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Financial Crisis and Non-performing Exposures in Greece

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LSE The London School of Economics and Political Science

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ABSTRACT

The paper provides a brief history of the decade long Greek banking crisis, which reshaped the banking system into essentially four systemic banks, owning 96% of total assets. The crisis also led bank stock prices to a value of almost zero twice in a row, once in early 2012 after the PSI bond haircut, and again in late 2015, after the politically generated recession and the GREXIT fears of the first semester of the year. Today the amount of legacy non-performing loans (NPLs) or exposures (NPEs) is enormous and by far the highest in Europe. It has to decline fast to non-crisis levels for the banks to be able to provide fresh credit and support the economy.

A rapid reduction of NPEs is hampered by two key obstacles: First, the NPE reduction causes a loss in equity capital, which could lead to a violation of the Basel III capital requirements; and second, the NPE reduction can easily lead to negative annual profitability, which could force dilution of private sector stock ownership, caused by the 2014 legislation of Deferred Tax Credit (DTC).

The higher the NPEs and the lower the provisions of banks, the higher their need for fresh capital. Banks differ in those characteristics and some may not avoid an eventual recapitalization in 2021. The stricter regulators are in their minimum capital ratio requirements or the more pessimistic private investors are on their valuations of the bank NPEs, the higher the need for fresh capital for the banks. A sensitivity analysis of the bank capital needs to these two exogenous variables (Table 2.2), reveals a fragile situation, in which capital needs can easily sky-rocket.

In the medium term, the drive to increase annual profitability remains a strategic one-way street for banks. The challenges Greek banks face are very similar to those of European banks, though with some distinct features. The environment of low interest rates, intense competition with technology companies that are gradually penetrating retail banking, and the constant tightening of the supervisory framework, is putting pressure on their profitability. Additional Greek pressures arise from (i) the negative impact of reduced NPEs on accounting profitability; (ii) the digital transformation of the economy, which entails massive increases in investment in IT projects and in executives' training; (iii) a switch of traditional bank customers towards alternative sources of financing; (iv) the high operating costs, which are inherited from the earlier prosperous times, and so on.

[1] The article is translated from the original article in Greek, published in a book of conference proceedings, entitled: "*Obligations of Financial Institutions*, *Proceedings from the 29th Panhellenic Conference on Commercial Law*," pp.245-298, edited by the Association of Greek Commercialists, Nomiki Vivliothiki, Athens, 2021.

[2] Professor of Finance and Economics, Department of Banking and Financial Management, University of Piraeus, Greece; and Senior Independent Director, National Bank of Greece, website: hardouvelis.gr

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Executive summary

The unprecedented Greek banking crisis of the 2010s becomes transparent in the fluctuations of bank stock prices, which fell to almost zero twice, first in February 2012 (Figure 1.1) and then in November 2015 (Figure 1.4). An additional result of the ongoing crisis is the extremely high level of Non-Performing Exposures (NPEs) as a percentage of total loans,[3] which peaked in March 2016, and today remain the highest in Europe.

A rapid reduction of NPEs to a desired level below 3% of total loans is hampered by two key obstacles: First, the NPE reduction causes a loss in equity capital, which could lead to a violation of the Basel III capital requirements; and second, the NPE reduction can easily lead to negative annual profitability, which could force dilution of private sector stock ownership, caused by the 2014 legislation of Deferred Tax Credit (DTC).[4] As a result, the reduction of NPEs has been delayed, making banks reluctant in absorbing additional risk by providing easy credit. Extensions of new loans to healthy, mainly small- and medium-sized enterprises (SMEs) are hard to come by, thus not contributing towards a much-anticipated rapid economic expansion.

The effort to reduce NPEs began in 2018-2019 and was carried through direct sales of specific groups of loans. Securitizations came later. In December 2019, following an earlier proposal by the Hellenic Financial Stability Fund (HFSF), an Asset Protection Scheme was legislated, under the name “Hercules” (L. 4649/2019). Its aim was to assist banks in securitizing large volumes of NPEs, being backed by a Greek state guarantee. Soon after, the four systemic banks announced they would adopt "Hercules" and one of them, Eurobank, already completed the securitization of a large portfolio in the first half of 2020, thus gaining (at least) a temporary lead over the other banks in the effort to reduce NPEs.

During 2020, the global Covid-19 crisis caused an unforeseen deterioration in domestic and international economic and financial conditions, which are likely to last for a while. The earlier ambitious bank plans for a rapid and comprehensive balance sheet clean up were slowed down but did not stop, and year 2021 is likely to bring a stream of securitizations by the remaining three systemic banks. Throughout 2020 banks operated with abundant liquidity, thanks to the ECB's post-March expansionary monetary policy. However, the reading on their capital adequacy is ambiguous and differs significantly across the banks.

The higher the NPEs and the lower the provisions of banks, the higher their need for fresh capital. Banks differ in those characteristics and some may not avoid an eventual recapitalization. Yet, in their quest to clean up their balance sheets, they all face common exogenous forces as well. Namely, the stricter regulators are in their minimum capital ratio requirements or the more pessimistic private investors are on

[3] The definition of NPEs is given in Section 2.1.

[4] As analyzed below, the stock ownership dilution can be avoided via a “hive down” accounting methodology. However, this methodology can be applied only once by the Bank.

their valuations of the bank NPEs, the higher the need for fresh capital for all banks. A sensitivity analysis of the bank capital needs to these two exogenous variables, reveals a fragile situation, in which capital needs can easily sky-rocket (see Table 2.2). In fact, as of October, the concern about a further continuation of the pandemic and its negative impact on the economy strengthens the need for additional provisions and equity. The Bank of Greece (BoG) has also expressed a similar concern and proposed a new scheme for the overall management of troubled assets of the Greek banks, complementary to "Hercules," claiming it would simultaneously resolve both the high NPE and high DTC problem, the details of which are forthcoming.

Year 2021 is expected to be more difficult than 2020 for banks. The 2020 borrower moratoria and their tolerance by the SSM (Single Supervisory Mechanism) may be over and, before providing new credit, banks would have to reassess the creditworthiness of their customers, households and companies. The pressure on banks for new loan extensions would be great despite possible adverse market conditions and risks. Yet, despite these adversities, a new vicious cycle between the economy and the banking sector, similar to the earlier one during the Greek crisis, is unlikely to happen. And the reason is that while the problems of the economy are affecting the banks, the bank problems no longer affect the economy with the same ferocity and immediacy as in the recent past. In contrast to the Greek crisis 2010-2018, today banks have abundant liquidity, which can be channeled to viable businesses. Moreover, over the next years, European funds of up to €70 billion are expected to flow into the Greek economy,[5] while fiscal policy is unlikely to be similarly restricted by excessive primary surpluses as it occurred during the Greek crisis.

The 2021-2023 period is the time to complete the cleaning-up of bank balance sheets. The question is whether this could occur without new capital increases. A sensitivity analysis in Table 2.2 shows this is difficult (for some banks) and can happen only in the optimistic scenarios of the analysis, which can materialize under very strict conditions.[6] The first condition is for the Greek economy to stand on its feet in 2020-2021, so that banks do not to face a new generation of NPEs, which would entail new provisions and additional equity. The second condition is the gradual return to pre-crisis normality with an improvement in borrower repayment culture and a boost in consumer and business psychology. A third condition is that the valuations of the NPE portfolios, when sold, do not fall sharply relative to the pre-Covid-19 prices. A fourth condition is that the SSM maintains its current tolerant policy towards the problems of the banks in Greece and in the rest of the European Union. If the above conditions are met, a virtuous cycle between the banking sector and real economy can materialize.

[5] The total resources will be a function of our ability to absorb the funds. In the traditional package of the seven years 2021-2027 of the Multiannual Financial Framework, amounting to approximately €40 billion, a package of approximately €30 billion has been added for the six years 2021-2026 from the new Recovery Fund. The latter, as a percentage of GDP, is the third largest in the European Union after Hungary and Bulgaria.

[6] In Section 2.3, readers are given the tools to repeat the aggregate analysis of Table 2.2 per individual bank.

In the medium term, besides the desired cleaning-up of their balance sheets, Greek banks also face great challenges to their profitability. Some of the profitability challenges are common across Europe, including the international environment of low interest rates, an intense international competition from high-tech companies that are gradually penetrating the retail banking sector, or the constant tightening of the European supervisory framework. Other challenges are more specific to Greece, such as: (i) the negative impact of reduced NPEs on accounting profitability; (ii) the digital transformation of the economy, which in the short term entails massive increases in investment in IT projects and in executives' training; (iii) a switch of traditional bank customers towards alternative sources of financing such as corporate bonds, private equity funds, private debt funds, mezzanine funds and crowd funding; (iv) the high operating costs, which are inherited from the earlier prosperous times; (v) the loss of experienced staff as a result of the previous domestic economic crisis; and so on.

Today, banks are undergoing rapid transformation, with fewer branches, more digital platforms, fewer employees, remote work, and executives who are being trained in the use of new technologies on an ongoing basis. The economy is being digitized, the challenges are multiplying, but the increase of profitability remains a strategic one-way street for banks. And improved profitability will be achieved if the economy is put back on a sustainable growth trajectory.

The remaining text is organized as follows: Section 1 provides a brief history of the Greek banking system's performance over the last decade, including the multiple systemic bank recapitalizations, the value of bank shares that fell to zero twice, the withdrawal of Greek banks from abroad and the consolidation of the domestic banking system into four systemic banks. Section 2 describes the challenges banks face today and, in particular, the exorbitant amount of non-performing exposures, which remain high because banks face the obstacles of capital adequacy and DTC plus profitability pressure from an economy that has yet to find its growth momentum. This section also presents a detailed sensitivity analysis of the bank capital requirements. Section 3 describes the profitability pressures banks face today and in the coming years, both in Greece and abroad. Increasing profitability is now a strategic one-way street for banks. Section 4 presents the two-way interaction between banks and the economy, the first signs of increased lending in 2019, and the new Covid-19 crisis of year 2020. Section 5 concludes.

1. The turbulent history of Greek banks during the crisis: A brief review

1.1 The performance of bank stock prices

The last twelve years were a difficult period for banks both in Greece and abroad. This difficulty is reflected in the evolution of their stock prices, i.e., the way in which investors assessed over time the future prospects of banks. Figure 1.1 presents the evolution of stock returns, i.e., prices including dividends, of four different portfolio indices, three of which represent the banks in Greece, Europe and the USA respectively, while the fourth illustrates European non-financial corporations. This fourth portfolio of European companies is used as a benchmark for comparing the other three banking portfolios.[7]

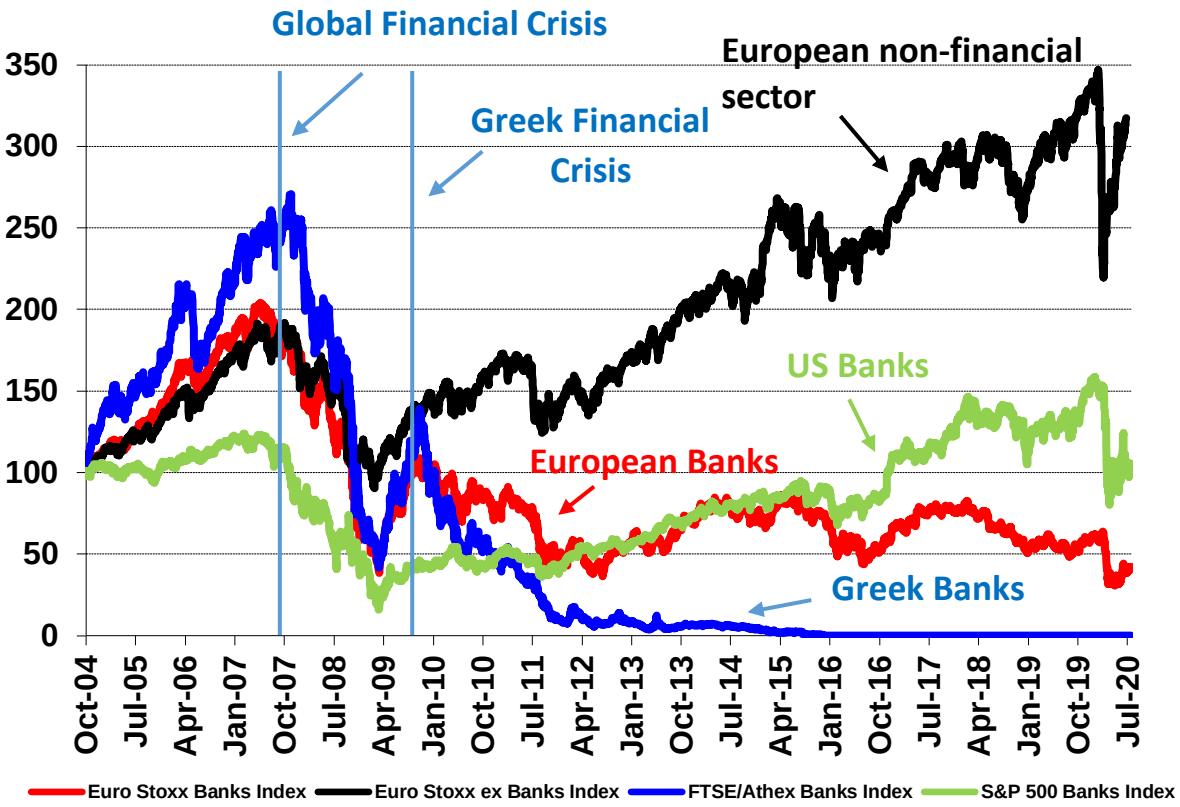
Figure 1.1 records the value of each portfolio from September 2004 to July 2020. In the beginning, on 30/9/2004, the value of each index is set to equal €100 and can be thought of as the portfolio purchase price. The subsequent course of the index incorporates the value of reinvesting interim dividends and, therefore, reflects the sale value of each portfolio at the end of each month. Bank stock indices are the "FTSE Athex Bank Index" in Greece, the "Euro Stoxx Banks" in Europe, and "S&P 500 banks" in the USA. The index of non-financial corporations in Europe is the "Euro Stoxx ex Banks Index" (Euro Stoxx 50). The two vertical lines in Figure 1.1 indicate the beginning of the global financial crisis in September 2007 and the Greek crisis in October 2009, respectively.

The main conclusion from Figure 1.1 is that cumulatively all banking indices have performed poorly in the past sixteen years, especially when compared to the performance of non-financial corporations in Europe. The initial investment of €100 in European non-banking shares in July 2020 was worth €318, which is equivalent to an average annual nominal yield of 7.7% over the sixteen years. By contrast, the same investment of €100 in American banks yielded about €100, i.e., it generated zero nominal return. In Europe, banks performed even worse. There, investors lost money as their initial €100 investment became €57, which is equivalent to a negative average annual nominal return of -3.5%. Last, in Greece investors completely lost their investment, as the amount of €100 in banks evaporated to zero.

[7] For a comprehensive analysis of the Greek banking system and Greek banks see M. Haliassos, G. Hardouvelis, M. Tsoutsoura and D. Vayanos Article (2017). For the Greek banking crisis, see G. Hardouvelis (2017).

Figure 1.1

The evolution of four stock price indices
(September 2004 – July 2020)



Source: Bloomberg

Note: The indices start with the value 100 on 30/9/2004 and incorporate the value of the reinvestment of interim dividends. The Greek banking index is the FTSE Athex Bank. The European banking index is the Euro Stoxx Banks. The United States banking index is the S&P 500 Banks. The index of non-financial corporations in Europe is the Euro Stoxx ex Banks.

