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Haircut of Greek government bonds (psi) and the loss to the banking sector of Cyprus as a result of losing their subsidiaries in Greece.

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ABSTRACT

During the last 30 years the Cypriot economy faced an extreme growth, either characterized as a miracle or a bubble. In the last decade, the economic euphoria arrived after the accession to the EU and to Euro zone, low interest rates and easy access to bank lending have caused rapid growth driven by extreme bank lending, reflection of which was the direct increase in property values and private and public sector debt. Nowadays, Cyprus suffers from an unprecedented financial crisis that resulted in asking financial assistance from IMF and Europe. Successive downgrades of creditworthiness as well as strict public finances had a major negative impact on Cypriot banks' performance. Besides, Cypriot banks owned a significant volume of Greek governmental bonds, a haircut of which worsened the situation. The primary conclusion of my thesis is a multi-variable description of the Cypriot banks' problems. That means that it is undeniable that Greek government bonds PSI (haircut) had a major negative impact on Cypriot banks. Nonetheless, there is strong evidence that the problems faced by most of the Cypriot banks started since the financial crisis turmoil in 2008 (two years before PSI) and they were driven by the overwhelming and irrational – in some cases – growth of the domestic banking system and the total economy. So, I adopt the approach that Greek bonds' PSI extended the problems of Cypriot banks that anyway would come in view.

Keywords:

Cypriot banks, Haircut, PSI, Greek debt, Recapitalization

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CHAPTER 1: INTRODUCTION

1.1 *Opening theme*

After the Greek debt-restructuring deal during 2011-2012, private investors were asked to accept to write off over 50% of the face value of Greek governmental bonds which they were holding. Among the investors, the biggest Cypriot banks had also participated in the voluntary exchange of these bonds in accordance with the Private Sector Involvement (PSI) agreement which was formerly agreed between the Greek government, private sector bondholders and the European Union. Cypriot banks' exposure to Greek governmental bonds seems to be the catalyst for repeated downgrades of the Cypriot government's creditworthiness by the rating agencies. As a result, the consequential inability to refund its state expenses from the international bond markets, led Cyprus to search for public creditors.

Since February 2012, the Cypriot government has been relying on an emergency loan from Russia to cover its budget deficit and re-finance maturing debt. But the size of its budget deficit was not the only reason of the downgrading of the Cypriot economy to junk status. Strong output expansion in the years following European Union accession helped boost income in Cyprus economy, but also masked growing macroeconomic imbalances. These imbalances were uncovered after the United State's subprime mortgage crisis of 2008 (Mitov and Bebee 2013).

During 2009 the Cypriot economy shrank over 1.6% and went into deep recession. That fact led to a huge decline of property market prices (up to 30%) which also led to increasing pressures of the banking system due to a rise on non-performing loans (The World Bank 2012). As the Cypriot government was unable to raise liquidity from the markets to support its financial sector (also state-to-state lending was non-viable due to high interest rates), during June of 2012 Cyprus requested a bailout from European Union and on 30 November 2012 Cyprus had achieved a first agreement on the bailout terms with the public creditors. The Euro group meeting of 16th of March 2013 welcomed the political agreement reached with the Cypriot authorities and a deal of 10 billion euro was agreed as the process of negotiations was continued. As part of that first deal, and in order to make the Cypriot public debt sustainable in the long run, a levy for all deposits on all domestic bank accounts was announced that it will be raised another 6 billion Euros.

Depositors had seen for the first time the possibility their accounts to be reduced, even though the European authorities ensured all the previous years that no

depositors with deposits of 100.000 Euros or less would suffer a loss. After a week of tensions and upheavals in Cyprus, Euro group reached to a decision which included a 10 billion bailout package for Cyprus and a bank rescue plan (Kambas and Tagaris 2013). That decision kept Cyprus in the euro zone and restored the promise to protect bank deposits covered by the EU-mandated 100.000 euro deposit guarantee. The Euro group stated in its decision of 25th of March 2013 that those initiatives as well as a strict implementation of the agreed policy conditionality will allow Cyprus' public debt to remain on a sustainable path and enhance the economy's growth potential (Euro group Statement on Cyprus 2013).

In the first days of April 2013 the Cypriot bailout package was agreed by a Memorandum of Understanding between European Commission, European Central Bank and International Monetary fund, known as Troika, outlining the necessary measures that must be taken for the restructuring the Cypriot economy. The main aim of this thesis is to seek if the Greek debt-restructuring deal was the main cause of the recent Cyprus economic crisis. In this framework of analysis, it will be examined the course of Cypriot banks after the application of Greek PSI. Also it will be examined too how the Cypriot debt crisis will affect the bond market, especially in Europe. For the sake of the researching methodology, we have to include in our analysis the variables of the international debt crisis that faces the developed world, as well as the characteristics of the Cypriot economy.

Closing this section I would like to state two basic reasons for undertaking this research. The first is that the general issue of financial and debt crisis in Euro zone can lead to a permanent cut-off of international bond markets many European member-states. Also, we have noticed that a bond market crisis is emerging. These are the most important factors which maybe will have consequences to all economies across Euro zone. Therefore, the management of Euro zone's financial and debt crisis has to be reexamined very carefully. The second reason is that I would like to investigate deeply the above research question, and especially the factor that led Cypriot banks to current situation.

1.2 Research problem - questions

The Cypriot banks owned a significant volume of Greek governmental bonds. *Is "the Greek debt haircut" the main cause of their recent problems?"*. This is the basic assumption that we have to deal with in this analysis. At this point we have to

examine if the Greek debt-restructuring deal, and especially the Private Sector Involvement (PSI) in this deal, was the main cause (and not just a catalyst) of the recent problem that Cypriot financial sector faces nowadays.

In this type of problem, we had to assume that the recent bank problems are the depended variable, and the haircut the independent one. But, as it seems to be, the situation is more complex, as there is another factor that affects the previous assumption. This factor is the structural problems (imbalances) that the Cypriot economy faced as the global financial crises of 2008 had shown. One of these problems was the decline of property market prices at 2009-2011 which also led to increasing pressures of the banking system due to a rise on non-performing loans. The non-performing loans need to be written-off due to International Financial Reporting Standards (IFRS) rules. Losses on loans are subtracted from bank capital. Liquidity problems change over into solvency problems.

So, the recent banking crisis in Cyprus is a matter that is being affected by the liquidity problems that the banking system had faced before the Greek haircut. For this reason, we should examine the course of Cypriot banks before and after the application of PSI, to current situation. Also we should not forget that the financial crisis of 2008 which mutated to public debt crisis, especially in the area of euro zone, is the main cause that uncovered the recent imbalances in Cyprus. As the governments had to borrow more from the international bond markets in order to refund their state expenses and deficits, their public debt had increased and their creditworthiness decreased. That factor led to seek for public creditors as they found themselves out of the bond markets.

If we could represent a research scheme of variables that could be as below:

Symbols	Variable content
A	Financial crisis of 2008-2009 (financial crisis started in its severity with the collapse of Lehman Brothers on 15 September 2008 mutated to debt crises as governments tried to refund their expenses from international bond markets)
B/b	Domestic economic depression in Cyprus led to decline of property market prices and consequently to liquidity problems on banking sector (non-performing loans)
C/c	Greek governmental bonds which after the application of PSI losses their face value at a half (from March 2012)
D	Recent economic situation of Cypriot banking system (2012-2013)

E	Eurozone's inability to tame the general debt crisis at its area early and properly (from 2009)
F	The course of Cypriot banks after the application of PSI (2012-2013)
G	EU (and other creditors-IMF) rescues Cypriot economy (bailout package) (2013)
H	Greek debt crisis (from 2009)

As a result, we have to examine firstly if **“the Greek debt haircut” is the main cause of the recent problems which Cypriot banking (financial) sector faces nowadays** and secondly if (and how) the liquidity problem led to banking funding gap and ultimately banking insolvency. This will be clarified better if we examine **the course of Cypriot banks before and after the application of PSI, to current situation.**

1.3 Methodology

There are two basic ways for theories to be tested. The first way is experimentation and the second one observation. Observational tests come in two varieties, one of which is large-n study and the other is case study. In our analysis we will use the testing method which relies on observation using a case-study analysis. But as we have to examine the questions stated above, we have to take into account a larger sample analysis in order to avoid losing the opportunity to control the effect of perturbing third variables. As a result, a large-n analysis is an appropriate method because the investigator can run partial correlation to control the effect of specific omitted variables (Evera, 2001).

