-squared	0.903927	S.D. dependent var	0.096870
S.E. of regression	0.030025	Akaike info criterion	-3.904379
Sum squared resid	0.002705	Schwarz criterion	-3.854728
Log likelihood	20.61751	Hannan-Quinn criter.	-4.239254
F-statistic	17.46531	Durbin-Watson stat	2.061902
Prob(F-statistic)	0.020371		

10.1.2 Government Effectiveness

Dependent Variable: EFF
Method: Least Squares
Date: 10/18/12 Time: 01:10
Sample: 2004 2011
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.071535	0.297264	0.240645	0.8253
ETA	1.067745	1.287131	0.829554	0.4676
NPL	17.92628	4.294321	4.174414	0.0250
ROAE	-0.164991	0.464731	-0.355024	0.7461
GOV	-0.111922	0.241940	-0.462603	0.6751

R-squared	0.900655	Mean dependent var	0.279000
Adjusted R-squared	0.768194	S.D. dependent var	0.096870
S.E. of regression	0.046639	Akaike info criterion	-3.023586
Sum squared resid	0.006526	Schwarz criterion	-2.973935
Log likelihood	17.09434	Hannan-Quinn criter.	-3.358461
F-statistic	6.799411	Durbin-Watson stat	2.062374
Prob(F-statistic)	0.073616		

10.1.3 Political Stability and Absence of Violence

Dependent Variable: EFF
Method: Least Squares
Date: 10/18/12 Time: 01:12
Sample: 2004 2011
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.380529	0.173896	2.188257	0.1164
NPL	15.52385	2.401479	6.464287	0.0075
ETA	-0.822347	1.001429	-0.821174	0.4717
ROAE	-0.703308	0.321256	-2.189242	0.1163
PSTABIL	0.440022	0.162864	2.701780	0.0737

R-squared	0.968999	Mean dependent var	0.279000
Adjusted R-squared	0.927665	S.D. dependent var	0.096870
S.E. of regression	0.026053	Akaike info criterion	-4.188175
Sum squared resid	0.002036	Schwarz criterion	-4.138524
Log likelihood	21.75270	Hannan-Quinn criter.	-4.523051
F-statistic	23.44290	Durbin-Watson stat	2.862957
Prob(F-statistic)	0.013392		

10.1.4 Control of Corruption

Dependent Variable: EFF
Method: Least Squares
Date: 10/18/12 Time: 01:13
Sample: 2004 2011
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.987805	1.058281	0.933406	0.4195
ETA	-1.294068	2.917243	-0.443593	0.6874
NPL	16.30321	3.856685	4.227260	0.0242
ROAE	-0.392671	0.464435	-0.845480	0.4599
CORR	-0.983269	0.993031	-0.990169	0.3951

R-squared	0.919783	Mean dependent var	0.279000
Adjusted R-squared	0.812828	S.D. dependent var	0.096870
S.E. of regression	0.041909	Akaike info criterion	-3.237460
Sum squared resid	0.005269	Schwarz criterion	-3.187809
Log likelihood	17.94984	Hannan-Quinn criter.	-3.572336
F-statistic	8.599696	Durbin-Watson stat	2.200017
Prob(F-statistic)	0.054065		

10.1.5Voice and Accountability

Dependent Variable: EFF
Method: Least Squares
Date: 10/18/12 Time: 01:15
Sample: 2004 2011
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.009812	0.089361	-0.109804	0.9195
ETA	0.581285	0.865377	0.671713	0.5499
NPL	16.16399	3.092616	5.226639	0.0136
ROAE	0.041246	0.362716	0.113714	0.9166
VOICE	0.005230	0.003014	1.735318	0.1811

R-squared	0.946884	Mean dependent var	0.279000
Adjusted R-squared	0.876063	S.D. dependent var	0.096870
S.E. of regression	0.034103	Akaike info criterion	-3.649715
Sum squared resid	0.003489	Schwarz criterion	-3.600064
Log likelihood	19.59886	Hannan-Quinn criter.	-3.984590
F-statistic	13.37009	Durbin-Watson stat	2.601469
Prob(F-statistic)	0.029629		

10.1.6 Rule of Law

Dependent Variable: EFF
Method: Least Squares
Date: 10/18/12 Time: 01:16
Sample: 2004 2011
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.941471	0.831092	-1.132812	0.3396
ETA	2.255068	1.115867	2.020911	0.1365
NPL	16.66784	3.682786	4.525878	0.0202
ROAE	-0.363163	0.438330	-0.828515	0.4681
RLAW	0.840782	0.782106	1.075023	0.3611

R-squared	0.923166	Mean dependent var	0.279000
Adjusted R-squared	0.820721	S.D. dependent var	0.096870
S.E. of regression	0.041016	Akaike info criterion	-3.280543
Sum squared resid	0.005047	Schwarz criterion	-3.230892
Log likelihood	18.12217	Hannan-Quinn criter.	-3.615419
F-statistic	9.011317	Durbin-Watson stat	2.800341
Prob(F-statistic)	0.050789		