From September 2004 until their first collapse in February 2012, the equity values of Greek banks fluctuated sharply, tracking the overall movements of the crisis period. In September 2007, three years after the initial investment of €100 and shortly before the outbreak of the international financial crisis, their value had reached and surpassed €250, which in three years was equivalent to an average annual return of 36%! At that time, the Greek banking shares outperformed the foreign banking shares. Then there was a steady decline, which stopped in April 2009 at around €50. In mid-2009, as the end of the global financial crisis was in sight, the prices of Greek and European banking shares began to recover.

1.2 The Greek crisis commences at the end of 2009

The recovery of Greek banking stocks, which began in mid-2009, stopped at around €130 with the start of the Greek crisis in October/November 2009. At the same time, the continuous inflow of deposits into the Greek banking system stopped. In the previous period, despite the global financial crisis of 2007-2009, trust in Greek banks was high and deposits were steadily increasing until the end of 2009.

As depositors started realizing the scale of the Greek crisis, a continuous outflow of deposits began in early 2010, which stopped in mid-2012. A small return of deposit inflows was then observed until the end of 2014, but in 2015 there was a second and this time much severe and abrupt flight for a shorter period, which stopped only after the imposition of capital controls in June 2015 (see Figure 1.2).

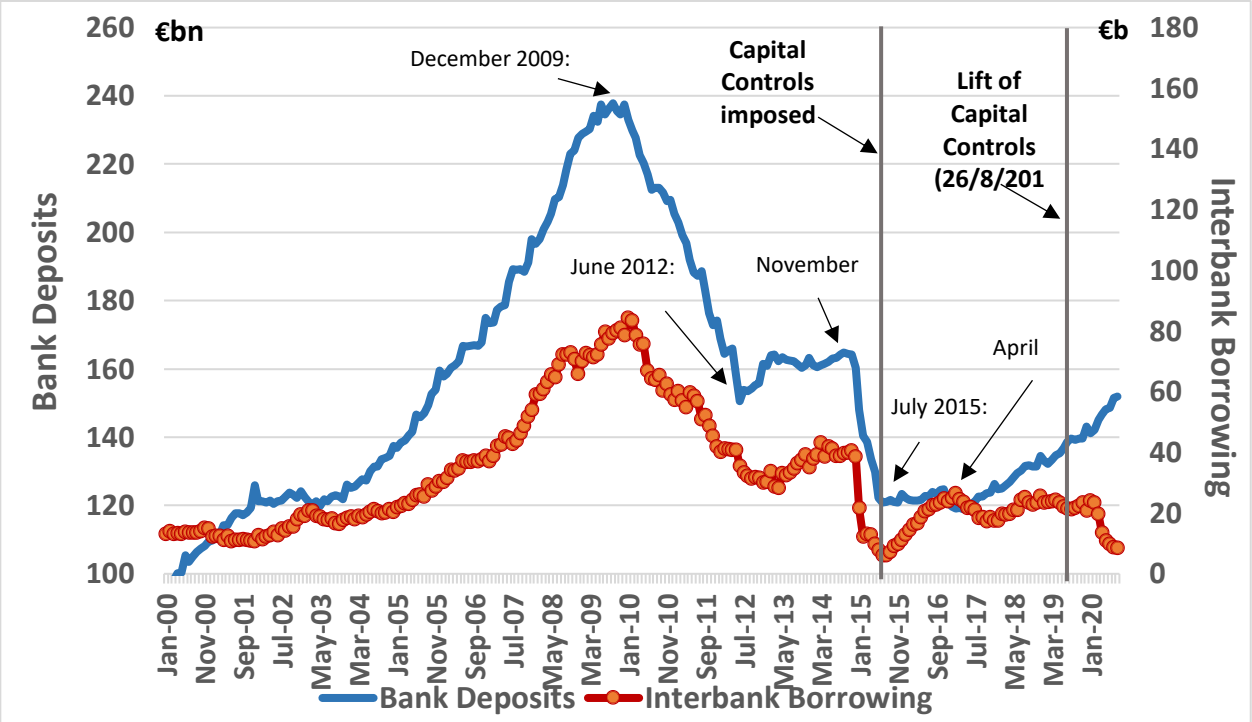
Besides deposits, Figure 1.2 also describes Greek bank interbank borrowing from foreign banks. The amount of foreign interbank borrowing was much smaller than domestic deposits, but quite significant, and both together represented the main private sources of funding for Greek banks. Interbank borrowing reached €84 billion in January 2010 and then declined together with domestic deposits and fluctuated in the €30 billion range from mid-2012 to mid-2013, when it increased again together with deposits until the end of 2014. In the first half of 2015 it shrank to almost zero due to the fear of Greece leaving the Euro Area (Grexit), a decline that resembles a similar flight of deposits. Today, the amount of interbank borrowing is small, while interest rates are negative.

The reduction of domestic deposits and the reluctance of foreign banks to provide lending to Greek banks in the interbank market was drying up liquidity and was pushing Greek banks to search for alternative sources of funding, while frustrating them from granting new loans. Despite this pressure, during 2009-2011 and until the month of the PSI, Greek banks not only did they not reduce their holdings of Greek Government Bonds and Treasury Bills but seem to have increased them. In January 2009 the face value of those securities was €25.3 billion and in January 2010, well after the Greek crisis had begun, the amount increased to €36.3 billion. Then, in January 2011, in the midst of rumors and fears of an upcoming haircut, the amount increased even more to €47.5 billion, while in December 2011 it stood at €44.9 billion.[8]

[8] Some banks may have acted opportunistically in the buying-selling trading process, while other banks may have been pressured by the Greek government to keep their Greek government bonds in their portfolios and not sell them.

Figure 1.2

Household and business deposits in Greek banks and interbank borrowing from abroad



Source: Bank of Greece, "Analysis of Deposits by Sector"
https://www.bankofgreece.gr/statistika/nomismatikh-kai-trapezikh-statistiki/katatheseis-twn-pistwtikwn-idrymatwn

Bank of Greece, "Aggregate MFI status without the Bank of Greece"
https://www.bankofgreece.gr/statistika/nomismatikh-kai-trapezikh-statistiki/logistikes-katastaseis-nxi

Notes:

1. End-of month household and business deposits in domestic Greek banks is denoted on the left axis, starting with the size of €100 bn (BoG, variable "Residents of the Interior" – "Businesses and Households"). End-of-month interbank Greek bank borrowing from abroad is denoted on the right axis, which starts at €0bn but has a scale smaller than the scale of left axis (BoG, variable "Liabilities to Credit Institutions" – sum of the variables: "Other Euro area countries" + "Other countries", in order to result the total interbank lending from abroad).

2. The correlation between the two variables of the figure is positive and high: +0.96 throughout the 248-month period, 1/2000 – 8/2020. The corresponding correlation between the monthly changes of the two variables is +0.28.

The shortage of liquidity was covered by borrowing from the European Central Bank, which acted as the lender of last resort (see later Figure 1.3). At the same time, the growth rate of lending became negative after the first quarter of 2011 (see later Figure 4.1). In fact, the Greek banks' borrowing from the Euro-system reveals very clearly the two different phases of the Greek crisis: The first phase ends at the end of 2014. This is when the need for financial assistance from the Euro-system was significantly reduced. The second phase starts in 2015 and lasts for about 4 years.

From November 2009 on, we observe a continuous fall in the prices of Greek banking shares. The original €100 portfolio had slowly crashed to the low values of about €15 in February 2012, when the PSI (Private Sector Involvement) agreement materialized (Figure 1.1). Due to the PSI, holders of Greek bonds suffered an average haircut, in present value terms, equivalent to 78% of their original holdings.[9] Moreover, since banks were holders of large amounts of bonds, the haircut caused the book value of their equity capital to turn negative.

Overall, during the Greek crisis, banks faced three simultaneous and connected problems.[10] First, they faced a problem on the asset side of their balance sheets due to their loans to both the public and private sector. Soon after the haircut on State loans, many of their loans to households and businesses became non-performing.

Second, banks faced a problem on the liability side of their balance sheet, as depositors lost confidence in the banks and began to gradually withdraw their deposits. The loss of confidence started and was perpetuated by the behavior of the State. State behavior raised fears of Grexit, namely raised the probability of the country leaving the euro area, which alarmed depositors.

The two problems, one on the asset side and the other on the liability side of the balance sheets, were also interdependent. The greater the problem of NPEs on the asset side, the greater the depositors' fears on the liability side. Conversely, the bigger the withdrawals of deposits on the liability side, the greater the restrictions by bankers on new lending on the asset side.

This bidirectional negative feedback soon brought a third problem for banks, as it had an adverse impact on their reputation, their profitability and, eventually, their capital adequacy and viability. And the vicious cycle did not stop there, as issues of reputation and viability of banks, in turn, had a natural secondary negative impact on the behavior of depositors and borrowers, and so on. Hence, during the crisis, the three problems functioned interdependently in a vicious re-enforcing cycle.

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[9] See Table II.1, page 14, "*Impairment losses on Greek Government Bonds and State-related loans under the PSI*", Report on the Recapitalization and Restructuring of the Greek Banking Sector, Bank of Greece, 2012.

[10] For a more detailed analysis (in Greek), see Hardouvelis (2017).

1.3 The PSI brings a complete reshaping in the landscape of the banking system

The PSI may have helped preventing the country from going officially bankrupt in 2012,[11] yet it triggered a complete reshaping of the architecture of the Greek financial system. This is because it caused losses to the banks' assets that far exceeded their existing equity. The total accounting losses were estimated by the BoG at €37.7 billion, of which €28.2 billion concerned the four major systemic banks, NBG, Piraeus, Alpha and Eurobank. Accounting-wise, these losses were recorded in the balance sheets of December 2011.[12]

For banks to continue to operate, they had to be recapitalized and, given the conditions prevailing in European markets at the time, this could not be done easily with private resources. At that moment in time, a major decision was made by the BoG in consultation with the ECB for state capital aid to be offered only to the four systemic banks. This decision was decisive for the subsequent degree of concentration in the Greek banking system, which at that time consisted of 14 commercial banks plus a number of cooperative banks, all operating in the Greek territory.[13] With the exception of Attica Bank, the other banks did not seem to be able to raise private funds, hence they were resolved and large components of their assets together with their deposits were subsequently sold to the four systemic banks. The cost of resolution (financial gap and other capital needs) exceeded €18.0 billion (€8.0 billion for ATE, €4.2 billion for Post Credit Bank, and €5.8 billion for other 14 banks).[14]

The Eurogroup in February 2012 made important decisions on the details of the PSI, the second Financial Adjustment Program 2012-2014, the total amount of new loans to Greece, as well as the amount of €50 billion from the new State loan, earmarked

[11] It has also helped the economic governance of the Eurozone, see Venizelos (2020).

[12] See Table I.1, p.8, and the accompanying analysis of the Bank of Greece in its *Report on the Recapitalization and Restructuring of the Greek Banking Sector*, 2012.

[13] Source: Bank of Greece (2012) https://www.bankofgreece.gr/Publications/%CE%88%CE%BA%CE%B8%CE%B5%CF%83%CE%B7_%CE%B3%CE%B9%CE%B1_%CF%84%CE%B7%CE%BD_%CE%B1%CE%BD%CE%B1%CE%BA%CE%B5%CF%86%CE%B1%CE%BB%CE%B1%CE%B9%CE%BF%CF%80%CE%BF%CE%AF%CE%B7%CF%83%CE%B7.pdf

[14] Of the €18 billion, €15.2 billion is the funding gap. The first two banks (Proton and T-bank) were resolved in 2011 with resources of €2.7 billion from the Greek Deposit & Investment Guarantee Fund (TEKE). The rest, including 7 cooperative banks, were resolved during 2012-2015 with HFSF resources and their healthy assets and deposits were sold off. In 2016, "PQH Unified Special Clearance SA" was created as well, which was essentially a bad bank that inherited the "bad" assets of the resolved banks, with the aim to liquidate them. PQH currently manages 18 such institutions under special clearance, with assets of an estimated nominal book amount of 9 billion euros, most of which relate to non-performing business and retail loans. Please also note that after the PSI, many foreign banks left Greece and sold their domestic activities, thus boosting the assets of the four systemic banks.

exclusively for the stability of the Greek financial system, which would be managed by the Hellenic Financial Stability Fund (HFSF).[15]

The actual recapitalization of the systemic banks took place in April 2013, with a one-year-delay. For banks to continue operating with their existing management teams and without state intervention in the way they managed their daily operations, they would have to attract private shareholders for at least 10% of the required capital increase. It was not an easy recapitalization because all four banks had negative equity capital. The existing negative book equity meant that in order for private shareholders to participate in the capital increase, the bank stock valuations after the recapitalization would have to be much higher than their book value, which, given the market conditions at the time, was unlikely to happen. Thus, in order to attract private shareholders, along with each share they would buy in the public offering, potential investors were also offered warrants, i.e., the opportunity to buy more shares (9 warrants per share) in the future from the HFSF on specific terms.[16]

The capital increase was successful. Only Eurobank did not try to find private investors in the increase due to its planned merger with NBG, which was cancelled at the last minute. The other three banks managed to overcome the 10% mark. €24.99 billion was raised from the HFSF and €3.59 billion from individuals.[17] Thus, after the capital increase, the HFSF held 84.39% of the shares of NBG, 81.01% of Piraeus, 83.70% of Alpha, and 98.56% of Eurobank.[18]

During 2013, almost two years after the PSI and the earlier decision for the first recapitalization, the continuing deep recession and the intense pressure from the

[15] The HFSF was established in 2010 under Law 3864 in the framework of the Economic Adjustment Programs for Greece. It was endowed with an initial capital of €1,500 million in cash. Following the Eurogroup decision of February 21, 2012, the European Financial Stability Fund (EFSF) contributed to the HFSF the total amount of €48.2 billion in EFSF bonds. The purpose of the HFSF is to contribute to maintaining the stability of the Greek banking system. It acts in compliance with the commitments arising from the Memorandum of Understanding of 15.3.2012, the draft of which was ratified by Law 4046/2012 (A '28) and from the Agreement on Fiscal Objectives and Structural Reforms of 19.8.2015, the draft of which was ratified by Law 4336/2015 (A '94).

[16] The structure of the recapitalization was designed earlier by the National Unity Government of Lucas Papademos with Deutsche Bank as the adviser and in collaboration with the Economic Affairs Office of the Prime Minister.

[17] Source: HFSF Activities January 2013 – June 2013, http://www.hfsf.gr/files/HFSF_activities_Jan_2013_Jun_2013_en.pdf. The amount of €25.0 billion of the first recapitalization of 2013, when added to the resolution amount of €13.5 billion, sums up to €38.5 billion (from €50 billion). The remaining €11.5 billion remained as a "cushion" until February 2015.

[18] After the first recapitalization, the HFSF owned 2,022,579,237 shares of Ethniki out of a total of 2,396,704,866 shares, 4,109,040,164 shares of Piraeus out of a total of 5,072,262,886 shares, 9,138,636,364 shares of Alpha out of a total of 10,918,323,078 shares, 3,789,137,358 shares of Eurobank out of a total of 3,844,498,131 shares. Source: HFSF Annual Report 2013.

International Monetary Fund,[19] led the BoG to a new stress test analysis of the viability of the systemic banks. The analysis reached the conclusion there was an additional capital need of €6.2 billion. Thus, in April 2014, each bank separately went ahead with a second share capital increase, trying to attract funds from private investors. Please note that the intervening period between the two recapitalizations was just one year, but the period between the decisions for their accomplishment was much longer. Despite the short time distance between the two recapitalizations, the new seasoned public offering was very successful. Combined, all four banks managed to raise €8.3 billion from the markets, a lot more than the required €6.2 billion.