After defining the above research questions, we have to determine data gathering. At this step we have to collect information for each case separately. We need to collect information about Cypriot banking recent crisis and about the general situation of debt crisis in euro zone and Greece. Also we have to be careful about the unique characteristics of the Cypriot case, as the factor of PSI application seems to be the main trigger of the recent situation, in contrast to Greek debt crisis (or other cases). There seems to be a similarity with Iceland's or Ireland's financial crises but we have to consider that the Cypriot problem is unique due to some exceptional characteristics. As the President of Euro group stated at March 25, Cyprus is a specific case with exceptional challenges which required the bail-in measures we

have agreed upon yesterday. Macro-economic adjustment programs are tailor-made to the situation of the country concerned and no models or templates are used (Statement by the Euro group President on Cyprus).

The data which is being collected is from official authorities and statistical agencies both from European's Union agencies and other public or private organizations. Simultaneously we have to collect all available data from Cypriot government and official agencies as well as from its Central Bank. Also we had to collect selected information from rating agencies and the Cypriot private bank sector. Because of lack of specific bibliography, we have to take into account the press release. The final step is to evaluate and analyze data in order to proceed to the testing of our assumption.

During the research process we should take into account three factors. The first is that the theoretical tools which we are planning to use in this research must be suitable for this type of analysis, especially for a case study. Secondly, the available sources about recent Cypriot financial crisis are not very much, especially in the field of bibliography. So, there are plenty of newspaper articles but we have to be careful about the validity of given information. For that reason we should verify the content if possible from more than one source of information. And thirdly, there are some validity problems during a case study method of work. As a result, we should take into account some similarities of other cases, trying to use a large-n study method of working.

Closing this paragraph I would like to state two basic reasons for undertaking this research. The first is that the general issue of financial and debt crisis in Euro zone can lead to a permanent cut-off of international bond markets many European member-states. Also, we have noticed that a bond market crisis is emerging. These are the most important factors which maybe will have consequences to all economies across Euro zone. Therefore, the management of Euro zone's financial and debt crisis has to be reexamined very carefully. The second reason is that I would like to investigate deeply the above research question, and especially the factor that led Cypriot banks to current situation. For all those reasons I strongly believe that with your valuable mentorship I will be able to accomplish this analysis.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Literature review mainly consists of clarifying and combining the terms of “haircut”, “debt exposure” and “contagion”. Debt restructuring typically incorporates swapping old debt in default for a new debt contract (Popov and Van Horen, 2012). This debt has usually the form of Government bonds. More information about the Greek debt restructuring will be given in Chapter 6. On the other hand, “debt exposure” means that an individual or a public/private corporation holds bonds and/or other debt securities. More particularly, banks use to hold a large amount of government debt securities on their balance sheet, importantly because the Basel Accords assigns a 0% risk weight to government bonds. Banks in general have a strong home bias in their portfolios and bank holdings of domestic government bonds as a percentage of bank capital tend to be larger in countries with high public debt (i.e. Greece). However, banks also hold sizeable amounts of debt issued by foreign sovereigns. This foreign exposure is the main issue of this thesis, as we are trying to examine if the Cypriot banks’ exposure to Greek debt that finally was restructured by a haircut led to a “contagion” of financial distortion to Cypriot banking system.

Bank for International Settlements (BIS) data suggest that banks’ exposure to the public sector in all foreign countries ranges from 75% of Tier 1 capital for Italian and German banks to over 200% for Swiss and Belgian banks (BIS, 2011). Therefore the European sovereign debt crisis provides for an ideal experiment to examine how exposures to foreign sovereign debt impact bank lending, both domestically as well as across borders.

Theoretically, one can distinguish one main channel through which exposure to foreign sovereign debt can have an impact on banking sector. Losses on sovereign debt have a direct negative effect on the asset side of the bank’s balance sheet and on the profitability of a bank. This weakening of the bank’s balance sheet increases its riskiness, with adverse effects on the cost and availability of funding (Popov and Van Horen, 2012).

2.2 Contagion

Popov and Van Horen (2012) identified the international transmission of tensions in sovereign debt markets to the real economy through the channel of bank lending.

They showed that while the syndicated loan market recovered in the aftermath of the 2008-2009 financial crisis, lending by European banks with sizeable balance sheet exposure to Greek, Irish, Italian, Portuguese, and Spanish (GIIPS) sovereign debt was negatively affected after bond markets became impaired in 2010. Their results are consistent with the existence of an international transmission of financial market shocks through the balance sheets of multinational banks.

Schnabl (2011) exploited the 1998 Russian default as a negative liquidity shock to international banks and analyzed its transmission to Peru. He found that after the shock international banks reduced bank-to-bank lending to Peruvian banks and Peruvian banks reduced lending to Peruvian firms. The effect was strongest for domestically owned banks that borrow internationally, intermediate for foreign-owned banks, and weakest for locally funded banks. These results suggest that international banks transmit liquidity shocks across countries and that negative liquidity shocks reduce bank lending in affected countries.

Angeloni and Wolff (2012) found that European banks' stock market performance in the period July to October 2011 was impacted by Greek debt holding and in October to December 2011 by Italian and Irish sovereign exposures.

Earlier, Arezki et al. (2011) showed that news on sovereign ratings affected bank stock prices in Europe during the period 2007 and 2010. They also found that rating downgrades near speculative grade have significant spillover effects across countries. Using a larger sample of countries and longer time period, Correa et al. (2012) found that sovereign rating changes impact bank stock returns, especially in the case of downgrades. Furthermore, studying correlations in changes in Credit Default Swaps (CDSs) spreads of European sovereigns and banks, De Bruyckere et al. (2012) found evidence of significant spillovers during the European sovereign debt crisis.

According to Dornbusch et al. (2000), reasons for contagion can be divided into two groups: on the one hand fundamental based reasons and on the other hand investor behavior-based reasons. While fundamental based contagion works through real and financial linkages across countries, behavior based contagion is more sentiment driven. It seems reasonable to assume that during a financial crisis both types of contagion are present: Firstly, fundamental based because of the strong interrelationship of financial sectors. For instance, during the Greek debt crisis it became apparent that European banks had a significant exposure to Greek government bonds. Hence, a potential restructuring of Greek bonds increased the

probability of bail-out packages in different European countries. Secondly, as discussed in Dornbusch et al. (2000), investor behavior-based contagion usually takes effect through liquidity and incentive problems, as well as information asymmetries and coordination problems.

As Dornbusch et al. (2000) stated:

“In the absence of better information to the contrary, investors may believe that a financial crisis in one country could lead to similar crises in other countries. A crisis in one country may then induce an attack on the currencies of other countries in which conditions are similar. This type of behavior can reflect rational as well as irrational behavior. If a crisis reflects and reveals weak fundamentals, investors may rationally conclude that similarly situated countries are also likely to face such problems; such reasoning helps explain how crises become contagious. This channel presumes, of course, that investors are imperfectly informed about each country’s true characteristics and thus make decisions on the basis of some known indicators, including those revealed in other countries, which may or may not reflect the true state of the subject country’s vulnerabilities. The information investors use may include the actions of other investors, which brings us to the effects of informational asymmetries on investor behavior”.

2.3 Exposure to Greek debt

During 2010, the financial problems of Greece became so severe that the euro countries agreed to provide bilateral loans for a total amount of EUR 80 billion to be disbursed over the period May 2010 through June 2013 (Mink and De Haan, 2012). In addition, the International Monetary Fund (IMF) financed EUR 30 billion under a stand-by arrangement. An important motivation to provide financial support to Greece despite the no bailout clause in the Maastricht Treaty was fear of contagion; see for instance ECB Vice-president Constancio (2011). It was feared that a restructuring of Greek debt could lead to a new banking crisis in the EU as several banks, notably in France and Germany, had a high exposure to Greece. In addition, policymakers were afraid that a Greek default would spill over to other highly indebted countries in the euro area.

Blundell-Wignall and Slovik (2010) summarized the European banks’ stress test and appraised the way it has treated the sovereign debt crisis using new data on bank exposures to sovereign debt. They used these findings to comment on market

concerns about banking sector exposure to sovereign debt during and beyond the period of the stress test. The main observations of their study are:

1. Banks tend to be heavily exposed to the sovereign debt of their own country. The exposure of Greek banks to Greek sovereign debt represents 226% of their Tier 1 capital (see Table 2.1 and 2.2). In Italy, Hungary, Spain, Portugal, and Ireland these numbers are 157%, 133%, 113%, 69% and 26%, respectively.
2. Large cross-border exposures (defined as an exposure above 5% of Tier 1 capital) to Greece are present for Germany, France, Belgium (all with systemically important banks), Cyprus and Portugal (see Table 2.1). It is worth mentioning that Cypriot banks' exposure reached 109% of their Tier 1 capital.
3. Some banking systems are also exposed to non-euro area sovereign debt not subject to the European Financial Stability Facility (EFSF). For example, Austrian, Belgian and German exposures to Hungary are above the notional 5% threshold.

Table 2.1: Country banking exposure to sovereign debt of Greece

Country	Exposures to Greek debt (€ million)	Exposure as % of Tier 1 Capital
Greece	56,148	226%
Germany	18,718	12%
France	11,624	6%
Cyprus	4,837	109%
Belgium	4,656	14%
United Kingdom	4,131	1%
Netherlands	3,160	4%
Italy	1,778	2%
Portugal	1,739	9%
Spain	1,016	1%

(Source: Blundell-Wignall and Slovik, 2010, pp. 8)

Table 2.1 interprets a huge risk exposure of major Greek banks to Greek sovereign debt. The five major Greek banks rated by Fitch (National Bank of Greece S.A., EFG Eurobank Ergasias S.A., Alpha Bank, Piraeus Bank and Agricultural Bank of Greece (ATEbank) (all 'B+' / Rating Watch Negative (RWN)) — have a substantial EUR 45 billions of exposure to Greek sovereign risk in addition to their lending operations to the Greek private sector. This alone ties their risk profiles very tightly to that of the

sovereign, as a Greek restructuring or rollover would have direct implications for the banks' solvency. Only Alpha Bank's exposure is equivalent to less than 100% of equity (see Table 2.2).

According to Fitch (2011a), in the worst case, a disorderly restructuring or rollover of Greek government debt would materially increase the likelihood of Greek bank default due to a further critical tightening of liquidity and reduced confidence. The worst-case scenario would be a shutdown of the liquidity line from the ECB by, for example, no longer accepting Greek banks' government or government-guaranteed bonds as collateral; although liquidity could possibly be supplied indirectly through the Greek central bank, as has been the case in Ireland.

Concerns around the Greek banks also centre on the risk of a further deposit outflow and/or a deficit of collateral available for the discount facility provided by the European Central Bank (ECB). As long as the terms of any restructuring or rollover are acceptable to the ECB, it seems logical that it would continue to accept restructured or rolled over Greek government bonds or government-guaranteed bonds as collateral for discounting, provided the banks pledging the collateral are solvent.

As mentioned above, Cypriot banks' exposure to Greek debt was notable before its restructuring. Bank of Cyprus Public Company Ltd (BOC; BBB+/RWN) and Marfin Popular Bank Public Company Limited (Marfin; BBB-/Stable) have large exposures to Greek risks, mainly in the form of loans and their sovereign debt exposures are also relatively high (see Table 2.2). Marfin (46% of its loan book) is more exposed to overall Greek sovereign and economic risk than BOC (35%), which largely explains the two-notch difference between the banks' ratings. Marfin's funding profile is also weaker than BOC's, with greater reliance on ECB funding¹.

Table 2.2: Selected larger exposures to Greek sovereign debt (2011 1st quarter)

Country	Bank	Exposures to Greek debt (€ billion)	Exposure as % of Tier 1 Capital
Greece	National Bank of Greece	18.6	214%

¹ On 1st June 2011, Fitch Ratings has placed Bank of Cyprus' (BoC) ratings on Rating Watch Negative (RWN) and downgraded Marfin Popular Bank's (MPB) Long-term Issuer Default Rating (IDR) to 'BBB-' from 'BBB' and placed its Individual Rating on RWN. The rating actions on BoC and MPB reflect the increased risks from the banks' sizeable exposure to Greece (Fitch, 2011b).

Country	Bank	Exposures to Greek debt (€ billion)	Exposure as % of Tier 1 Capital
Greece	EFG Eurobank Egasias	8.8	152%
Greece	Alpha Bank	4.6	80%
Greece	Piraeus Bank	8.7	217%
Greece	ATE Bank	4.2	525%
Cyprus	Bank of Cyprus	1.8	62%
Cyprus	Marfin Popular Bank	3.0	91%

(Source: Fitch, 2011b, pp. 2)

Data from the Bank for International Settlements (BIS) estimates foreign bank exposure to Greek sovereign debt to be approximately EUR50bn. Fitch assesses around EUR37bn of this to be held by 35 major European commercial banks, including approaching EUR5bn by BOC and Marfin.

France & Germany: Fitch estimates the Greek sovereign debt exposures of the major French and German commercial banks to be approximately EUR11bn and EUR8bn, respectively. Fitch's data for Germany excludes substantial exposures that are with KfW ('AAA', which has a EUR22bn loan commitment on behalf of Germany to Greece), or were transferred by the former Hypo Real Estate Bank (now Deutsche Pfandbriefbank AG) and Depfa Bank plc to the German run-off institution FMS Wertmanagement Anstalt des oeffentlichen Rechts ('AAA'; around EUR10.8bn of aggregated economic exposure, mostly government bonds). Such exposures are effectively at the risk of the German sovereign.

While a sovereign default and haircut would directly dent bank earnings for a short period, French and German bank exposures to Greek sovereign risk are for the most part small relative to the overall solvency of banks in question (typically less than 10% of equity, often significantly so). Higher exposures were held by France's La Banque Postale and Deutsche Postbank at the latest reporting date. However, relative exposure has reduced since due both to lower exposures and to equity increases at both banks.

Credit Agricole (CA; 'AA-') is the most exposed French bank to overall Greek risk, mainly due to its ownership of heavily loss-making Emporiki Bank of Greece (EUR21bn of loans; 26% non-performing loan ratio). CA has already injected EUR2bn of fresh capital into Emporiki since 2008, and was providing EUR15bn of

funding at end-Q111 (EUR11bn net of deposits placed back with CA group entities), largely reflecting a decision not to participate in a deposit war.

Under a severe (hypothetical) stress test, in which the principal source of losses is a 33% default rate applied to Emporiki's loan book, Fitch estimates that Emporiki could need around EUR2bn more capital in order to maintain current capitalization levels. This could be very comfortably absorbed by CA in the context of its EUR75bn equity base and strong liquidity.