1.4 Turning the page in 2014

The large private investor oversubscription in the recapitalization of April 2014, just one year after the first recapitalization of 2013, demonstrates the new confidence of investors in the future of both the banks and the Greek economy. In 2014, after six years of crisis, Greece seemed to have turned the page. The HFSF did not participate in the capital increase and thus its participation rate was reduced to 57.24% of the shares of NBG, 67.30% of Piraeus, 66.36% of Alpha, and 35.40% of Eurobank.[20] The big change in ownership took place in the case of Eurobank, which from a fully state-owned bank in 2013 became the only Greek systemic bank in 2014 in which the state did not have a majority stake.

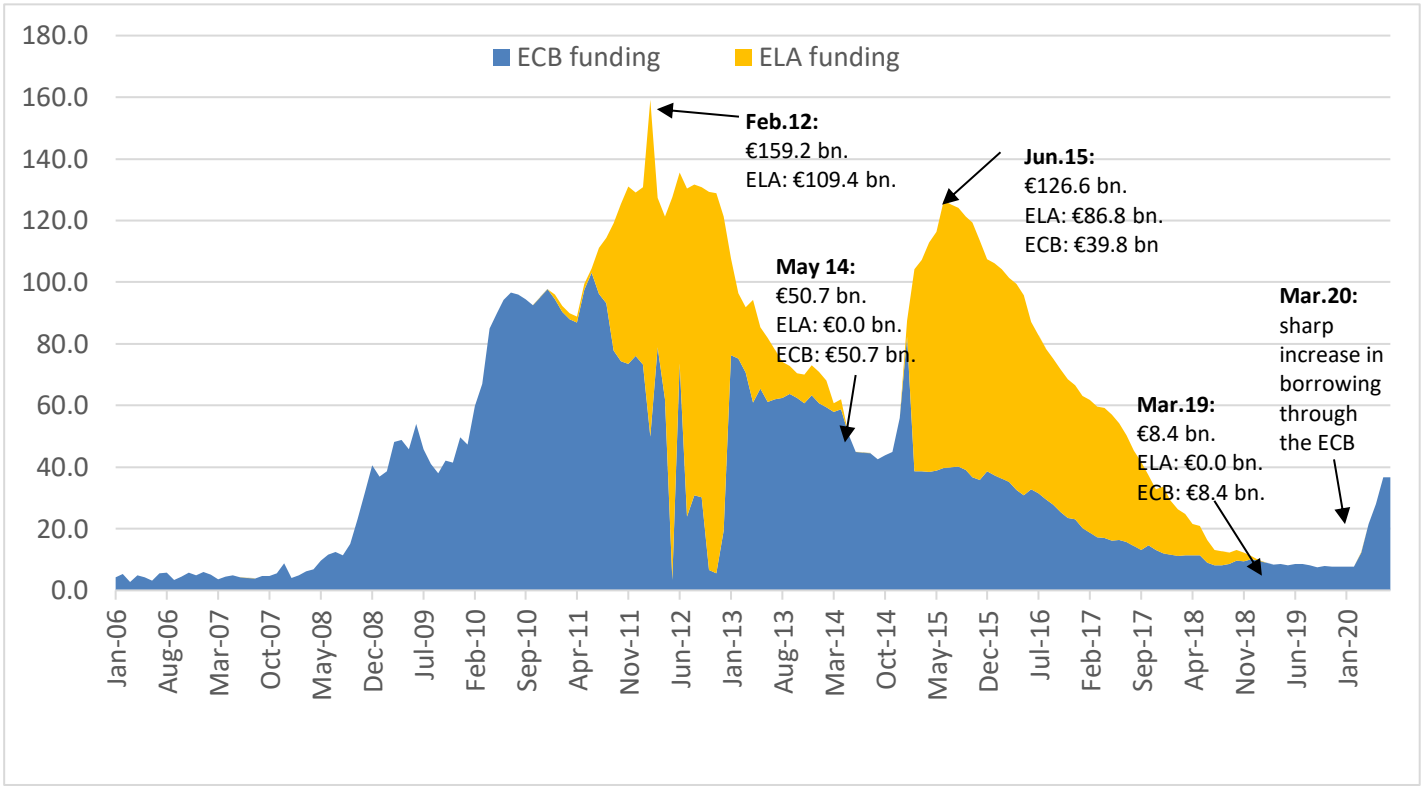
Year 2014 marked the recovery of the Greek economy, with a positive annual rate of 0.7% GDP growth for the first time in 6 years, and with unemployment reversing its earlier upward momentum, beginning a new downward trend from the high 27.5% of December 2013. Household deposits also gradually began flowing back to the banks as early as May 2012, while bank borrowing from the ECB had decreased to only €44.9 billion in November 2014 from earlier highs of over €100 billion. Most importantly, by mid-2014 the earlier costly borrowing through the Emergency Liquidity Assistance (ELA) was completely eliminated (Figure 1.3). The Economic Sentiment Indicator improved as well, with optimism coming back among investors. Financial uncertainty

[19] The IMF pressure was widely commented in the domestic Economic Press of the time. See, for example, "The recession is accelerating a change in the IMF's stance on Greece and the Eurozone," by Dimitra Kadda, capital.gr, 22/1/2013, https://www.capital.gr/oikonomia/1712562/i-ufesi-epitaxunei-allagi-stasis-tou-dnt-gia-ellada-kai-eurozoni.

[20] After the second recapitalization, the HFSF held 2,022,579,827 shares of Ethniki out of a total of 3,533,507,739 shares, 4,106,340,049 shares of Piraeus out of a total of 6,101,545,399 shares, 8,925,267,781 shares of Alpha out of a total of 12,768,623,420 shares, and 5,208,067,358 shares of Eurobank out of a total of 14,712,054,710 shares. Source: HFSF Annual Report 2014.

was significantly reduced (EPU Index), as was the case of banking uncertainty (EPUB sub-index).[21]

Figure 1.3
Eurosystem Loans to Banks in Greece
(2006-2020)



Source: Bank of Greece, "Monthly Accounting Statements"
https://www.bankofgreece.gr/ekdoseis-ereyna/ekdoseis/anazhthsh-ekdosewn?types=365d253d-456e-488d-b23e-c569ad1fb3ef&mode=preview&years=2019,2015

Note: Lending through ELA (Emergency Liquidity Assistance) costs about 1.5% more than ECB lending and is granted by the BoG with a lower quality pledge.

Year 2014 was also characterized by the fact that from November 1, the newly established Single Supervision Mechanism (SSM) took charge of the supervision of all systemic banks in Europe. Earlier, in the third quarter of 2014, it had carried out an Asset Quality Review and Stress Tests on the approximately 130 systemic European banks under its direct supervision. The four participating systemic Greek banks did

[21] See the study of G. Hardouvelis, G. Karalas, D. Karanastasis and P. Samartzis (2018). The time series of the uncertainty indices for Greece start in 1998 and are updated every month with the new month. They can be found on the website http://hardouvelis.gr/hkks-uncertainty-indices-for-greece/

manage to pass the assessment successfully, without the need for a new recapitalization. This became possible mainly because the Greek Government of the time acted prudently and introduced the Deferred Tax Credit legislation.[22]

The DTC legislation was a notable success of the ND (New Democracy party) - PASOK (Panhellenic Socialist Movement) coalition government. It did not attract the attention it deserved from the mass media at the time, however, primarily because such technical matters are difficult to fully comprehend and digest.[23] Yet DTC did help keep most of the previous Deferred Tax Assets (DTAs) as part of banks' regulatory capital, thus enormously boosting the capital base of banks.[24] Under the DTC legislation, the Hellenic Republic guaranteed that in the future, in the event that banks do not have positive profitability or are under special liquidation, the Hellenic Republic itself will replace part or all of the DTAs with Greek Treasury Interest-Bearing Notes and in return will receive shares of the bank equal to the amount of financing. Thus, with DTC, the Greek banks in 2014 did not lose regulatory capital and managed to meet the capital requirements of the European supervisor.[25]

The DTC issue is technical, yet essential even nowadays and for this reason it is examined in more detail in the next section. At the end of 2014, DTC represented approximately 58% of the regulatory capital of systemic banks. At the end of 2019 it stood at 55% (see Table 2.1), in mid-2020 after the securitization of Eurobank under

[22] Article 5, Law 4303/2014, Government Gazette A 231 / 17.10.2014. A second complementary reason for the success of the Greek banks to pass the hurdle, was the fact that in 2014 they were able to present reliable three-year restructuring plans and so they met the so-called "dynamic scenario" of the SSM stress tests for the following three-year period 2014-2016. These three-year restructuring plans were credible because they had already been approved by the European Commission's Competition Directorate, the DG Competition.

[23] Neither did the government advertise its accomplishment. For a non-specialist, the accounting description of regulatory capital is particularly difficult to understand, hence there was always a danger of malicious misinformation regarding DTC, which could have caused depositor panic.

[24] Under the International Accounting Definition of Deferred Tax Assets, a business may carry forward profits or losses in a subsequent tax year, usually 5 years, while in Greece for banks after PSI the time period increased to 30 years with retroactive effect from 14/2/2012, with Law 4172/2013, article 27 (Government Gazette A '167 / 23-07-2013). By transferring the losses of PSI and non-performing loans to the future, banks significantly reduce their future taxable profits. Until 2014, for banks in Europe and internationally, this future benefit was accounted for in the present as regulatory capital. However, with the new stricter regulations in Basel III, only 10% of the DTA could be credited to banks' regulatory capital under multi-filter restrictions.

[25] Under the International Accounting Definition of Deferred Tax Assets, a business may carry forward profits or losses in subsequent tax years, usually 5 years, while in Greece for banks after the PSI, this time period was increased to 30 years with retroactive effect from 14/2/2012, under Law 4172/2013, article 27 (Government Gazette A '167 / 23-07-2013). By transferring the losses from the PSI and from non-performing loans to the future, banks significantly reduce their future taxable profits. Until 2014, the existing bank regulation in Europe and internationally, allowed this future tax benefit to count as regulatory capital. However, with the new stricter bank regulations of Basel III, only 10% of DTA (and under additional multi-filter restrictions) could be counted as regulatory capital. The DTC legislation essentially rescued banks, at least temporarily, from the very strict prohibition of DTA in counting as regulatory capital.

the "Cairo" project, which will be analyzed subsequently, it has been estimated at 58%, while its significance will increase with the upcoming securitizations.

1.5 A second crisis begins in 2015

2015 was a year of surprises and reversals. The economic growth that had begun in 2014 turned into a new recession. The January elections ushered in a new political leadership, which switched policies, flirted with the idea of leaving the Euro Area and instilled widespread fear in investors and depositors. Deposits were being withdrawn on a daily basis and at high amounts. Instead of settling the final details of the 2nd Economic Adjustment Program, the new Government froze the negotiations, left the Program assessment on hold, created conflict with the European partners and isolated itself politically and financially.

A new crisis began. This new crisis was clearly reflected in the borrowing volumes of Greek banks from the Euro-system. Earlier, in 2014, this borrowing had decreased significantly, while its expensive ELA component had shrunk to zero. Yet in 2015, not only did total borrowing skyrocket again, but it also took the form of the costly ELA channel (see Figure 1.3). Without the country following an approved Economic Adjustment Program and given its non-investment grade by the rating agencies,[26] the ECB was no longer able to lend cheap money to Greek banks directly from Frankfurt, as before. Yet now Greek banks were in much greater need than ever before as deposits were being withdrawn at a fast pace. As a result, banks turned to their last resort funding source, namely BoG's expensive ELA channel, and their borrowing skyrocketed.

From January to June 2015, financing through ELA, rose from zero to €86.8 billion, while the total dependence of Greek banks on the Euro-system in June 2015 reached €126.6 billion. This amount of June borrowing was, in fact, even higher than the deposits of banks' private sector customers, which were only €120 billion! It should be noted that the outflow of deposits stopped only on 28/6/2015, i.e., on the day when capital controls were imposed (see Figure 1.2).

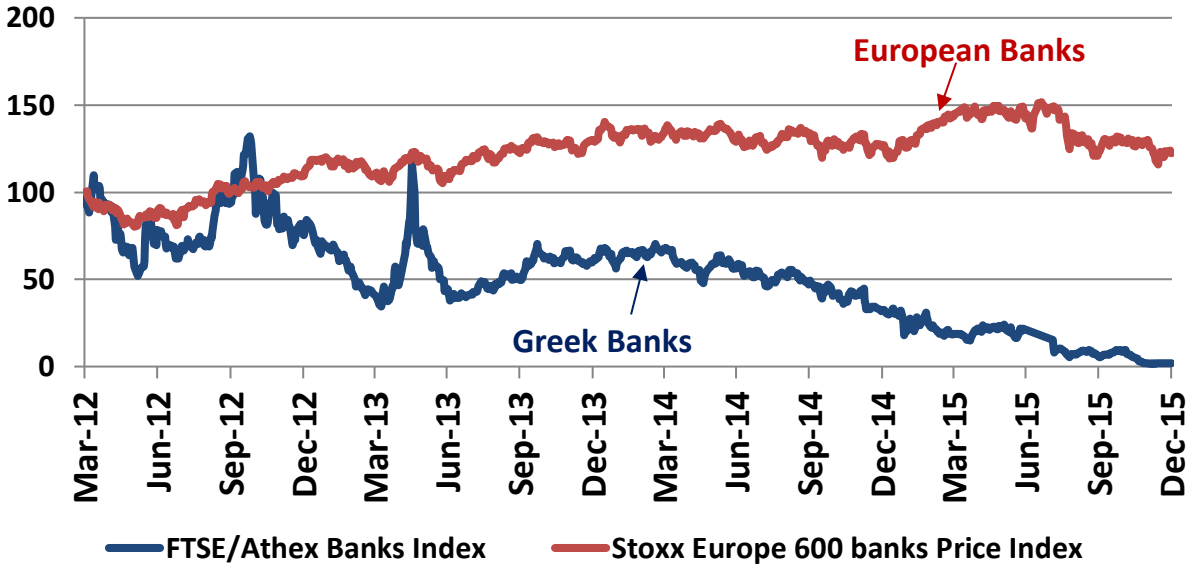
The fear of being forced out of the Euro Area also brought about the famous political "somersault" regarding the result of the July referendum. Namely, the government decided to bypass the "no" decision of the earlier referendum. The self-inflicted recession of the first semester essentially forced the government to seek assistance from the European partners and sign on July 13, 2015 the third Economic Adjustment Program for the period until 2018. Under the new agreement, Greece could borrow up

[26] At the beginning of 2015, the rating of S&P was B (1/28/2015) and Moody's was Caa1 (2/6/2015).

to €86 billion over the ensuing three years, with €25 billion earmarked exclusively for the stabilization of the banking system.

Figure 1.4

Comparative evolution of bank share prices in Greece and Europe
(March 2012 - December 2015)



Source: Bloomberg

Note: The indices start with the price 100 on 28/2/2012 and incorporate the value of the reinvestment of intermediate dividends. The Greek banking index is the FTSE Athex Bank. The European banking index is the Stoxx Europe 600 banks.

Given the new recession and the adverse environment, the SSM then decided to reexamine the balance sheets of Greek banks, launching a year ahead of schedule, i.e., in October 2015, the Asset Quality Review and the Stress Tests, which were normally expected to take place in the third quarter of 2016 alongside the rest of the European banking sector. The main reason for the time acceleration of the biennial stress tests was the sense of a potential need to recapitalize the banks with state resources, something that according to the new legislation on banking union in the European Union, could not be done without a significant bail-in contribution, possibly using deposits as well. The bail-in legislation would be effective as of January 2016 and, thus, the risk of using deposits to rescue banks, as had previously taken place in 2013 in Cyprus, was real.

The AQR and stress test results were announced on October 31, 2015 and the need for new capital injections to the four systemic banks was great, approaching €14.4

billion.[27] This verdict came as an unpleasant surprise and was a major setback for the banks, since precisely one year earlier when a corresponding AQR and stress tests had been performed, no additional capital had been required.[28]

The recapitalization of November 2015 highlighted two important issues. First, in only four years after the PSI and the previous collapse of stock process, bank stock prices hit zero again. This is illustrated in Figure 1.4, in which an investor starts with an initial investment of €100 in March 2012, immediately after the first almost zeroing of securities in February. In November 2015, the initial €100 were completely lost. By contrast, as a measure of comparison, we notice that during the same period, an investment of €100 in European banking stocks maintained their value at around €100.

This second zeroing of the value of the Greek banking shares, in contrast to their first near zeroing in February 2012, came at a significant cost for the Greek State because this time the State through the HFSF was a shareholder of the banks.[29] The loss was, therefore, large for the shareholder: From the end of April 2014, i.e., immediately after the second recapitalization, until the beginning of December 2015, i.e., immediately after the completion of the third recapitalization, the HFSF lost €23.4 billion. The amount is calculated as the difference in the value of the HFSF portfolio between the two dates, plus the amount of HFSF participation in the capital increase in November 2015, less the HFSF income from the sale of shares to private investors, who exercised the right to purchase shares from the HFSF in the same period between April 2014 and December 2015.[30] This amount of €23.4 billion could potentially have reduced the public debt and, unfortunately, was lost.[31]

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[27] Source: ECB, Press Release (10/31/2015) https://www.bankingsupervision.europa.eu/press/pr/date/2015/html/sr151031.el.html

[28] Note that the minimum capital ratios imposed by SSM on Greek banks in November 2015 with respect to the AQR and stress tests results increased significantly compared to the corresponding minimum ratios in the pan-European exercise of October 2014. In November 2015, the baseline stress scenario minimum CET1 ratio was 9.5% compared to 8% in October 2014, and the adverse stress scenario minimum CET1 ratio was 8% compared to 5.5% in October 2014. The stricter requirements have many economic and political interpretations, yet they appear as an adverse treatment of Greek banks by the supervisor.

[29] After the third recapitalization, the reverse split of Piraeus Bank and the conversion of preference shares of NBG into common shares, on 30/11/2015, the HFSF held 3,694,688,694 shares of NBG out of a total of 9,145,269,049 shares, 169,175,146 shares of Alpha from total of 1,537,955,879 shares, 2,307,508,300 shares of Piraeus from a total of 8,733,945,129 shares and 52,086,673 shares of Eurobank from a total of 2,170,278,049 shares. Source: HFSF Annual Report 2015, p. 59.

[30] The loss is calculated as follows: Let VALUE(t) be the variable that represents the portfolio value of all the shares of the 4 Greek systemic banks, held by the HFSF on date t. Then the loss or profit of the HFSF from the second to the third recapitalization is equal to VALUE (12/9/2015) - VALUE (4/30/2014) - amount of participation in the third recapitalization + income from the sale of shares to individuals who exercised the rights to purchase shares in the period between the two recapitalizations = €(2,665,115,375.07 - 20,937,027,167.57 - 5,425,660,748 +252,929,368) = - €23,444,643,172.5 or - €23,444.6 million or -€23.4 billion. Please note an additional complication: At the beginning of December 2015, the recapitalizations closed with the additional purchase by the HFSF of Conditional Convertible bonds (CoCos) issued by both Piraeus Bank, with a nominal value of €2.04 billion, and by the

Second, in November 2015 the HFSF percentage participation in banks fell even further, as in the new recapitalization two of the four banks (Eurobank and Alpha) managed to raise all the required capital by the SSM exclusively from the private sector. Thus, the participation of the HFSF was limited to 40.4% in NBG, 26.4% in Piraeus,[32] 11% in Alpha, and 2.4% in Eurobank. It was the perfect irony of Greek politics: A "leftist" government at the end of 2015 essentially privatized the banks, which had previously been nationalized by a "center-right" government.

The following Figure 1.5 presents the evolution of bank shares after their second zeroing in November 2015. Investors start with an investment of €100 on November 30, 2015. We observe sharp fluctuations: Four years later, in November 2019, the value of the investment was around €78, at the same level as the shares of European banks. Then, especially after March 2020 and the coronavirus crisis, stock values fell sharply and in July 2020 the index had gone down to €31.7.

Will investors in Greek banking stocks be unfortunate for a third time? Many pessimists claim that it will take years for banks to fully clean up their portfolios so that they can have double-digit rates of Return on Equity, that their sources of profitability are uncertain, that they have no vision for the future, and so on. Others are more optimistic and believe that having withstood the crisis of 2010-2018, banks will succeed in their new post-covid dual role, namely to both finance the economy and offer satisfactory profitability and dividends to their shareholders. The answer obviously depends a lot on the course of the coronavirus pandemic and the economy in 2020-2021.

National Bank of Greece, with a nominal value of €2.029 billion. The price of those CoCos at that time was close to par and, accordingly, they do not affect our previous calculations.

[31] The HFSF itself estimates that it lost €25 billion in equity value over the whole period from the first to the third recapitalization of the four systemic banks. Of course, to this total HFSF cost, one would also have to add the cost of resolving the non-systemic banks, which amounted to €13.5 billion and was paid by the HFSF. Please consult the HFSF annual financial reports, which contain HFSF's own estimates of losses in recapitalizing the four systemic banks. These reports reveal the following losses: April-December 2013: €5.98 billion; January - December 2014: €9.69 billion; January - November 2015: €9.33 billion. Therefore, a total of €25.0 billion loss.
http://www.hfsf.gr/files/hfsf_annual_report_2013_el.pdf
http://www.hfsf.gr/files/hfsf_annual_report_2014_el.pdf
http://www.hfsf.gr/files/hfsf_annual_report_2015_en.pdf

[32] If the Piraeus Bank CoCos were to be converted into shares by the HFSF, then the current HFSF ownership percentage of 26.4% would go up to 61.3%.

Figure 1.5

The comparative evolution of bank share prices in Greece and Europe
(November 2015 - July 2020)

Source: Bloomberg

Note: The indices start with the price 100 on 30/11/2015 and incorporate the value of the reinvestment of intermediate dividends. The Greek banking index is the FTSE Athex Bank. The European banking index is the Stoxx Europe 600 banks.

In August 2020, the share prices of Greek systemic banks were very low not only in relation to their level before the coronavirus crisis (Figure 1.5), but also in relation to their book value.[33] The latter imbalance suggests that either bank stock prices are much lower than their fair values,[34] possibly temporarily due to the coronavirus crisis, or that their book values are overestimated due to a possible overestimation of the true value of the NPEs in banks' books, or both, which is most likely. The market price and fair value of a bank are mainly monitored by shareholders and other investors, while its book value is mainly monitored by accountants, auditors and supervisors, who apply capital adequacy regulations based not on the stock market value but on the book value of the bank's equity.

[33] According to Bloomberg, at the beginning of August 2020, the Price / Book Value ratio of Eurobank and NBG was close to 0.22, Alpha 0.11, and Piraeus 0.08.

[34] The term "fair value" is mainly adopted in order to reflect the fundamental ("real economic") value, in contrast to both (i) the market value, which may have temporary short-term fluctuations, and to (ii) the book value, which is measured on the basis of acquisition cost ("historical cost"). Under the accepted Accounting Standards, fair value is the value at which an asset could be exchanged, or a liability settled between two counterparties that act consciously, know the object of the transaction, and the transaction is objective and neutral, i.e., it is done on market terms.

A bank's book equity is particularly sensitive to the method of recording non-performing exposures (NPEs). A mispricing of NPEs automatically leads to a mispricing in a bank's equity. The problems of NPEs, their possible mispricing in the books of banks and the effects – a likely over-estimation - on book capital, are issues analyzed in the following section.

2. Non-performing exposures and the Damocles swords of capital adequacy and DTC

2.1 Greek banks today: Smaller international presence, new corporate governance rules and stricter provisions

Today, European banks spend a lot of time and significant resources on their regulatory compliance, while in Greece the issues of corporate governance and non-performing exposures have gained a leading role in their daily operations. Following the international financial crisis in 2007-2009, both in Europe and Greece the bank regulatory framework became stricter across the full spectrum of bank activities, especially in terms of the quality and quantity of required equity capital, the size and type of liquidity, the transparency towards investors or even the bank strategy. In Europe, after the Greek crisis, bank supervision became even stricter for an additional reason: the drive towards a banking union, which has three legs: A common regulator, similar solvency requirements and a common deposit insurance. The common regulator, SSM, has already made its presence quite visible, while the new solvency rules have led to MREL: Minimum Required Eligible Liabilities.

In Greece, the supervision of banks became even stricter because after the PSI of 2012, the four systemic banks were recapitalized with State resources. The State's participation in the first recapitalization, decided in February 2012, immediately activated the European Union Directorate-General for Competition. Since then, DG Competition is actively involved in the strategic choices of systemic banks, forcing them to draw up three-year plans, involving a contraction of their unnecessary assets, subsidiaries and a lot of their international activity. Today, the majority of those banks have already satisfied the DG-Comp requirements.

The three-year period from 2011 to 2013 was dramatic in terms of the size, the operations and the strategy of Greek banks. They experienced a first big shock when, during the ongoing crisis, their largest customer of their loan portfolio, the Hellenic Republic, essentially told them "*I will not repay you*." The banks had lent the Hellenic Republic in two ways: First, by having purchased Greek government bonds of a total nominal value of €43.6 billion; and second, by having lent to large companies belonging to the perimeter of the General Government an amount of €5.0 billion. As already

mentioned, the PSI stipulated that only part of the total debt was to be repaid. This led to a loss higher than the banks' book equity. It essentially bankrupted the banks, although in legal terminology, a bankruptcy never occurred.[35]

Then in 2013, as already mentioned, banks were recapitalized mainly with State resources, which the Hellenic Republic borrowed from the EFSF (and ESM later)[36] and the IMF. The State became the dominant shareholder of the systemic banks through the Hellenic Financial Stability Fund (HFSF). At that time, DG Competition, became the main regulator of their strategic choices. This was the second major shock that the banks experienced, which very much determined their current size and range of services. DG Competition intervened in the overall strategic planning of banks. One of its actions was to put pressure on systemic banks to sell their subsidiaries abroad along with other assets (non-core businesses: insurance, hotels, leasing, etc.). In two of the four systemic banks, which were financed by the State for a second time in November 2015, the said pressure seems to have turned into a clear obligation.[37]

The corporate governance rules came into force in the summer of 2013 when the HFSF, as the main shareholder, signed a Relationship Framework Agreement (RFA) with each of the four systemic banks, which is still in force and defines the relationship between the HFSF and banks. With these agreements, the HFSF has played a decisive role in improving the corporate governance structures of systemic banks.

Then, in November 2015, shortly before the third recapitalization and following a decision in principle at the Euro Summit on July 12, 2015,[38] as well as discussions and

[35] Regarding the PSI-led "bankruptcy," the counter argument by the Hellenic Republic to possible bank complaints, is that without the PSI the Hellenic Republic itself would essentially "go bankrupt," and consequently a suspension of payments from the State would bankrupt the banks anyway, plus it would also have abrupt and multiple additional negative effects on the entire economy, households, businesses, retirees, and even civil servants, everyone. According to this counter argument, the PSI was the least painful solution, as the debt haircut was similar across all lenders, coordinated and "voluntary," having the agreement even of the other Euro Area countries, whose citizens or companies had also lent the Greek State.

[36] The European Financial Stability Facility (EFSF) was established in June 2010 as a temporary institution to address the crisis in the Eurozone. Subsequently, it lent money to Greece, Portugal and Ireland. From 2012 to 2015, it lent a total amount of €141.8 billion to Greece. See https://www.esm.europa.eu/assistance/greece/efsf-programme-greece-expired . The European Stability Mechanism (ESM) was set up in September 2012 by the Euro Area member states as a permanent organization to provide emergency loans to Eurozone members under a monitoring memorandum. It is based in Luxembourg and up to date has lent to Greece, Ireland, Portugal, Spain and Cyprus.

[37] In retrospect, this new architecture appears to many observers as sub-optimal both for the banks and the State. Many foreign countries in which the Greek banks operated are in economic prosperity and thus banks lost a significant source of recurring annual profitability. Some observers even go as far as calling the withdrawal of Greek banks from the wider region as an issue of clear "national defeat," as economic power translates directly into political power in the relations between countries.

[38] The text of the results of the Summit makes a clear reference to the issues of corporate governance: "The Greek government must ... in agreement with the institutions take the necessary steps to strengthen the financial sector, including decisive action on non-performing loans and measures to

negotiations with the Troika (or the Institutions), further steps were taken to improve the corporate governance framework of the Greek systemic banks, in which the HFSF was a major shareholder. Namely, Law 4340 / 1.11.2015 amended Article 10 of Law 3864/2010 and established the criteria and qualifications for the participation of the board members in the banks, as well as the requirements for the chairs of the various board committees. An HFSF representative always participates in the Board of Directors.[39]

Since then, corporate governance issues within the four systemic banks have been at the core of their processes. The HFSF has taken important initiatives, such as the repeated assessment of the members of the boards of directors as well as of the members of the board committees. It may be noted that by 31/12/2017, 59% of the board members and 73% of all non-executive board members had been replaced, while in March 2018 specific guidelines were issued for the selection process and the appointment of the members of the boards of directors at Greek systemic banks.[40] The participation of independent members on the board, which was almost unknown until recently in Greece, has renewed the make-up of board membership, offering significant added value.[41]

Another issue that is of particular importance for Greece, given that NPEs are very high in the country, is the Single Supervisory Mechanism's (SSM) policy for NPEs. In fact, the term "Non-Performing Exposures" (NPEs) was introduced in recent years by the SSM itself in Europe in order to describe more accurately the percentage of bank loans of dubious quality. NPEs include traditional non-performing loans (NPLs), which are 90 days past-due loans, denounced loans, and Unlikely to Pay (UtP) exposures. The latter are defined as "non-performing" under qualitative criteria, even though they are either being repaid or are less than 90 days past-due. In fact, this category mainly includes loans that are being regularly repaid but have been recently rescheduled by the bank

strengthen the governance of both the HFSF and banks, in particular by eliminating any possibility of political interference, especially in appointment procedures."

[39] See the HFSF website: http://www.hfsf.gr/el/rfa_2015.htm The requirements of Law 4340 were particularly restrictive for those who had worked exclusively in Greece in the banking sector or had been involved in politics in the previous years. The obvious aim was to put a break in the existing status quo of political interference and other unwanted practices of the time. Yet some experts today claim that the restrictions were somewhat arbitrarily imposed, mainly on domestic Greeks and without competency assessment criteria, plus they contrast with articles of the Greek Constitution. The restrictions, however, continue unaltered to this day.

[40] See http://www.hfsf.gr/files/HFSF%20Guidelines%20BoD%20Selection%20Process.pdf

[41] A topic of constant discussion in the domestic financial press is the strong presence of foreign independent members, especially because they chair the most important committees of a bank (Audit, Risk Management, Nomination & Governance, Strategy, Remuneration Committees) are, by the criteria of the Law, essentially only foreign. These members add significant international experience and a different and valuable perspective on banking issues, but are obviously less familiar with the domestic economic, business, political and legal realities.