Other countries: Dexia (Belgium), with EUR3.4bn of exposure at end-2010 in its banking book, also has a relatively high exposure in relation to its tier 1 capital base. Because regulatory capital does not take account of negative revaluation reserves, Dexia's tier 1 ratio is high, meaning an isolated Greek restructuring would not have a material impact on regulatory capital. However, Greek sovereign exposure represented a significant percentage of Dexia's Fitch core capital (FCC, which includes negative revaluation reserves) of EUR3.8bn at end-2010, which partly explains Dexia's low Individual Rating of 'D'.

Most other European banking systems have far less direct exposure to Greek sovereign risk, so even very severe haircuts on Greek sovereign debt would in isolation have a negligible impact on solvency.

In Austria, the major commercial banks have modest holdings of Greek sovereign debt. However, it is worth noting that KA Finanz AG has around EUR1bn of exposure to Greek sovereign and public sector debt. KA Finanz is the run-off vehicle for the former Kommunalkredit Austria's non-core assets, 99.78% owned by the Republic of Austria, so this is effectively at the risk of the Austrian sovereign. Meanwhile, the new Kommunalkredit Austria, which Fitch does not include as a "major commercial bank" in the heat map above, has high exposure to Greece relative to its capital size, but, like Dexia, has a low 'D' Individual Rating.

Cross border risk: European bank exposure to Greek banks is very limited (except for intragroup exposure such as CA and Emporiki). Cross-border lending to Greek corporates is often collateralized and/or not very correlated to Greek economic risk (e.g., shipping), and thus is not a major source of concern.

2.4 Timeline of The Recent Situation In Cypriot Economy

2.4.1 Problems faced the financial sector

The crisis in Greece affects the banking system in Cyprus. Cypriot banks hold Greek bonds and a chunk of their portfolio (as a group) are loans to Greece (households and corporations). The deterioration of the situation in Greece may have serious consequences for the Cypriot banking system and more generally for Cyprus. Each course will depend until he can reach the crisis. Further intensification of the crisis in Greece would have very negative consequences for Cyprus, and the authorities should always be prepared for any eventuality.

The profitability of banks certainly be affected anyway and, combined with the downgrades by rating agencies, will raise the cost of financing banks. In turn, banks will pass part of the cost to consumers, both in interest rates and other charges.

According to supervisory purposes this situation will likely lead to the need for a more stringent regulatory framework and requirements for capital increases, thus becoming even stricter lending to households and corporations. This may be an appropriate and necessary policy in terms of the supervisory authority, even if it could have a short-term impact on growth (University of Cyprus, 2012).

In the most extreme scenario that the state must intervene to strengthen the banks (capitalization process), of course, will probably also have financial implications. In this case additional resources are needed, further cutting public spending, or leading to further increases in taxes. Generally, these pressures and risks are severe, adversely affect the business climate and may affect the development in 2013 (University of Cyprus, 2012).

2.4.2 EU's Council decision according to Article 126 of the Treaty of the Functioning of the European Union - Excessive deficit procedure that led to bailout package

The sovereign debt crisis in the euro area, but also the growing concerns about the situation of the Cyprus banking sector worsened the short-term outlook of the Cypriot economy as well as the difficulties raising capital from the markets. These factors came to be added to imbalances accumulated over years. During the economic euphoria that followed the accession to the EU and then the accession to Euro zone, low interest rates and easy access to bank financing have caused rapid growth

driven by bank lending, reflection of which was the rapid increase in property prices and private sector debt. During the same period there was a significant loss of competitiveness in terms of prices and costs, as high wage increases exceeded the rate of productivity growth and led to a rapidly growing trade deficit, persistent deficits in the current account balance and worsening of the net investment position of the country (European Commission, 2012).

In this context, on June 25 2012, Cyprus submitted a request for financial assistance from the support mechanism of Euro zone and the International Monetary Fund (IMF). After protracted negotiations between the Cypriot authorities and the so called Troika (European Commission, European Central Bank, International Monetary Fund) and the final agreement of the Eurogroup on 25 March 2012, the financial assistance program of 10 billion Euros was adopted on 24 April by the European Stability Mechanism and the expected release of the first installment in May 2013. Under the economic adjustment program, the Cypriot authorities have pledged to intensify fiscal and structural measures to restore the stability of the Cypriot banking system, fiscal consolidation and strengthening competitiveness. The Memorandum of Understanding approved by EU Finance Ministers in April aims primary general government deficit of no more than 2.4% of GDP in 2013 and 4.25 % of GDP in 2014, aiming primary surplus of 4% in 2018 (Bank of Greece, 2013).

Policy measures for 2013 are included reductions of salaries and pensions in the public sector, increasing tax rates on corporate profits and income from interest, increase the retirement age by two years for various categories of workers, reduction in health costs and social benefits, raising income 1 billion from privatizations by 2015 and an additional 400 million until 2018 at the latest, as well as structural reforms in public administration and labor, goods and services.

2.4.3 Cypriot bailout package

The final conditions for activation of the bailout package were outlined by the Troika's Memorandum of Understanding (MoU) agreement, which was endorsed in full by the Cypriot House of Representatives on 30 April 2013, and includes (Eurogroup, 2013):

- Recapitalization of the entire financial sector while accepting a closure of the Laiki bank,

- Implementation of the anti-money laundering framework in Cypriot financial institutions,
- Fiscal consolidation to help bring down the Cypriot governmental budget deficit,
- Structural reforms to restore competitiveness and macroeconomic imbalances,
- Privatization program.

Moreover, the economic adjustment program in which Cyprus has to be involved will address short- and medium-term financial, fiscal and structural challenges facing Cyprus. The key program objectives are (European Commission, 2013b):

- to restore the soundness of the Cypriot banking sector and rebuild depositors' and market confidence by thoroughly restructuring and downsizing financial institutions, strengthening supervision and addressing expected capital shortfalls, in line with the political agreement of the Eurogroup of 25 March 2013
- to continue the on-going process of fiscal consolidation in order to correct the excessive general government deficit as soon as possible, in particular through measures to reduce current primary expenditure, and maintain fiscal consolidation in the medium-term, in particular through measures to increase the efficiency of public spending within a medium-term budgetary framework, enhance revenue collection and improve the functioning of the public sector; and
- to implement structural reforms to support competitiveness and sustainable and balanced growth, allowing for the unwinding of macroeconomic imbalances, in particular by reforming the wage indexation system and removing obstacles to the smooth functioning of services markets.

2.4.4 Summary of timeline

The timeline of the current situation of the Cypriot Economy can be summarized as follows (European Commission, 2013b):

31 May 2011: Cyprus suffers a sovereign triple-notch downgrade by Fitch and a one notch downgrade by S&P's on the grounds of the large exposure of Cypriot banks to Greece, given increasing rumours about an upcoming voluntary private sector involvement (PSI), and the large fiscal deficits.

11 July 2011: a lethal explosion destroys the Vasiliko electricity producing plant, which accounts for half of the total generating capacity of Cyprus. The destruction takes a toll on economic activity and lowers confidence levels in all sectors.

21 July 2011: euro-area Member States announce the commitment of voluntary PSI as a contribution to covering the Greek financing gap.

16 December 2011: the Budget Law 2012 is adopted incorporating a significant number of consolidation measures with the aim of reducing the government deficit from 6.3% of GDP in 2011 to 2.5% of GDP in 2012.

23 December 2011: a bilateral loan of EUR 2.5 billion is agreed with Russia, the aim of which is to cover 2012 sovereign financing needs. The first tranche of the loan is disbursed on 31 December 2011.

21 February 2012: 53.5% (in nominal terms) voluntary private sector involvement (PSI) in the Greek sovereign debt is announced by the euro-area Member States, significantly affecting the capital adequacy of the largest Cypriot banks.

21 May 2012: legislation is adopted and enacted allowing for state aid to Cyprus Popular Bank (Laiki), through a EUR 1.8 bn rights issue. This is considered necessary because Laiki's strategy was not successful in meeting its financing needs indicated by the EBA requirements and within the EBA deadline.