(usually going back at least 12 months and at most 36 months) in order to facilitate the borrower.[42]

The SSM has greatly tightened the provisioning standards for NPLs. In March 2018 it announced that for loans that have no collateral, provisions have to reach 100% of the value of the loan for loans over 2 years past-due. For loans with collateral, provisions should be at 40% of the nominal value of the loan at the end of the third year past-due, with this percentage increasing to 55% at the end of the fourth year, 70% at the end of the fifth year, 85% at the end of the sixth year and 100% at the end of the seventh year.[43] Therefore, the pressure on Greek banks from existing NPEs is very high, not only for the obvious reason that those loans ultimately need to generate cash revenue, but also because as time goes on, more provisions are required for the same NPEs.[44]

2.2 NPEs and the health of systemic banks at the end of 2019

NPEs showed an upward trend during the crisis and peaked at €107.2 billion in the first quarter of 2016, having increased by €92.6 billion since the end of 2008, at the onset of the crisis, when they used to be €14.6 billion. Given the cumulative 26% drop in economic activity during the crisis, the rise of NPEs is normal. Of course, among the troubled borrowers, who have lost their jobs or businesses and, accordingly, cannot meet their obligations to the banks, there are also strategic defaulters, who simply use the protection of the Law to avoid repaying their loans. For example, according to the study by Artavanis and Spyridopoulos (2020), 37% of non-performing first-home mortgages belong to strategic defaulters.[45]

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[42] The above categorization of loans is made by SSM for supervisory reasons. There is a second similar but different categorization based on International Financial Reporting Standards (IFRS). Today, according to the IFRS-9 standard, loans are divided into three categories, from 1 (better) to 3 (worse) and category "3" is very close to the concept of NPEs. Also note a second confusion. Today, the Bank of Greece, in the data it publishes, it no longer distinguishes between NPEs and NPLs and publishes the same size for both variables. At the same time, the EBA (European Banking Authority) publishes data on NPEs, but their definition includes not only loans but also bonds. Thus, the data of EBA for the NPEs do not correspond to the data of the Greek banks and the BoG for NPEs.

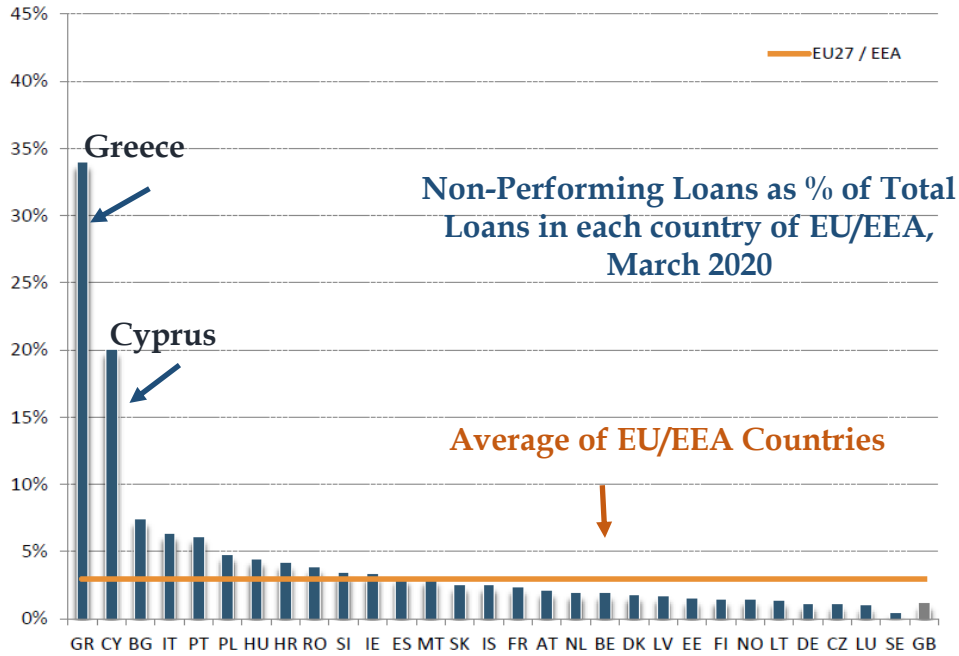
[43] See "Addendum to the ECB Guidance to banks on non-performing loans: supervisory expectations for prudential provisioning of non-performing exposures", March 2018.

[44] Note that by increasing the pool of provisions over time, the amounts of annual profits that could potentially be channeled into an increase in equity are being reduced. In other words, given the course of profitability and the broader health and strategy of banks, the new stricter legislation on provisions makes the banks' capital base falsely appear a little weaker.

[45] During the crisis, the Hellenic Republic hastened to protect its citizens from the effects of the crisis and, especially borrowers, through a series of laws ('Katseli' Law, etc.). Issues related to the legal framework and its impact on economic behavior are important, yet are beyond the scope of the present article. For example, since the fall of 2020, a topical issue of discussion is the formulation of the new bankruptcy code, which also aims to restore the culture of payments. Some observers and bank representatives argue that payment culture is not sufficiently promoted in the new bankruptcy Law. Others, coming from the political opposition, claim the opposite, i.e., that the new bankruptcy Law has designed an

Figure 2.1

Percentage of Non-Performing Loans in relation to Total Loans
(Countries of EU/EEA – March 2020)



Source: European Banking Authority (Risk dashboard data as of Q1 2020)
https://eba.europa.eu/risk-analysis-and-data/risk-dashboard

Note: The chart compares the percentages of NPLs because comparable data exist only for NPLs. NPLs are less than the NPEs, discussed in the main text.

Today the volume of the NPEs continues to be excessively high; indeed, the highest in Europe. Figure 2.1 compares Greece with the rest of Europe. Comparative data are available only for NPLs and not for NPEs. Thus, only for this chart we use NPLs as a measure of comparison. According to EBA data on NPLs, in March 2020 the percentage of NPLs in Greece was approximately 31.5 percentage points higher than the European average. In fact, it was about 14 percentage points higher than the corresponding percentage of Cyprus, a country that in 2013 experienced a severe banking crisis and used the deposits of its customers for the relief of the banks (bail in) and for a long period was the country with the highest percentage of NPLs and NPEs in Europe.

Table 2.1 presents a more detailed picture of each of the four Greek systemic banks (Eurobank, NBG, Alpha, Piraeus), namely their assets, NPEs, profitability, and capital adequacy ratios. The data are collected from the published balance sheets of each banking Group at the end of 2019. At Group level, at the end of December 2019 the

aggressive framework of asset liquidation, which Greek society and the Greek economy do not have the strength and endurance to bear.

average percentage of NPEs was 39.4% with Alpha and Piraeus having the highest percentages.[46]

The data of December 2019 do not reflect the large securitization under the "Cairo" project, worth €7.5 billion, completed by Eurobank in the first half of 2020. In the last two columns of Table 2.1, there is an estimate of the impact that the securitization would have if it had been completed earlier, in December 2019. The picture of Eurobank and the rest of the banks is improving, with Eurobank gaining at least a temporary lead over the other banks in achieving the target of reducing NPEs.

Table 2.1 also provides a first analysis of the question of whether or not banks have the ability to cover losses in the very extreme case that the entire portfolio of NPEs is completely written off, i.e., in the event that the banks do not receive any income from those loans, while the corresponding collateral, which supports NPEs, has zero value.[47] The sum of the NPEs across the four systemic banks is €70.2 billion, and this value in the analysis we assume goes to zero. The corresponding cushion, which can absorb the previous loss, consists of the banks' equity and provisions (or reserves). Using the total regulatory capital of €28.1 billion and the provisions of €33.4 billion, the total cushion amounts to €61.5 billion. In all banks, in December 2019, the cushion was smaller than the NPEs by €8.7 billion. The conclusion is that the banking system cannot withstand a total write-off of NPEs.

[46] It seems that in recent years, the stock market valuations of Greek banks are determined almost exclusively by investors' assessment of the quality of their loans and the scope each bank has for "forward-looking" positive initiatives on the issue of NPEs. Due to the size of the problem, common valuation ratios such as, for example, the Price / Book Value ratio, which typically depend on a future profitability perspective, in Greek banks today they are determined almost one-to-one by the quality of each bank's loan portfolio in combination with its excess capital, as expressed by indicators such as the NPE ratio, the Texas ratio, etc. Thus, as mentioned earlier, the Price / Book Value ratio today, in August 2020, is extremely low for all banks indiscriminately. This is a result of the fall in bank stock prices following the outbreak of the coronavirus crisis (see Figure 1.5), as well as an overestimation of the value of part of the NPEs in the banks' books.

[47] The analysis is related to the description of the Texas Ratio, an index used by bank analysts. It is equal to the ratio:
NPEs / (Regulatory Capital + Total Provisions). Observe that Texas Ratio <1 or Texas Ratio <100% indicates durability. Durability is also indicated by a positive “capital cushion.” Table 2.1 also shows and defines as “capital cushion” the difference between the denominator and the numerator.

Table 2.1

Assets, NPEs, Profitability and Capital Adequacy of Systemic Banks in Greece
(€ million, Group Level – December 2019)

Group Level December 2019	Eurobank	NBG	Alpha	Piraeus	Total	Eurobank post Cairo	Total post Cairo
1. Assets	64,761	64,248	63,458	61,231	253,699	63,427	252,364
2. Risk Weighted Assets (RWAs)	41,407	36,900	47,483	45,410	171,200	39,385	169,178
3. Gross Loans	44,406	34,938	48,731	50,148	178,223	39,306	173,123
4. Non-Performing Exposures (NPEs)	13,000	10,939	21,827	24,470	70,236	6,184	63,420
NPEs over Gross Loans (%)	29.3%	31.3%	44.8%	48.8%	39.4%	15.7%	36.6%
5. Total Provisions	7,099	5,757	9,558	10,986	33,400	3,663	29,964
Coverage rate (Provisions/NPE)	54.6%	52.6%	43.8%	44.9%	47.6%	59.2%	47.2%
Provisions for IFRS-9 stage 3 loans	6,556	5,282	8,877	10,631	31,346	3,120	27,910
6. Pre – Provision Income (PPI)	943	829	1.136	1,161	4,069	n/a	n/a
Net Interest Income	1,377	1,190	1,547	1,435	5,549	n/a	n/a
Net Fee & Commission Income	354	256	340	318	1,268	n/a	n/a
7. Tangible Equity	6,287	5,057	7,939	5,332	24,615	4,953	23,281
8. Regulatory Capital CET1	6,917	5,966	8,495	6,732	28,110	5,178	26,371
CET1 / RWAs (%)	16.7%	16.0%	17.9%	14.8%	16.4%	13.1%	15.6%
Fully loaded (for IFRS-9) CET1/RWAs (%)	14.6%	12.9%	14.9%	13.0%	13.9%	10.9%	13.0%
9. Deferred Tax Credit (DTC)	3,821	4,500	3,167	3,900	15,388	3,821	15,388
DTC / CET1 (%)	55.2%	75.4%	37.3%	57.9%	54.7%	73.8%	58.4%
Capital Cushion ≡ Rows (8) + (5) – (4)	1,016	784	-3,774	-6,752	-8,726	2,657	-7,085
Texas Ratio ≡ Rows (4) / [(8) + (5)] (%)	92.8%	93.3%	120.9%	138.1%	114.2%	69.9%	112.6%

Notes:

1. All amounts are expressed in million euros. CET1 (Common Equity Tier I) is high quality regulatory capital. DTC (Deferred Tax Credit) is a component of CET1. The definition of CET1 for Piraeus Bank includes its conditional convertible bonds, which amount to €2.04bn.

2. In 2020-H1, Eurobank proceeded with a successful securitization of NPEs with the code name "Cairo." Based on this event, the two far-right columns present pro-forma estimates, incorporating the 2020 securitization into the 2019 data, as if the securitization had taken place earlier, in December 2019. Hence, there is a pro-forma post-Cairo reduction in loans and NPEs by €6.8 bn; in provisions by €3.4 bn; in capital by €1.7 bn; and in RWAs by €2.0 bn.

3. Source: Annual Reports 2019 for all four banks, plus announcements of mid-year 2020 Financial Statements.

The picture for the total capital cushion improves slightly after Eurobank's Cairo securitization. The pro-forma total regulatory capital is now estimated at €26.4 billion, provisions (or reserves) at €29.9 billion, and thus the total cushion becomes €56.3 billion. With the new smaller total amount of NPEs at €63.4 billion, the cushion continues to be in deficit, though smaller, at €7.1 billion. Despite this deficit, it should nevertheless be noted that the analysis explores a very extreme case, in which NPEs together with their collateral bring zero income to the banks. In reality, NPEs do have quite a bit of value. This was the reality in a number of already completed NPE sales/securitizations. This issue is further analyzed below.

2.3 Capital adequacy as a constraint to NPE reduction

In the effort to reduce the amount of NPEs through either sales or securitizations, banks face two major constraints. The first is capital adequacy and the second is the legislation on DTC. The first constraint is imposed by the supervisory authorities and the second by the valuations of private market participants. We examine both, beginning with the first constraint and most serious one.

Regulations on minimum capital requirements are in force since the early 1990s and are known as "Basel" regulations. They are based on the notion that the more equity capital, contributed by its shareholders, a bank has, the greater is the protection it can afford to offer to its remaining fund providers, including its depositors. These regulations even define the minimum required capital ratio as a percentage of risk-weighted assets.[48]

The valuation of a bank's equity capital fluctuates over the years due to many factors: A capital increase raises equity capital, so does the positive after-tax profitability, which is not distributed to shareholders in the form of dividends. The sale of assets at a price lower than their book value reduces equity capital. Equity capital is also easily being reduced by the securitization of NPEs, as will see later with a specific example.[49]

The strictness of the Basel regulations has increased over the years. In 2019, the SSM required Greek systemic banks to have a) a minimum total regulatory capital of 13.75% of their risk-weighted assets, and b) a minimum Common Equity Tier 1 or (CET1) ratio

[48] See Juan Ramirez, "Handbook of Basel III Capital."

[49] In the sales or securitizations of NPEs that took place up to date, the observed price always turned out to be less than the valuation in the books of the bank. This indicates that the NPE book values are over-estimated, which is also consistent with the simultaneous very small Price-to-Book value ratios observed in the stock market for Greek banks.

of 10.25%. In fact, these minimum ratios increased in January 2020 to 16.0% and 12.5% respectively.[50]

Table 2.2

Sensitivity Analysis on the Capital Needs after a Securitization/Sale of NPEs (€bn)

NPEs Transfer Price	Target of CET1/RWAs (Target CET1 ratio)						
0	6%	8%	10%	12%	14%	16%	18%
60%	20.9	18.2	15.5	12.9	10.2	7.5	4.9
50%	14.6	11.9	9.2	6.5	3.9	1.2	-1.5
40%	8.2	5.5	2.9	0.2	-2.5	-5.2	-7.8
30%	2.0	-0.8	-3.5	-6.2	-8.8	-11.5	-14.2
20%	-4.5	-7.1	-9.8	-12.5	-15.2	-17.8	-20.5
10%	-10.8	-13.5	-16.2	-18.8	-21.5	-24.2	-26.9
0%	-17.2	-19.8	-22.5	-25.2	-27.9	-30.5	-33.2

Note: The analysis is performed for the sum of all four banking groups based on their balance sheet data at the end of 2019, post Cairo, as shown in the far-right column of Table 2.1. The analysis assumes NPEs go to zero immediately, i.e., in early 2020. Hence, the analysis does not incorporate the positive influence on capital from the profitability of years 2020 and beyond (about €3 to €4 billion per year) or the post March 2020 capital gains from the reduction in Greek government bond yields (about €2bn), nor the negative impact of the coronavirus crisis on the NPEs (an expected capital cost of around €3bn to €4bn in 2021-2022), the extra IFRS-9 provisions (about €3.2 bn until year 2023), or the gradual retirement of DTC (about €760 million per year).