30 May 2012: published EC proposals for the Council Recommendations to Cyprus and the conclusions of the In-Depth Review of the macroeconomic imbalances in Cyprus identify very serious imbalances that need to be addressed urgently.

25 June 2012: Fitch downgrades the Cyprus sovereign to non-investment grade. As a result of this, all of the three major credit rating agencies have ranked the Cyprus sovereign as non-investment grade.

25 June 2012: Cyprus formally presents euro-area Member States with a request for external financial assistance from the EFSF/ESM to contain the risks arising in the banking sector in the presence of economic imbalances.

23 November 2012: Cyprus and EC/ECB/IMF reach an agreement on the policy side of a draft Memorandum of Understanding (MoU).

Early-December 2012: the Cypriot House of Representatives passes almost unanimously a number of bills that cover the vast majority of fiscal measures for 2012-14 as outlined in the draft MoU, as well as important first steps in relation to fiscal-structural reforms (e.g. pension system, health sector, budgetary framework, welfare benefits, COLA, etc.).

Mid-December 2012: EC/ECB/IMF are presented with the preliminary results of the financial sector due diligence exercise -carried out by PIMCO and Deloitte- broadly confirming the EC/ECB/IMF assessment of the banking sector recapitalization needs of approx. EUR 10 bn.

21 January 2013: the Eurogroup welcomes progress made with the adoption of the policy measures by the Cypriot House of Representatives in December 2012, which was marked by the support of almost all political parties, indicating a broad political consensus behind the key fiscal objectives of a macro-financial program for Cyprus, as outlined in the draft MoU.

2 February 2013: the results of the due diligence exercise are submitted to the Central Bank of Cyprus and circulated to the members of the Steering Committee (EC, ECB, IMF, ESM, EBA, CBC and CY MoF).

4 March 2013: the Eurogroup welcomes the commitment of newly-elected President Anastasiades to closely cooperate with Cyprus's European partners towards the earliest possible completion of the loan agreement.

16 March 2013: a political agreement is reached between the Eurogroup and the Cypriot authorities. The Cypriot authorities commit to introducing an upfront one-off stability levy applicable to resident and non-resident depositors, both insured and uninsured. Additional measures include the increase of the withholding tax on capital income, a restructuring and recapitalization of banks, an increase of the statutory corporate income tax rate, a bail-in of junior bondholders, and a privatization plan.

18 March 2013: the Central Bank of Cyprus declares bank holidays, extended until 28 March 2013, due to bank-run fears following the decision of the Cypriot House of Representatives not to adopt the government's proposal for the one-off stability levy agreed at the Eurogroup of 16 March 2013.

25 March 2013: the Eurogroup and Cypriot authorities reach an agreement, supported by all euro-area Member States and the three institutions (EC/ECB/IMF), on the key elements necessary for a future Economic Adjustment Programme.

30 April 2013: the Cypriot House of Representatives endorse the Programme.

8 May 2013: the Board of Directors of the ESM approve the disbursement of the first tranche in two installments, the first one of EUR 2 billion on 13 May and the second one of EUR 1 billion at the end of June.

15 May 2013: The Executive Board of the International Monetary Fund (IMF) approved a three-year SDR 891 million (about EUR 1 billion) arrangement under the Extended Fund Facility (EFF) for Cyprus in support of the authorities' economic adjustment program.

16 May 2013: the Council adopted a revised Recommendation to Cyprus under the Article 126(7) with an extension of the deadline for correction of excessive deficit by four years until 2016.

2.4.5 Future perspectives

The Cypriot economy is facing serious challenges due to the adjustment to the new situation after the recent recession. The deterioration of the external environment in combination with the recently announced measures and the dramatic situation in Greece, add new data that make up an even more negative environment in 2013 and 2014. Based on the analysis published in the latest issue of the University of Cyprus (2012), the growth rate of private consumption to GDP will decline in the coming quarters. These estimates are based on current expectations of consumers and corporations and therefore contain timely information on the status of the economy. Moreover, the qualitative analysis of the economy highlights the challenges that are likely to affect the economy in the coming months. A key role will have the government's economic policy called not only to manage the financial crisis the country faces, but also to adopt measures to support, or at least not impede economic recovery.

2.5 The Greek Debt-Restructuring Deal and the Private Sector Involvement Domino Effect

2.5.1 Introduction

At two consecutive Euro Summits held on 11 and 25 March 2011, and subsequently, following an ad hoc decision taken at the Euro Summit of 21 July 2011, a new financial Support Programme was adopted for Greece to cover the country's financing needs until mid-2014, including the participation of the private sector.

Under the initial design of the Private Sector Involvement (PSI), private sector holders of Greek Government Bonds (GGBs) were invited to voluntarily exchange their holdings of existing GGBs for new bonds with longer maturities and lower coupons (De Grauwe, 2011). This would incur a loss of about 21% on average, in Net Present Value (NPV) terms, for private bond-holders. In view of its implementation, Greek banks recorded related provisions in their June 2011 financial statements (Bank of Greece, 2012).

The Euro Summit statement of 26 October 2011, however, acknowledged that a deeper PSI would play a vital role in establishing the sustainability of Greek sovereign debt. Thus a modified PSI was adopted – envisaging a significant reduction in face amount terms of Greek sovereign debt – together with an ambitious program of structural reforms for the Greek economy, aimed at bringing down the Greek debt-to-GDP ratio to 120% by 2020. In particular, this GGBs exchange program, which was completed on 25 April 2012, involved a discount of 53.5% on the face amount of Greek debt held by private investors. Specifically, the participation rate in the swap reached 96.9% of the total out-standing amount of eligible bonds. This rate is equivalent to €199 billion worth of bonds out of the total €205.5 billion in eligible paper, which was exchanged for:

- (i) New Bonds issued by the Hellenic Republic having an aggregate face amount of €62.4 billion (31.5% of the principal amount of the bonds tendered for exchange);
- (ii) PSI Payment Notes issued by the European Financial Stability Facility (EFSF) in two series maturing on 12 March 2013 and 12 March 2014, respectively, having an aggregate face amount of €29.7 billion (15% of the principal amount of the bonds exchanged), and
- (iii) Detachable GDP-linked securities of the Hellenic Republic having a notional amount equal to the principal amount of the New Bonds issued.

In addition, private investors received short term EFSF bills, having an aggregate face amount of €4.9 billion, for the accrued interest of the exchanged GGBs at the settlement date of the exchange.

The scope of the PSI program also included certain loans to the broader public sector, which were also exchanged for new Hellenic Republic bonds and EFSF Payment Notes under the same terms as for GGBs. These were mostly loans to large state-owned enterprises, such as the Athens Urban Transport Organization (OASA), TRAM S.A., the Hellenic Railways Organization (OSE) and Hellenic Defense Systems (EAS), totaling €4.9 billion.

2.5.2 PSI impact on banks

In the context of the PSI, Greek banks exchanged GGBs and state-related loans of a total face amount of €48.6 billion, for New Bonds issued by the Hellenic Republic and PSI Payment Notes issued by the EFSF.

Banks' NPV loss from the debt exchange was estimated on average at 78% of the face amount of the old GGBs. For the Greek banking sector, these losses amounted to €37.7 billion (see Table 6.1), out of which €5.8 billion had already been recorded on the June 2011 financial statements. This loss constituted a major factor for determining the capital needs of banks.