On the vertical axis, the selling/securitization prices of NPEs range from 0% (low) to 60% (high). On the horizontal axis, the minimum capital ratio targets (CET1/RWAs) range from 6% (low) to 18% (high). Positive figures in the Table indicate the existence of a surplus of billions of euros in relation to the respective CET1/RWAs target and given the respective transfer price. Negative figures indicate a deficit and the need for a capital increase. The analysis assumes the total amount post-Cairo NPEs of €63,420 million is transferred out (goes to zero), and only the provisions for IFRS-9 stage 3 loans are used up. This implies that the new clean balance sheets do have adequate provisioning, namely the provisions for the existing stage 1 & stage 2 loans (healthy up-to-date loans & restructured loans of good quality), worth €2.054 million.

The table calculations are explained with the following example of the pair [price: 30%, capital target: 12%]. We assume the transfer price of the total of €63,420 million NPEs is 30%, hence banks receive €19,020 million. The loss of capital is equal to €16,484 million (= sale receipt of €19,026 + provisions of €27,910 – loan write-off of €63,420). Hence, total CET1 capital is reduced from €26,371 million to €9,887 million, assuming no additional deferred tax is recognized. Next, the loan write-offs are assumed to reduce RWAs by €35,510 million, which represents the difference between the book value of NPEs and their respective provisions (NPE €63,420 - Provisions €27,910), multiplied by an average risk weighting of 100%. [Note that for banks that do not use the standardized method of calculating RWAs but the internal ratings-based approach (IRB), the impact on RWAs is smaller]. Therefore, the new RWAs are now lower at €133,668 million. Hence, the assumed CET1 target of 12% of the new RWAs, implies a capital target of €16,040 million. This target is above (higher than) the existing CET1 capital by €6,153 million: €9,887 - €16,040 = -€6,153 or - €6.2 billion in the table. This capital gap is 4.6% of the new RWAs.

[50] According to Table 2.1, it is easy to see that the January 2020 increase in the minimum CET1 ratio is fulfilled by all banks. For Piraeus Bank, the previous two minimum capital ratios are higher by 0.25% (of weighted assets).

The abrupt increase of the minimum capital requirements in January 2020 may appear extreme, yet it can easily be justified if we were to compare capital adequacy ratios in Greece with those in other countries of the European Union. According to the EBA dashboard, differences between average ratios in EU countries are small, yet in 2019 the CET1 ratio in Greece was the fourth worst in the EU and the total capital adequacy ratio was the fifth worst.[51]

Following the outbreak of the coronavirus crisis in March 2020, the supervisory authorities took a decisive step and greatly eased these requirements, thus enabling banks to increase their lending without the need for additional capital: They reduced the required minimum capital ratios for Greek banks to 11.5% for total capital and 6.7% for CET1.

The supervisory restriction on minimum capital requirements is a significant barrier for Greek banks at a period when efforts are being made to drastically reduce NPEs. As already noted, this is because the reduction of NPEs typically implies a reduction in banks' equity capital. For example, suppose a non-performing loan has a book value of €100 thousand in the bank's assets. Assume the bank keeps provisions for this loan worth €45 thousand. Suppose next that the loan with its collateral is securitized/sold at a price of €40 thousand. As a result, the bank suffers an accounting loss equal to €15 thousand (= €100,000 – €45,000 – €40,000). This loss of €15 thousand is deducted from its annual profitability and, consequently, from its equity capital.[52]

The above example demonstrates a harsh reality for banks today as they are forced to adopt a strategy of rapid reductions in their NPEs. The strategy is difficult to achieve without a simultaneous reduction in their profitability and their equity capital. In fact, the higher the percentage of NPEs in their balance sheet or the lower the percentage of provisions that cover those NPEs, the greater the reduction in their capital.

Table 2.2 presents a sensitivity analysis of the Core Equity Tier I (CET1) capital needs of Greek systemic banks if they were to attempt to shed their entire NPE portfolio through sales or securitizations in the first quarter of 2020. The capital needs in the table are shown as a function of two variables, which describe the view of supervisors (horizontal axis) and the view of the market (vertical axis). The first variable is the required minimum capital adequacy (CET1) ratio, a target imposed by SSM. The second variable is the transfer price of NPEs as a percentage of the nominal value of the loans

[51] https://www.eba.europa.eu/sites/default/documents/files/document_library/Risk%20Analysis%20and%20Data/Risk%20dashboard/Q4%202019/882137/EBA%20Dashboard%20-%20Q4%202019.pdf

[52] The accounting loss of €15,000 in the example also suggests that before the sale / securitization of the loan, its value in the bank books was over-estimated by €15,000.

in the bank's balance sheets.[53] The target CET1/RWA ratios are recorded on the horizontal axis, starting at 6% and rising at two percentage point intervals up to 18%. Transfer prices are recorded on the vertical axis, start from the extremely pessimistic value of 0% and then rising at 10 percentage point intervals all the way up to the very optimistic case of 60%. The combination of capital requirements in the range of 10% - 12% with transfer prices in the range of 30% - 50% will most likely reflect the reality of events in 2021.

The analysis of Table 2.2 is based on bank Group data at the end of 2019, adjusted pro-forma to incorporate the large Cairo securitization of Eurobank, which already took place in the first half of 2020. The analysis shows the capital needs that would arise if the sale/securitization of NPEs were to take place in the beginning of 2020. The table reveals the somewhat ambiguous and stressful capital position of the banking sector. In January 2020, the cleaning up of its balance sheet could be achieved without raising new capital in many of the optimistic scenarios of Table 2.2, or conversely, the cleaning up would require huge amounts of additional capital in Table 2.2 the pessimistic scenarios of the table. For example, if the transfer price of NPEs is at 30% of the nominal value of the loans and SSM's target CET1 ratio 12%, then the cleaning up of NPEs would new equity capital of €6.2 billion. If, however, the supervisor is more lax and her requirements are only 8%, a percentage only slightly higher than the current (2020-Q4) requirements, then with the same price of 30%, the cleaning up can be achieved with new capital of just €0.8 billion.[54]

Of course, if transfer prices were to fall to the neighborhood of 20%, then the total capital needs would easily skyrocket, and some of the banks would be pressed for immediate recapitalization.[55] As a cautionary remark, it should also be noted that in the case of low transfer prices, in reality, the capital needs would be much more painful

[53] One could have used an alternative variable on the vertical axis of Table 2.2 in the place of the percentage sale / securitization price of the total NPE portfolio. Such an alternative is the balance of NPEs that are not collateralized via real estate, etc. Indeed, we already observed in earlier sales that consumer portfolios were priced at 3% -11% of their book value because they did not have sufficient collateral, while the price for small business loans and loans to corporates seems to exceed 30% of their book value, the Pillar securitization commanded a price above 50%, the Cairo securitization had a price of 33%, and so on. Our analysis in Table 2.2 does not specialize by type of portfolio and amount of collateral. It is simple, general and can be easily applied by the reader to any future portfolio that is up for securitization or sale.

[54] Note that due to the coronavirus crisis, for Greek banks the minimum requirements of the SSM for Regulatory Capital CET1 have been reduced, at least temporarily, to slightly below 7%.

[55] The analysis in Table 2.2 focuses on the high quality, Tier I, CET1 capital. As mentioned earlier, supervisory rules have an additional limit on total capital, namely Tier I plus Tier II capital. Tier II capital can be met, for example, with the issuance of subordinated bonds. Three of the four systemic banks (NBG, Alpha, Piraeus) have already issued such Tier II bonds. Also note that there are additional regulatory rules on bank resolution, like the Minimum Requirement on Eligible Liabilities (MREL), which are pushing banks to unwillingly issue extra bonds, whose service subtracts from their annual profitability. By contrast, for the moment, the new Basel III liquidity regulations are not very restrictive because after March 2020 the ECB provides ample liquidity to all banks.

than those described in the corresponding cells of Table 2.2. This is because low market prices are not generated in a vacuum. Low prices usually occur alongside a deterioration in the level of NPEs. In Table 2.2, NPEs are assumed to remain stable at their level of the first half of 2020. However, the more we, as analysts, believe that transfer prices are declining, the more we should be expecting that along with falling prices, NPEs are also increasing. Both forces operating together would be pushing the capital needs much higher than those in the cells of the table. The table highlights only the effect of the first of the two forces, namely prices.

The notes in Table 2.2 utilize a specific example and painstakingly describe the methodology behind the calculations of the capital needs in every cell of the table. Thus, the reader has the tools to verify by herself/himself all the figures of Table 2.2, based on the data provided in Table 2.1. In addition, using the same methodology, the reader can calculate the capital needs for each bank separately. The required individual bank data are already tabulated in Table 2.1. Once she finishes the exercise, she will also find out large differences between the four banks.

The calculations in Table 2.2 show the new capital needs at the beginning of 2020. Thus, the analysis does not incorporate the negative impact of the coronavirus crisis on the economy and banks. An increase in NPEs due to the coronavirus crisis, under normal circumstances, would imply higher provisions. If, for example, in the next 18 months – through to the end of 2021 – new NPEs of around €6 billion do occur, then additional provisions of at least €3 billion would be required initially.[56] And, based on the supervisory rules, this amount of provisioning can easily increase over time and can potentially even rise all the way up to the full amount of €6 billion of NPEs. Note, however, that the SSM has recognized the negative effects of the crisis on banks and proceeded to relax the regulatory restrictions. It announced that any new provisions in 2020 and 2021 for Stage 1 and Stage 2 loans (i.e., not credit-impaired loans), will begin influencing the banks' regulatory capital from year 2022 onwards. Accordingly, some of the new capital requirements emerging from the coronavirus crisis are temporarily transferred to the future, after 2021.[57]

If we were to calculate the capital needs for a total cleaning up of balance sheets at the end of 2021 or beginning of 2022, namely, including the events of the additional years 2020 and 2021, then the calculations of Table 2.2 would have to be adjusted with the expected additional post-Cairo inflows and outflows in 2020 and 2021. A ballpark estimate of this adjustment is a capital relief on every cell of Table 2.2 by around €3 to

[56] The amount is, of course, an estimate. More pessimistic estimates place the NPE figure closer to €10bn. The future figure also depends on the type of loans that can turn into NPEs, given that different types of loans need different amounts of provision coverage. Moreover, the moratorium of 2020 has frozen the NPE scenery and generated a lot of uncertainty regarding a future sudden cliff effect.

[57] A pan-European bad bank, funded with emergency-coronavirus-related European credit, is likely to reduce the negative effects of NPEs and spread them to the long run.

€4 billion. A large inflow is the profitability of the four systemic banks before provisions, which in two years are likely to range between €6 to €8 billion.[58] Regarding outflows, a first major outflow is the gradual amortization of the DTCs, which is estimated to be around €1.5 billion in two years.[59] A second outflow comes from the new IFRS-9 accounting standards, which were imposed in 2018 and the effect of their additional provisions on capital is gradually phased in through 2023. At the end of 2019, we were still at the beginning of this phase in route.[60] Overall, summing up the opposing forces of inflows and outflows, the picture of capital needs at the end of 2021 or beginning of 2022 is expected to improve slightly (relative to each cell in Table 2.2) by approximately €3 to €4 billion.

Next, suppose we become ambitious and wish to calculate the capital needs for cleaning up the balance sheet four years later, at the end of 2023 or beginning of 2024. We would then have to add to our previous estimates of end-2021 or beginning-2022, the additional inflows and outflows in 2022 and 2023. However, for the years 2022-2023, forecasts are tenuous. It is not easy to predict the end of the pandemic, nor the future course of the economy with clarity. The future behavior of the supervisory authorities is also unknown, i.e., whether they will go ahead and establish a Bad Bank or what would be their desired new level minimum capital requirements. We simply expect the economy to recover, profitability to improve, and regulators to take a tougher stance again.

In the years 2022-2023, there will be capital inflows from the annual profitability of banks but also significant outflows. For example, the amortization of DTCs will continue, while NPEs, as long as they remain on the balance sheets of the banks, will impose increased requirements for additional provisions. According to the new SSM policy (see Addendum 2018), after the first seven years of any past-due loan, the default provision becomes 100%. Today the provisions coverage for NPEs is only 47% (Table 2.1). In addition, in the years 2022-2023, there is likely to be a significant increase in the loan portfolio of banks, by approximately €10-15 billion, of which €5 billion concerns financing for securitizations. The said increase also implies an increase in capital requirements. Finally, 2023 coincides with the entry into force of the tighter regulations of Basel IV. While the coronavirus crisis may slightly postpone the

[58] Another inflow is the amount of trading gains from the portfolios of Greek government bonds, whose yields have significantly declined since March 2020. This figure is around €2.0bn, of which €1.4bn belongs to the National Bank. The figure was not added to the calculations.

[59] The withdrawal is estimated at €760 million per year: NBG €219 million, Alpha €158 million, Piraeus €194 million, and Eurobank €189 million.

[60] It is estimated that by the end of the journey, in 2023, the additional capital needs will top €3.2 billion. Part of this amount will be borne in the two years 2020-2021. Note also that banks have already formed all these provisions in their balance sheets. The phase in exists only for reasons of presentation of banks' regulatory capital. That is, in 2023, the banks' regulatory capital will have decreased by €3.2 billion compared to that in Table 2.1, but the level of provisions will remain unaffected.

implementation of some of the ingredients of Basel IV, we nevertheless expect an additional negative effect on capital.[61]

Table 2.3

Individual bank forecasts of their future NPEs in December 2018

(% of total loans, million euros)

	2018A	2019E	2020E	2021E	2022E
Eurobank	37%	16%	13%	9%	
	16,700	6,400	5,100	3,400	
NBG	40%	32%	26%	14%	
	15,400	11,100	8,900	4,300	1,600
Alpha	51%	n/a	n/a	20%	
	21,700	16,200	11,800	7,400	
PIRAEUS	53%	n/a	n/a	23%	
	26,400	22,900	16,500	11,300	
TOTAL	80,200	56,600	42,300	26,400	

Note: The figures are based on banks' submissions to the Single Supervisory Mechanism for 2019-2022. The statistics of 2018 capture the actual data at the end of 2018. The statistics for 2019-2022 represent the banks' own estimates, which were made at the end of 2018.

Table 2.3 shows the plans of banks to reduce their NPEs all the way up to 2021-2022, as submitted to the SSM in early 2019. The plans are mainly of historical importance but indicate the degree of banks' ambition to reduce NPEs quickly, especially because back then they were under enormous pressure by the SSM to immediately resolve the NPE problem. In reality, measures for accelerating the reduction of NPEs were taken only in December 2019, when the Ministry of Finance went ahead and enacted Law

[61] A McKinsey study by Schneider, et.al. (2017), shows an additional burden on CET1 of approximately 5 percentage points of RWAs.