Table 6.1: Impairment losses on Greek government bonds (GGBs) and state-related loans under the PSI (million euro)

Banks	Face amount of GGBs (1)	Face amount of state-related loans (2)	Total face amount (3) = (1)+(2)	PSI loss of GGBs (4)	PSI loss of state-related loans (5)	Total gross PSI loss (6) = (4)+(5)	Total gross PSI loss / Core Tier 1 (Dec 2011) (%)	Total gross PSI loss / Total assets (Dec 2011) (%)
NBG	13,748	1,001	14,749	10,985	751	11,735	161.0	11.0
Eurobank	7,001	335	7,336	5,517	264	5,781	164.5	7.5
Alpha	3,898	2,145	6,043	3,087	1,699	4,786	105.7	8.1
Piraeus	7,063	280	7,343	5,686	225	5,911	226.0	12.0
Emporiki	351	415	766	270	320	590	40.3	2.7
ATEbank	5,164	608	5,772	3,873	456	4,329	1,144.2	17.1
Postbank	4,197	175	4,372	3,306	138	3,444	618.3	24.8
Millennium	185	0	185	137	0	137	29.0	2.2
Geniki	384	7	391	287	5	292	78.1	8.9
Attica	199	0	199	142	0	142	38.8	3.4
Probank	415	0	415	295	0	295	105.1	8.7
New Proton	934	0	934	216	0	216	378.8	12.6
FBB	70	0	70	49	0	49	33.8	3.1
Panellinia	34	0	34	26	0	26	31.7	3.5
Total	43,643	4,966	48,609	33,876	3,857	37,733	170.6	10.1

(Source: Bank of Greece, 2012, pp. 14)

2.6 The Course of Cypriot Banks before and after the Application of Psi

2.6.1 Cypriot banks' balance sheets

After the accession of Cyprus to the European Union in 2004 and especially since the adoption of the euro in 2008, there was a large increase in assets of Cypriot banks, which reached 136 billion in July 2012 (716% of GDP) by 63 billion in January 2006 (see table 7.1). Specifically, during this period, loans to corporations grew by 66%, while mortgage loans increased by 80%. Finally, the value of government bonds in the portfolios of banks increased by 81% during this period, and has its maximum value during the first quarter of 2011 (€ 16 billion, an increase of 350% since January 2008).

Table 7.1: Cypriot banking sector measures before and after PSI

(million euro)	2006	2012
Total assets / liabilities	62,483	128,127
Total assets / liabilities as percentage of GDP	364%	716%
Assets		
Loans to Eurozone residents	37,796	81,811
Loans to non-Eurozone residents	14,750	32,190
Other	9,937	14,126
Liabilities		
Eurozone residents' deposits	34,301	73,587
Non-Eurozone residents' deposits	17,687	35,134
Capital and reserves	5,979	15,129
Other	4,516	4,277

(Source: Bank of Greece, 2013, pp. 32)

Related to the composition of the assets of Cypriot banks, the share of government bonds ranged between 5%-15% for the period 2006-2012, while the eve of the Greek PSI, in March 2012, stood at 10% of total assets of the Cypriot banking sector. In December 2012 (after the Greek PSI) the value of the portfolio excluding loans of Cypriot banks as a percentage of total assets had fallen to 6.8%, reflecting the decline in the value of government bonds by 4.5 billion Euro and shareholder value by € 1.8 billion due to the continued decline in stock prices in Greece and Cyprus during this period. The amount of total liabilities of Cypriot banks also increased significantly, as after the adoption of the euro in Cyprus banking system became particularly attractive to residents outside the euro area, resulting in the amount of their deposits grow faster than deposits of permanent residents.

2.6.2 The authorities' perspective

According to the Association of Cyprus Banks (ACB) (2012) the private sector involvement (PSI) and subsequent write-down in the value of Greek sovereign bonds (GSBs) had a major impact in the financial results of its member banks. ACB's members have accepted the proposal of the Greek government and their participation in the voluntary exchange of GSBs and have therefore included in their results losses stemming from a write-down of over 70% of the nominal value of GSBs. This caused the profitability and the return on equity index to drop to -29.7% (2010: 12.6%) and reduced the capital adequacy ratios of some members below the regulatory thresholds.

According to the European Commission (2013a), Cypriot banks have been badly hit by the Greek crisis. The Cypriot banks suffered about 4 billion in losses from the Greek PSI, i.e. more than 22 per cent of GDP. The steep contraction of the Greek economy has caused a significant deterioration in the quality of the Greek loan book. In Cyprus the property market has gone from boom to bust, which has impacted negatively on the domestic loan book. Based on stress-tests, including by PIMCO, the capital shortfall of the Cypriot banks is estimated at around 10 billion, after bailing in junior debt holders, or almost 60 per cent of GDP. The liquidity situation in the banks is also tight. The only available liquidity backstop for Cypriot banks is ELA from the Central Bank of Cyprus (CBC). Due to the capital shortage and the erosion of collateral value large Cypriot banks have lost access to the regular financing operations of the ECB.

Moreover, the credit ratings of Cypriot banks have been downgraded further due to pressures from developments in Greece and the Cypriot sovereign downgrades, thus making it more difficult for them to raise capital through the markets. The latest downgrade of the three domestic banks came from Moody's on 14 March 2012 following a sovereign downgrade a day earlier. Bank of Cyprus was downgraded by two notches to B1 from Ba212 and Cyprus Popular (Laiki) Bank to B3 from B2. Both banks are non-investment grade according to Moody's. The main reason given for the rating cuts was the losses on banks' holdings of Greek government bonds after the Greek debt exchange (European Commission, 2012).

As a result of large losses on Greek government bond holdings, Cypriot banks' solvency ratios fell below the required supervisory levels and this needs to be addressed in order to reach the EBA targeted minimum of Core Tier 1 of 9% by June 2012, with one main bank needing government intervention to meet its

recapitalization needs. A further deterioration in asset quality and increasing provisioning undermined the profitability of banks in 2011 and this is expected to remain under pressure due to the weak economic environment in Cyprus and Greece. Anticipating that the Cyprus Popular Bank may fail to achieve its own plan to raise the fresh capital required by mid-June 2012, the government decided to recapitalize the bank and underwrote a rights issue of EUR 1.8 billion on 17 May 2012. In that case, the bank will have to undergo appropriate restructuring and downsizing in line with EU competition law (European Commission, 2012).

Solvency coefficients for the local Cypriot banks fell below regulatory levels due to the haircuts on Greek government bonds and increasing non-performing loans. Following substantial impairments in the nominal values of the Greek government bonds, the capitalization levels of Cypriot banks were significantly reduced. Given the 9% Core Tier 1 EBA requirement, this implies a substantial capital shortfall for the domestically supervised institutions. To this end, domestic banks began to raise capital (European Commission, 2012).

Foreign subsidiaries have transferred all Greek government bonds to their parent banks, eliminating a significant part of the risk. Following the final agreement on private sector involvement (PSI) in the impairments on Greek sovereign bonds, Greek subsidiaries in Cyprus moved all their Greek holdings, amounting to EUR 2.4 billion, to the books of the parent banks in March 2012. The capital buffers foreseen in the second Greek assistance program to cope with the implications of PSI already included coverage for the bonds held by the subsidiaries in Cyprus. The only exposure left is EUR 1 billion in the form of Greek bank bonds, which are in principle fully covered by cash collateral from the parent bank. Hence, the risk for the Cypriot Treasury to recapitalize Greek subsidiaries disappeared. Currently, solvency ratios of the Greek subsidiaries stand above those of domestic banks with Core Tier 1 exceeding 10% (European Commission, 2012).

Bank of Cyprus and Cyprus Popular (Laiki) Bank faced significant losses due to impairments on their Greek sovereign holdings, and both require an increase in capital to bring it back up to regulatory minimum. The two banks voluntarily participated in the latest deal on impairments on Greek sovereign bond holdings, PSI, while both of them applied a haircut of over 74%. These haircuts have tightened banks' capital bases to well below the regulatory minimums (European Commission, 2012).

Both banks have also issued covered bonds in order to adjust liquidity needs. On 22 July 2011, Laiki Bank completed an issuance of EUR 300 million and, on 20 July, Bank of Cyprus issued EUR 700 million in covered bonds with a maturity of two years, an extension period of one year and an annual interest rate of the three-month euribor plus 2%. The covered bonds have been rated Baa1 by Moody's. They are covered by residential loans and have been admitted for listing and trading on the Irish Stock Exchange. The issue of covered bonds was completed under a EUR 5 billion Covered Bond Programme, in accordance with the Covered Bond Law of 2010, which came into force on 23 December 2010 and the Central Bank of Cyprus directive, which was issued under the provisions of the above Law (European Commission, 2012).

Asset quality in terms of non-performing loans is rapidly deteriorating. Non-performing loans (NPLs) have been increasing since 2008 and a significant deterioration took place in the second half of 2011, with the result that NPLs reached 10.2% of total loans for Bank of Cyprus and 13.9% for Cyprus Popular (Laiki) Bank by the end of 2011. The rapid worsening of asset quality comes mainly from the Greek private sector loan portfolios. Due mainly to the adverse economic environment in Greece, the repayment capacity is likely to deteriorate further and NPLs are likely to rise, leaving the banks' capital more vulnerable to losses.

Profitability turned negative in 2011, and liquidity deteriorated due to deposit outflows. Since the outbreak of the financial crisis, banking profitability deteriorated due to the unfavourable domestic and foreign macroeconomic environment. The locally active banks had reached the peak of their profitability in 2007. Since then, profit has been gradually declining and turned negative at the end of December 2011. Due to a substantial increase in provisioning and non-performing loans, banks' returns on assets turned negative. The loan-to-deposit ratio for the consolidated banking sector increased somewhat to 112.7%, mainly due to deposit outflows from the Greek bank branches (European Commission, 2012).

Although banks are supported by a strong deposit base, partly of foreign origin, funding and liquidity remain among the main risks for financial stability. Funding remains rather tight and the dependence on foreign deposits poses a risk as the latter represent one third of total banks' deposits. In 2011, the overall deposits of the consolidated banking system decreased by 11% year-on-year, mainly due to major deposit outflows to the Greek bank branches and foreign-owned corporate enterprises. These amounted to 10% for Bank of Cyprus and 21% for Cyprus

Popular (Laiki) Bank by the end of 2011. As a risk management measure, the deposit insurance scheme was strengthened in July 2009. Thus, the maximum amount of compensation per depositor per bank was increased from EUR 20,000 to EUR 100,000, including all currencies. Co-insurance was abolished and claims of up to EUR 100,000 became fully reimbursed (European Commission, 2012).

CHAPTER 3: METHODOLOGY - DATA

In order to examine the relationship between Greek debt haircut and the course of Cypriot banks we ran a regression analysis.

The initial applied model is represented by the following linear function:

$$P_i = c_0 + c_1 SDE_i + u_i$$

Where, P_i is the profitability of bank i in 2012 or 2011 respectively, SDE_i is the net exposure of bank i to Greek sovereign debt as percentage of its equity in 2011, c_0 is the regression's constant term, c_1 is the coefficient of the sovereign debt percentage and u_i represents the regression residuals. With regard to this model, the regression results are expected to reveal a negative and statistically significant relationship between P and SDE , when the hypothesis of this thesis is valid.

The sample consisted of 49 commercial banks, operating in European Union, that are represented in table 8.1.

Table 8.1: Banks participated in regression analysis

Bank name	Country	Bank name	Country
Agricultural Bank	Greece	Raiffeisen	Austria
Hellenic Postbank	Greece	Rabobank	Holland
Piraeus	Greece	Landesbank Hessen	Germany
NBG	Greece	Royal Bank of Scotland	United Kingdom
EFG Eurobank	Greece	Casa	France
Alpha Bank	Greece	Bayer Landesbank	Germany
Marfin Popular	Cyprus/Greece	Unicredit	Italy
Bank of Cyprus	Cyprus	West LB	Germany
Dexia	Belgium	Dekabank	Germany
BPI	Portugal	Deutsche	Germany
DZ Bank	Germany	SEB	Sweden
Commerz	Germany	Caixa Geral de Depositos	Portugal
Postbank	Germany	BBVA	Spain
BPCE	France	HSBC	United Kingdom
BCP	Portugal	Banco Popolare	Italy
BNP Paribas	France	Jyske Bank	Denmark
Landesbank Baden	Germany	Barclays	United Kingdom
Soc Gen	France	Allied Irish Banks	Ireland

ING	Holland	Santander	Spain
HSH Nordbank	Germany	Intesa	Italy
Erste	Austria	OP-Pohjola	Finland
Norddeutsche Landesbank	Germany	Monte dei Paschi	Italy
KBC	Belgium	UBI Banca	Italy
NLB	Slovenia	SNS Bank	Holland
Agricultural Bank	Greece	Bank Of Valletta	Malta

It is obvious that a sample of Cypriot banks exclusively, could not be large enough to run a reliable regression analysis. So, the followed approach assumes that the Cypriot banks were affected significantly by PSI, if the sample of European banks were affected significantly too.

Moreover, we ran four (4) separate regressions, as P_i is represented similarly by *Return on Average Assets (ROAA)* ratio and *Return on Average Equity (ROAE)* ratio, while these profitability ratios are extended to 2012 and 2011. ROAA is usually calculated as “Net income / Average assets” and ROAE as “Net income / Average equity” for a given period. Both average assets and equity were calculated as the arithmetic average between the reported values of the beginning and the ending of the same fiscal year. The relevant data were collected by Bankscope database.

On the other hand, the Guardian (2011) published a relevant article in which it represented the monetary exposure of various European countries and banks to Greek debt. This was the basis to form the SDE variable. After that, we used Bankscope database again in order to collect information about equity of each bank. This data refers to banks’ annual reports of 2011.

Moreover, we conducted a cross-sectional and time-series analysis (panel data); hence we ran two (2) regressions, each of which included profitability of bank i in year t (P_{it}) instead of P_i (either $ROAA_{it}$ or $ROAE_{it}$). Finally, we constructed a dummy variable which categorizes the banks in two groups (1 and 2). The first group includes banks operating in PIGS (Portugal, Ireland, Greece and Spain) and other banks operating generally in Southern Europe (e.g. Malta, Italy, Cyprus). All the other banks of Middle and Northern Europe were included in the second subgroup. Through this categorization we aimed to provide several descriptive statistics.

Finally, the regression analysis was conducted through SPSS software and its results are represented in the next subchapter.

CHAPTER 4: RESULTS

The separate regressions between ROAA₂₀₁₂ – SDE and ROAA₂₀₁₁ – SDE are represented in tables 8.2 and 8.3 respectively.

Table 8.2: ROAA₂₀₁₂ – SDE regression results

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,118 ^a	,014	-,007	,0468749

a. Predictors: (Constant), Exp_Eq_Ratio

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,007	,007		-,968	,338
	Exp_Eq_Ratio	-,002	,003	-,118	-,816	,419

a. Dependent Variable: ROAA_2012

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,001	1	,001	,666	,419 ^b
	Residual	,103	47	,002		
	Total	,105	48			

a. Dependent Variable: ROAA_2012

b. Predictors: (Constant), Exp_Eq_Ratio

Table 8.3: ROAA₂₀₁₁ – SDE regression results

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,344 ^a	,118	,100	,0276398

a. Predictors: (Constant), Exp_Eq_Ratio

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,008	,004		-1,938	,059
	Exp Eq Ratio	-,004	,002	-,344	-2,512	,015

a. Dependent Variable: ROAA_2011

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,005	1	,005	6,311	,015 ^b
	Residual	,036	47	,001		
	Total	,041	48			

a. Dependent Variable: ROAA_2011

b. Predictors: (Constant), Exp_Eq_Ratio

The results of table 8.2 reveal a negative relationship between ROAA in 2012 and SDE ($c_1 = -0.002$), however it is not significant at a 0.05 significance level (sig: $0.419 > 0.05$). The same results derive from table 8.3. Moreover, the column labeled F of the Anova test gives the overall F-test of $H_0: C_1=0$ versus $H_a: C_1 \neq 0$. Since significance F (equal to P-value) is higher than 0.05 in both regressions (0.666 and 6.311 respectively), we cannot reject H_0 at a significance level of 0.05 (95% confidence interval). Hence, there is evidence of no relationship between European banks' profitability and exposure to Greek debt, whether measured by return on average assets.