4649/2019. According to this Law, known by the name of "Hercules", a Hellenic Asset Protection Scheme was set up, which carried a Greek State guarantee.[62]

The Hercules scheme is similar to the Italian GACS scheme (Garanzia Cartolarizzazione Sofferenze), which has been in force in Italy since 2016. The Greek scheme was originally designed in 2018 by the HFSF and then modified in the fall of 2019 to be applicable for a country with a lower credit rating than Italy's.[63] In summary, a Special Purpose Vehicle (SPV) can be set up, which purchases the NPEs and is financed by means of bonds issued in three different quality ratings: The lower quality Junior (or Equity) and Mezzanine Tranches are transferred to investors at a market price, and the higher quality Senior Tranches are typically retained by the Bank itself and carry a Greek State guarantee. The guarantee fee is proportional to the senior tranche risk as well as the risk of the Greek State.[64]

Following the legislative regulation in December 2019, the Ministry of Finance implemented a plan for the immediate securitization of a large amount of NPEs, worth around €30 billion. According to the respective law, the Greek State can grant up to €12 billion in total guarantees, provided that the necessary criteria of the Law are met. By the end of 2019, all the banks had rushed to declare their future participation in Hercules and in the first half of 2020 Eurobank completed the Cairo securitization. Then, in the beginning of August 2020, Alpha Bank announced that it was moving forward with its initial securitization plan under the name Galaxy, but at the somewhat lower amount of €7.7 billion. Piraeus Bank followed with the Phoenix Project, worth €1.9 billion, while the largest Vega package, worth €5 billion, seems to have been postponed. NBG is preparing its Frontier Project, a package of mainly mortgages, amounting to approximately €6.1 billion.[65]

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[62] Banks are often criticized for lacking ambition in reducing NPEs. We mentioned two main reasons, the lack of capital and DTC. There are, however, practical reasons for the delay in reducing NPEs as well. These are due to the country's developing financial and institutional environment, such as the lack of an organized secondary market for loans, the lack of an encompassing bankruptcy law, the lack of legal framework for the operation of servicing companies, etc. For example, the framework for the establishment and operation of servicers was originally defined in 2016 by the Act of the Executive Committee of the Bank of Greece (82 / 8.3.2016), following the enactment of Law 4354/2015 Government Gazette A 176/16.12.2015. Today, after many revisions of the previous Acts, the framework for the establishment and operation of servicing companies is determined by the Act of the Executive Committee of the Bank of Greece 118/19.5.2017.

[63] The detailed proposal of the HFSF was in the closets of the Ministry of Finance since November 2018. See HFSF Annual Financial Report 2019, p. 11 (http://www.hfsf.gr/files/hfsf_annual_report_2019_en.pdf). One could argue that the delay in the implementation of "Hercules" had a demonstrable high cost for the banking system. Had the plan been properly processed and implemented by the end of 2018, instead of the end of 2019, the coronavirus crisis in 2020 would have found the banking system in a more robust state, possibly with about €30 billion less NPEs.

[64] In the package of loans to be securitized, in addition to the NPEs, healthy loans can also be included.

[65] The coronavirus crisis, which began in March 2020, has reduced somewhat the degree of ambition in many securitization projects.

After the first quarter of 2020 and the advent of the coronavirus crisis, the concern about the course of NPEs and consequently banks' capital needs became particularly intense. As mentioned above, the Asset Protection Scheme was created before the coronavirus crisis and, thus, may no longer be sufficient for a satisfactory future consolidation of balance sheets. With the SSM's tolerance, banks have provided their customers a moratorium period until December 2020, but it is difficult to predict what will happen with the pandemic and the economy thereafter.

The analysis of Table 2.2 showed that the capital needs of banks may easily soar, especially if the amount of NPEs increases. The BoG also began to worry about the possibility of a new generation of NPEs. Thus, in the Financial Stability Report of July 2020, the BoG states that it is developing a proposal for a scheme that sets up an NPEs Asset Management Company (AMC) for Greek banks, or a "Bad Bank" in colloquial usage.

The BoG claims that the proposed AMC scheme can run in parallel with the banks' existing infrastructures and brings added benefits. The AMC can address both the NPEs and the DTC problem, while taking into account all the state aid restrictions imposed by DG Competition on banks.[66]

2.4 Deferred Tax Credit (DTC) as a constraint to NPE reduction

The second limitation to rapid NPE reduction stems from the required positive amount of annual bank profitability. In the earlier example, an NPL with a book value of €100 thousand is transferred out of the balance sheet at the price of €40 thousand, while the bank has provisions against the loan worth €45 thousand. The transfer creates a loss of €15 thousand, which is deducted from the annual accounting profitability of the bank and from its equity. The example shows how easily the bank's accounting profitability can turn negative after a sharp and large reduction in the NPE portfolio, even at a time when the bank's regular business profitability shows no particular problems.

[66] The proposed project had not been made public at the time of writing, so it is difficult to further analyze its benefits and estimate its costs. The BoG claims that in the plan the possible losses related to the existing stock of NPLs are covered exclusively by the banks and not by the Greek taxpayer, up to the minimum limit of the capital adequacy ratio. According to E. Tzortzi (Kathimerini newspaper, 30/9/2020), an amount of €40-45 billion NPEs is expected to be transferred to the AMC by the banks. In a more recent description by N. Malliara (web-site: capital.gr, 8/10/2020), it is stated that there is a state guarantee in the difference between the value of the securities with which the loans have been transferred to AMC and the price at which the investor will buy them. The state guarantee carries a commission, which banks would pay to get it. The guarantee would cover the loss resulting from the sale of NPLs at market prices lower than their net book value. Banks will be able to record these losses on their balance sheets in installments over a period of five or seven years, while the payment of the guarantee to the State will be made by writing off from the bank an equal amount of "deferred tax credit."

Negative accounting profitability (at the bank level and not at group level, i.e., on a solo basis) is undesirable for the private shareholders of Greek banks because in this case the DTC regulation requires the Greek State to offer cash and in return to take up bank stocks of equal market value.[67] This exchange between cash and stocks creates two problems. First, it dilutes private shareholders as the State gains more shares. This dilution is typically undesirable for all private shareholders. Second, now the State is in need of additional resources to be able to purchase the stocks. Today the Greek State does not have the luxury of allocating scarce resources towards the further nationalization of its banks.[68]

The constraint on non-negative annual profitability seems to have less direct impact than the previous constraint on capital adequacy. This is because the problem of negative accounting profitability can be averted, the first time it occurs, without a significant financial cost, using the method of "hive-down." The method was invented in 2018, during the time of the SYRIZA-ANEL government, and Eurobank was the first bank to implement it. Eurobank announced in November 2018 two simultaneous policies: First, a merger plan with its subsidiary, Grivalia, that would boost its capital base,[69] and second, a large securitization plan of €7.5 billion by means of hive-down that would greatly clean up its portfolio. The securitization would have resulted in large accounting losses of approximately €1.2 billion, but thanks to the arranged hive-down, the bank avoided issuing and selling new shares to the Greek State, thus escaping a partial nationalization.[70]

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[67] The cash conversion formula in DTC is as follows: Cash infusion by the State = [(net operating loss / (equity at the beginning of the period)] X (total DTC). That is, if, for example, the annual net operating loss is 10% of the Bank's total equity at the beginning of the pre-loss period (i.e., the case of 10% negative RoE), then the State has to offer cash equal to 10% of the existing DTC and receive stocks of equal value.

[68] Recall the DTC legislation was voted by the Greek Parliament in September 2014 with Article 5 of Law 4303/2014. It effectively restored a significant portion of Deferred Tax Assets (DTAs) to the category of regulatory capital, capable of complying with the new capital adequacy rules. The ultimate goal was to avoid a new recapitalization of banks, since earlier, in April, Greek banks had already been recapitalized. Yet in the summer of 2014, SSM carried its own Asset Quality Review and Stress Tests in Greece and in all other countries, before taking over the supervision of the European systemic banks in November 2014.

[69] The merger was completed in February 2019 and increased the equity capital of Eurobank by €0.9 billion. It represented a vote of confidence by the major shareholder of both Eurobank and Grivalia on the future of the Bank and the Greek economy. The shareholder essentially placed all the capital gains from Grivalia into Eurobank's capital. This capital was used to absorb losses from the "Cairo" securitization, which was completed in the following year.

[70] The securitization was completed in the first half of 2020 with an accounting loss of €1.2bn and without the hive-down, the dilution would have been huge because the loss of €1.2 billion is deducted from pre-provision income on a solo basis. As a result, pro forma solo negative profitability would be around 20% of equity, which would have implied a large DTC conversion into cash infusion. For example, if the share price of Eurobank were at €0.40 and the capitalization was at the level of €1.5 billion, then new shares with a total value of €760 million would have to be issued, i.e., about 1.9 million new shares, which would be added to the existing 3.7 million currently owned by 99% of Eurobank private shareholders. As

The hive-down method is the accounting separation of the balance sheet of the existing bank into two banks, say "NewCo" and "HoldCo." HoldCo holds all non-performing loans to be securitized on its asset side, and a capital cushion on its liability side. NewCo has all the banking activities, the banking license and, among other things, the regulatory capital of DTC. When the securitization is completed, the resulting loss from the sale of the NPEs (or from their distribution to shareholders) impacts HoldCo and not NewCo. Hence the loss, while absorbing capital from HoldCo, it does not activate the DTC because the DTC is elsewhere, it does not belong to HoldCo. In the coming years, however, any further losses at NewCo will trigger a DTC conversion.

The above hive-down description clarifies that the first time around, the dilution of shareholders can be avoided, yet the danger of a future dilution remains if in the first NPE securitization the balance sheet is not fully cleaned up. If, for example, after the hive-down there are still 20% or 30% of NPEs remaining in the balance sheet of the bank, then the next time the bank records negative profitability, it may be forced to issue shares in favor of the State. Also, the hive-down method is not innocuous, as it does carry operating costs.[71]

In 2019, two more banks, Alpha and Piraeus announced that they would also go ahead with a hive-down exercise. NBG, which at the end of 2019 had faced fewer difficulties with NPEs than other banks, until the advent of the coronavirus crisis, considered that it could reduce its NPEs without the assistance of the hive-down method. This is because, relative to December 2019, it sits on a cushion of yet unrealized bond profitability worth €1.4bn. It can, therefore, easily decide to book those profits, raise provisions, and avoid a hit on profitability and a triggering of DTC. Hence, its €6.1 billion securitization project "Frontier" is likely to be launched in 2021 together with the other banks.

3. Bank profitability under pressure

3.1 International factors affecting profitability

The low stock market performance of Greek and foreign banks, illustrated in earlier Figure 1.1, indicates the intense pressure banks have been undergoing with respect to

a result, the Greek State would appear today as the main shareholder of the Bank with a percentage ownership of 35%.

[71] The operating costs of the hive down stem from the fact that the old bank (HoldCo) retains some rudimentary functions, i.e., it is not "ghost bank." Observe also that the Bank of Greece, in the recent semi-annual July 2020 summary of its Financial Stability Report, criticizes the hive-down method (and the existence of DTC) on best governance arguments because the practice allows private shareholders to acquire proportionally more voting rights than their true percentage equity ownership.

their profitability over time. In recent years, this pressure originates from three main factors: The first factor is the low level of nominal interest rates. When interest rates are low, the difference between lending and deposit rates becomes small as well, limiting net interest margins. Unfortunately for banks, this negative factor is likely to last. The Covid-19 pandemic, which began in the first quarter of 2020, has caused a deep recession across the world, reducing the demand for loans and other financial services. Central banks around the world responded by cutting short-term and, in some cases, even long-term interest rates. And this accommodating behavior may not change any time soon as the coronavirus crisis appears prolonged. As a result, the period of low interest rates will not be a short-lived phenomenon. Low interest rates are expected to plague the financial sector for a quite some time.[72]

A second factor is the intense competition banks face, especially in retail banking from high-tech companies, namely Fin-Tech and, above all, Big Tech companies. These companies plus other shadow banking companies, seek to penetrate the most profitable activities of banks, such as credit cards or transaction and payment services, but at the same time are not subject to the strict restrictions imposed on banks by supervisors.[73] In Europe, they are also facilitated by the PSD2 EU Directive 2015/2366, as they are given the opportunity to obtain information about the banks' clientele with relative ease, while the European legislation on GDPR (General Data Protection Regulation (EU) 2016/679), makes it difficult for traditional cross-selling by banks, i.e., the sale to the same customers of different products from another source, such as their subsidiary companies. This competition significantly dents banks' customer bases. Yet banks have not remained idle. They have made big investments in new technologies and their digital transformation is under way, having in fact been accelerated by the Covid-19 crisis and the need to perform banking activities from home. These investments, however, increase their annual operating costs for a substantial period ahead, which further puts their profitability under pressure.

A third factor is the tightening of the supervisory framework, which reduces bank risks but also increases their financial costs. After the financial crisis 2007-2009, and especially after the drive for banking union in Europe in 2012-2013, the supervisors have hardened their attitude. Basel III, which entered into force in 2014, has become more restrictive than Basel II. Supervisors require banks to have high quality capital (Common Equity Tier I – CET1 capital) and much more than they had in the past (i.e., now there is a countercyclical capital buffer, a conservation buffer, a supplementary capital for systemic banks, Pillar II supplementary capital, etc.). New regulations were

[72] Analyst forecasts of future inflation and interest rates diverge, although many do claim we are facing a "paradigm shift." See, for example, Jerome Powell (2020).

[73] These are companies that provide only a small subset of the full spectrum of banking services, hence manage to escape the regulatory definition of a "bank," which allows them to avoid the strict supervisory and regulatory control to which the banks are subject.

brought into effect for banks regarding the minimum level of liquidity they should maintain (Liquidity Coverage Ratio (LCR), Net Stable Funding Ratio (NSFR)), the simple leverage ratio (Tier-1 capital divided by total assets), and the Minimum Requirement for own funds and Eligible Liabilities in the event of failure (MREL).[74] Moreover, the new accounting standards under IFRS-9, which came into force in 2018 introduced additional provisions.[75] In short, the list of new supervisory interventions is long and constantly growing, and the imminent Basel IV framework, if not postponed, is expected to gradually impact banks' capital adequacy from 2023 on, by around 5 additional percentage points.[76]

3.2 Additional domestic factors affecting profitability

In Greece there are additional factors that put pressure on the profitability of banks. First, there is pressure on the accounting measurement of profits, which stems from the current effort to reduce NPEs, in item relatively absent in the rest of Europe as NPEs are low there. According to the international accounting standards followed by all European banks, the interest on non-performing loans is calculated on their recoverable amount, despite the fact that the actual recovery of this interest will eventually take place at a later stage (e.g., after liquidation of the collateral). Today in Greece this amount is extremely high. In banks with a high percentage of NPEs, about 40% of net interest income is accounting income of this sort (income of stage 3 loans, according to the IFRS-9 standard).[77] This picture will change dramatically the moment non-performing loans decline, hence the accounting income disappears.[78] Of course, as balance sheets get cleaned up, banks do not have to keep taking extra annual provisions, the so-called "Cost of Risk" will be lower than in the past. This may help avert a dramatic reduction in profitability.

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[74] The extra MREL costs are particularly evident today. Banks are forced to issue bonds to comply with the regulation when, in fact, some may not need the liquidity they receive from issuing the bonds. The latest such example is the 'Green Bond' of the National Bank, issued on October 1, 2020. It has a nominal value of €500 million, a six-year duration, with the possibility of withdrawal in five years and a 2.75% interest rate. The bond has added an annual cost of €13.75 million to the bank's annual income statement for at least 5 consecutive years, at a time when deposits only cost about 0.3%, or only € 1.5 million for the same funding amount of €500 million.

[75] The four systemic banks took the extra €6bn of new IFRS-9 provisions, but for purposes of reporting their CET1 capital, it was decided to grandfather the effect on capital over a six-year period. At the end of 2019, there were still €3.2 billion of further extra reduction in capital.

[76] See the analysis of Schneider, et. al. (2017) by McKinsey, based on the European Banking Authority's 2016 study, "2016 EU-wide transparency exercise."

[77] Based on International Financial Reporting Standards (IFRS), interest on non-performing loans (NPLs) is credited on the recoverable amount of the loan, i.e., on a net basis after provisions, and not on a gross basis, i.e., on the nominal value of the loan. This interest is essentially the present value (discounted amount) of interest on the component of the loan the bank expects to recover in the future. Hence, if the bank's expectations of loan recoverability are correct, the interest accrued on the NPLs will eventually be fully collected, even if liquidation of collateral were to become necessary.

[78] Another question is whether the ratio of total interest to total loans will eventually decrease. Note that both the numerator and the denominator of the fraction decrease. The fraction will decrease if the numerator is subject to a greater relative drop.