Continuing this type of analysis, the separate regressions between ROAE₂₀₁₂ – SDE and ROAE₂₀₁₁ – SDE are represented in tables 8.4 and 8.5 respectively.

Table 8.4: ROAE₂₀₁₂ – SDE regression results

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,075 ^a	,006	-,016	,4650536

a. Predictors: (Constant), Exp_Eq_Ratio

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,035	,071		-,496	,622
	Exp_Eq_Ratio	-,014	,027	-,075	-,515	,609

a. Dependent Variable: ROAE_2012

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,057	1	,057	,265	,609 ^b
	Residual	10,165	47	,216		
	Total	10,222	48			

a. Dependent Variable: ROAE_2012

b. Predictors: (Constant), Exp_Eq_Ratio

Table 8.5: ROAE₂₀₁₁ – SDE regression results

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,222 ^a	,049	,029	1,4649768

a. Predictors: (Constant), Exp_Eq_Ratio

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,258	,224		-1,154	,254
	Exp_Eq_Ratio	-,134	,086	-,222	-1,558	,126

a. Dependent Variable: ROAE_2011

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5,208	1	5,208	2,426	,126 ^b
	Residual	100,869	47	2,146		
	Total	106,077	48			

a. Dependent Variable: ROAE_2011

b. Predictors: (Constant), Exp_Eq_Ratio

The results of tables 8.4 and 8.5 reveal a negative relationship between ROAE in both 2012 and 2011 and SDE, however it is not significant at a 0.05 significance level, equally to the ROAA analysis preceded above.

Next, data were analyzed on a cross-sectional and time-series basis. The results referring to ROAA and SDE relationship are represented in table 8.6, while those between ROAE and SDE in table 8.7. Particularly, the results of table 8.6 are very interesting as the negative relationship between ROAA and SDE is found to be significant at a 5% significance level. The proposed model is as follows:

$$\text{ROAA} = -0.08 - 0.03\text{SDE}$$

So, there is a serious evidence that exposure to Greek debt affects negatively profitability, represented by return on average assets ratio.

Table 8.6: ROAA – SDE regression results (panel data)

Parameter Estimates							
Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test		
			Lower	Upper	Wald Chi-Square	df	Sig.
(Intercept)	-,008	,0041	-,016	,000	3,429	1	,064
Exp_Eq_Ratio_panel	-,003	,0016	-,006	-8,723E-5	4,063	1	,044
(Scale)	,001 ^a	,0002	,001	,002			

Dependent Variable: ROAA_panel

Model: (Intercept), Exp_Eq_Ratio_panel

a. Maximum likelihood estimate.

Table 8.7: ROAE – SDE regression results (panel data)

Parameter Estimates							
Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test		
			Lower	Upper	Wald Chi-Square	df	Sig.
(Intercept)	-,147	,1175	-,377	,083	1,562	1	,211
Exp_Eq_Ratio_panel	-,074	,0451	-,163	,014	2,689	1	,101
(Scale)	1,182 ^a	,1689	,894	1,564			

Dependent Variable: ROAE_panel

Model: (Intercept), Exp_Eq_Ratio_panel

a. Maximum likelihood estimate.

Finally, table 8.8 represents the results of the one-way Anova test on profitability means between the 2 country groups ($H_0: \mu_1 = \mu_2$ versus $H_a: \mu_1 \neq \mu_2$). Both p values (Sig.) show a non-existing significance at a 5% significance level.

Table 8.6: One-way Anova – Country effects

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
ROAA_panel	Between Groups	,006	1	,006	2,849	,098
	Within Groups	,099	47	,002		
	Total	,105	48			
ROAE_panel	Between Groups	,010	1	,010	,048	,827
	Within Groups	10,212	47	,217		
	Total	10,222	48			

CHAPTER 5: CONCLUSION

Over the last 30 years the Cypriot economy grew by around 3-4%. This largely was a normal development since development level was low and the prospects for profitable investment high. During most of the preceding decade, Cyprus experienced an extended period of robust growth, low unemployment and strong public finances. Real GDP rose 3.6% a year on average during 2000-2008, led by strong expansion in services (mainly business services and shipping), construction and real estate. The main characteristics of the domestic economy can be summarized as follows:

- The rapid growth in business services reflected a favorable business environment and the availability of an educated, English-speaking labor force.
- Foreign capital was attracted by one of the lowest income tax rates in the EU (10%, zero for dividends) and the existence of double taxation treaties with many countries.
- Construction grew 6.7% a year on average during 2000-2008, and the number of newly built houses tripled between 2000 and 2008. Housing prices rose 50% during 2006-2008.
- Growth since EU entry was driven by domestic demand, with private consumption rising 6.5% a year from 2005 on average through 2008 and fixed investment rising 9% a year. Most of the increase in investment was centered in construction, however.

However, this situation has changed now and the “economic miracle” of Cyprus doesn’t exist anymore. Since 2008 the domestic economy has suffered two rounds of external shocks: first, the fallout from the global financial crisis in 2008-2009 and second, the consequences of the destruction of the Vassilikos power plant and the restructuring of Greek government bonds in the second half of 2011 and in 2012.

Firstly, the global financial crisis affected the economy through a number of channels:

- i. Faltering foreign demand led to a sharp decline in services exports and tourism earnings.
- ii. Construction came to a virtual halt as demand for housing fell, both foreign and domestic.

- iii. Inflows of foreign capital slowed (and even reversed for a while late in 2008-early 2009).
- iv. Growing financial fragmentation made it increasingly difficult for Cypriot banks to secure funding from abroad.

An even larger shock followed as a result of the restructuring of Greek government bonds. Cyprus' two largest banks [Bank of Cyprus (BoC) and Popular Bank (Laiki)] together held €4.7 billion of Greek government bonds at the end of 2011. The 75% PSI haircut resulted in losses equal to roughly €3.5 billion, or 33% of both banks' aggregate capital and 20% of GDP.

However, even before the Greek PSI, the European Banking Authority (EBA) estimated that both banks would need an additional €3.6 billion in capital to meet the 9% Core Tier 1 capital ratio and create adequate buffers for mark-to-market losses on their holdings of government debt. The latter already incorporated losses on the Greek bond portfolio equivalent to 11%. PSI-related losses and the further drop in prices of Cypriot government debt probably doubled the capital shortfall from the initial EBA estimate. Both BoC and Laiki have been unable to raise the needed capital, prompting the government to recapitalize them with €1.8 billion in one-year government bonds. This added 10% of GDP to government debt.

The total conclusions of our research conducted in the framework of this thesis result in a multi-variable description of the Cypriot banks' current situation. In other words, it is undeniable that Greek government bonds PSI (haircut) had a major negative impact on Cypriot banks. Nonetheless, there is strong evidence that the problems faced by most of the Cypriot banks started since the financial crisis turmoil in 2008 (two years before PSI). Moreover, special features of the Cypriot economy like industry structure, low taxation, extremely expanded banking sector and fiscal imbalances enhance the view that the Cypriot economy and consequently its banking system was a "bubble". As a result, it seems like PSI was not the unique cause of Cypriot banks' recent problems, but the process that launched these problems. This perception was revealed through the regression analysis of the previous chapter that showed that there is a significant relationship between European banks' profitability and their exposure to Greek government bonds, only when constructing a two-year panel data analysis between exposure as a percentage of equity and return on average assets.

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