During the years of NPE deconsolidation, the decrease in expected future profitability becomes transparent. This was previously explained in Section 2 through an example. NPEs become priced by the market and often this leads to a reduction in profitability and equity. This is because either the recoverable amount of NPEs in the books of banks is overestimated, or the provisions for those NPEs are low, or both.[79]

A second Greek factor that places further pressure on profitability comes from the digitalization of economic activities, which only truly got under way in Greece during this period, i.e., with some delay relative to other countries. The Greek State today is making a significant leap in the field of digitalization. Banks are at the heart of this effort, serving both the older and younger generations. At the same time, their structures are adapting to the new reality, with fewer branches, more digital platforms, fewer employees, remote work, and executives who are constantly undergoing training in new technologies. This transformation brings banks face to face with new challenges, while burdening them with new costs. Their digital investments are large but necessary, hindering their profitability in the short- and medium-term.

A third Greek factor placing pressure on profitability comes from the gradual activation of traditional bank customers who are turning to alternative sources of financing, such as corporate bonds, private equity funds, private debt funds, mezzanine funds, or crowd funding. For example, in recent years a substantial number of big corporate bond issuers appeared, such as Lamda Development, GEK TERNA, Mytilineos, Aegean Airlines, OPAP, Attica Holdings, etc. The four systemic banks compete in attracting as customers the large and healthy companies, have squeezed their loan interest margins and try to provide investment banking services.[80] In general, systemic banks have realized that if they offer standard mass-demand lending products, without inspiring their customers or providing them with expertise, then their profitability will be further eroded. A quick look at Table 2.1 and the sources of profitability in 2019 illustrates that commission income is a very small fraction of traditional interest income, which contrasts to other European banks, where commissions are almost at par with interest income as a source of profitability.[81] Apparently, there is a delay in Greece in offering non-traditional services to customers.

Intense competition is a fourth factor. SMEs remain an area offering greater margins in the profitability of banks given that these enterprises do not have the same access to alternative sources of funding. However, even in this case, the risk that profitability will

[79] See, as an example, a comparative analysis of the course of Greek systemic banks: "Greece: Banks", Citibank , 23/6/2020, https://www.protothema.gr/files/2020-06-23/Citi_Greece_Banks_June_2020__1_.pdf

[80] The shift of large customers of banks to alternative sources of financing has positive side effects as well, such as the reduction in their leverage ratios, hence a reduction in credit risk for banks.

[81] Of course, as discussed earlier, in Greece interest income seems to be artificially boosted up by over-booking interest income on NPEs.

be squeezed is high. In Greece, interest margins on SME loans are higher than in the rest of Europe, and this is driven by the much higher risk of these companies in Greece. Yet these margins are potentially shrinking as a result of the emergence of new predatory lenders that are competitors of banks and defy the risks involved.

The lack of presence of Greek banks in countries with high economic growth is an additional factor squeezing profitability. As mentioned earlier, Greek banks (at least two of the four systemic banks), were forced to cease their banking activities in foreign countries at a time when their previous multi-year activity was becoming profitable. This was due to the terms of the recapitalization with state funding. Yet, they may be able to operate again abroad in the future, after they completely clean up their balance sheets.

A final factor squeezing profitability comes from the high operating cost of banks. Most of the operating costs represents staff cost, which is being reduced gradually through voluntary retirement schemes. The aim is to bring the number of employees into line with today's much smaller size of banks, which is no longer what it used to be 10 years ago. In addition, a side effect of the crisis is that many competent bank executives were driven out of the banking system, either due to early retirement or their pursuit of new professional directions (private equity, consulting firms, business management, start-ups, business initiatives, etc.). Recently, a large number of experienced corporate banking executives have moved to Credit Management Services companies (Intrum, FPS). Thus, banks need experienced executives. For example, today, in the age of the coronavirus and the granting of a grace period to customers for their monthly installments, the traditional credit risk models of companies and individuals are obsolete. Credit risk assessment requires the use of quality criteria and previous experience in the assessment. Obviously, the experience is not the same as it was 10 years ago.

Despite the pressures on profitability, its increase is a one-way street in the strategy of Greek banks. Profitability provides the basis for gradually building up their capital base and for attracting shareholders, who would soon require satisfactory dividends. The current high degree of concentration in the banking sector, with 96% of assets belonging to just four systemic banks should help in this endeavor. Yet, the decisive factor for improving profitability is economic growth, an issue we analyze next.[82]

[82] A recent study by Karadima and Louri (2020) on banks in the Euro Area shows that the concentration of the industry is linked to the utilization of economies of scale, which along with digitization, are expected to lead to increased profitability. The study also shows that concentration helps in the quick reduction of NPEs, possibly due to economies of scale in their management / grouping / sale.

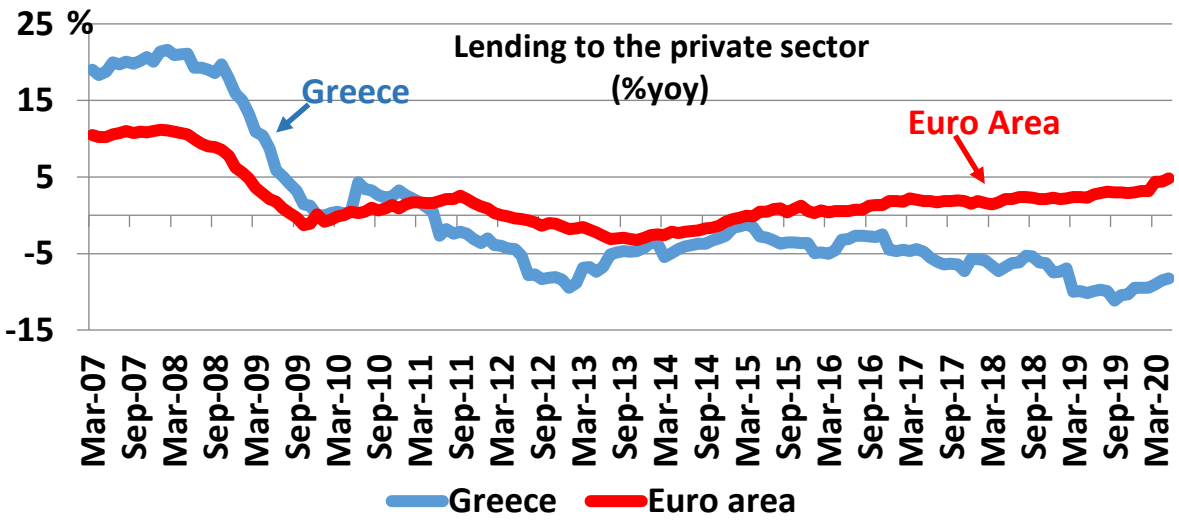
4. The bidirectional interaction between banks and the economy

The Greek crisis of 2010-2018 had a large negative impact on the lending activity of banks. The downturn in the economy reduced the demand for new loans, while the increase of NPEs brought to the surface the huge problems of households and businesses in repaying their debt, forcing banks to operate with strict selection criteria in granting loans. The Basel III strict supervisory framework has further heightened this cautiousness. Thus, both a reduced demand and a diminished supply contributed to a continuing reduction in the stock of total loans in the economy.

Figure 4.1 illustrates the annual rate of change per month in the total volume of loans in the balance sheets all banks in Greece. Since April 2011, the pace of change is negative consistently every month. Namely, in each month the volume of new loans is smaller than the volume of past loans that get repaid, causing the total volume to keep declining. Should we add up all these monthly loan reductions displayed in the figure, it becomes apparent that the Greek economy experienced a long period of enormous deleveraging.[83]

Figure 4.1

Annual rate of change in the stock of bank loans to the private sector in Greece and the Euro area



Source: Bank of Greece

[83] Deleveraging is also manifested in the asset size of banks, which decreased dramatically during the crisis. Total assets of banks in Greece on 31/12/2009 were €447,151 million (Annex IV, p. 88, Financial Stability Report, July 2010, Bank of Greece). Nine years later, on 31/12/2018 total assets had decreased by 43%, to €252,671 million (Table III.1, p. 20, Financial Stability Report, Bank of Greece, July 2020). Then in 2019, on 31/12/2019, total assets increased for the first time to €261,388 million (Table III.1, p. 20, Financial Stability Report, July 2020). Yet, this was due to an increase in bonds, not loans, which continued to decline (from € 150,608 million to € 149,342 million).

Deleveraging began at the onset of the crisis due to the decline in economic activity. The unsteady economy reduced loan demand and led to a contraction in banking activity. Borrower defaults steadily increased since 2008, first the non-collateralized consumer loans, followed by mortgages, and last small business loans and corporate loans. All along, the contraction in the economy and the defaults influenced bank lending behavior to become more conservative which, combined with stricter requirements by the supervisor, began to feed negatively back to the economy. In other words, a vicious cycle was created between the real economy and the financial sector, which seemed to have stopped by 2019.[84]

Indeed, in 2019 it looked as if something was changing, as the rate of change of loans channeled to businesses became positive for the first time in 8 years (Figure 4.2). These loans were aimed mainly for financing large technical projects, rather than small and medium-sized enterprises. Hence, it seems that in the near future this will be the path along which money will flow into the economy and the process of recovery will start: First an increase in large investments and related financing, then the diffusion of prosperity in the population, which would then generate growth in the demand for new loans by small- and medium-sized enterprises.

The economy in early 2020 had begun to enter a virtuous cycle, on an upward pro-cyclicality. But the coronavirus crisis in March halted the progress. The uncertainty is great because no one can predict how long the pandemic will last and the extent to which non-performing loans will increase. Banks are now obliged to make loan evaluations and take decisions in uncharted territory. Separating apart the sustainable businesses is particularly difficult. Separating companies with liquidity problems from companies with solvency problems is equally hard. It will take time for bank financing criteria to adapt to the new conditions, especially for those sectors that are heavily affected such as retail, food supplies, transportation, hotels, entertainment, etc., or sectors that need extra funding in the current crisis. And the Greek State has intervened with a wide array of household and business support programs, even a moratorium on loans, which before the covid crisis began were being serviced properly and on time.

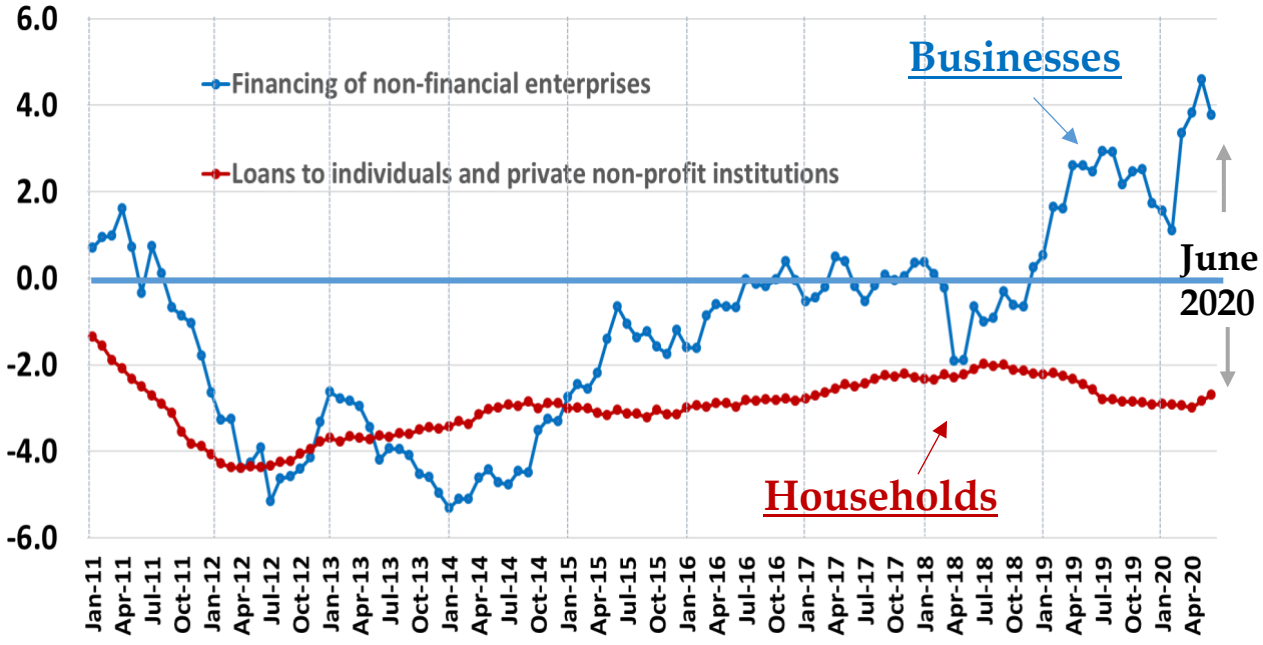
Year 2021 is likely to be more difficult than 2020 for banks. The grace period for many borrowers will be over, and banks will have to re-assess the creditworthiness of their customers (individuals and businesses) based on new facts and thus provide fresh funds. Indeed, the pressure for funding will be great, despite the possible adverse

[84] For a recent in-depth analysis of the two-way relationship between the economy and banks and the procyclicality issues, see Antzoulatos (2020), Chapter 16, and Figure 16.2.

conditions. In times of crisis, the banks are usually an easy target for the release of public anger. They also become the target of populist propaganda.

Figure 4.2

Annual rate of change in the balance of bank loans to households and businesses



Source: Bank of Greece

Despite the difficulties, over the coming year 2021, a new vicious cycle between the economy and the banking sector is unlikely to emerge, at least not with the intensity we observed in the recent past. The reason is clear: While the problems of the economy are affecting banks, policy makers are going out of their way to protect them, and vice versa, the problems of the banks are not affecting the economy as strongly and as directly as they did in the previous Greek crisis. Today, in contrast to the Greek crisis 2010-2018, banks do have ample liquidity, which can be channeled to solvent businesses with liquidity problems. Today, the ECB clearly pursues an expansionary monetary policy aimed at relieving banks and the economy. Today the banks' supervisory policy is flexible and accommodative to the needs of banks. In the past, there was no similar understanding of the Greek problems, nor was there ample liquidity for banks or a relaxed fiscal policy for the State and, as a result, the vicious cycle between banks and the economy was intense. In the past, the Greek banks and the Greek State were lonely amidst a crisis of their own, whereas today the crisis is common across Europe and the globe.

5. Conclusion

After an extremely turbulent period and painful restructurings in the first years of the previous decade of the 2010s, a new equilibrium is emerging today in the Greek banking system with four systemic banks holding the lion's share (96%) of the sector's total assets. A great boom of the economy or of new investments in the country have not yet materialized and remain the ultimate targets of policymakers. However, the country is out of the woods and so are most of its banks. Prior to the global 2020 Covid-19 crisis, by year 2019, economic recovery was gaining traction slowly for three consecutive years. The government kept generating large primary fiscal surpluses, interest rate risk premia on government bonds had fallen to reasonable levels, Greek banks had cut their ELA borrowing to zero, bank liquidity conditions had improved, corporate lending had begun to rise, and banks had managed to report positive profitability for the first time in a decade.

The banks' big challenge today is to reduce their legacy stock of NPEs. And serious steps have already been taken. In December 2019, the Greek parliament introduced a law, which allows the creation of an asset protection scheme, known by the name of "Hercules," in which the Greek State provides guarantees for the senior trance of the securitization, remunerated on market terms. And Hercules is on track despite a temporary slowdown, which the Covid-19 crisis brought. Eurobank was the first to utilize it with its €7.5 billion Cairo securitization in the first half of 2020. The other banks are following.[85]

The paper explains how a rapid reduction in NPEs results in negative profitability and a huge loss in equity capital. Both are problematic, particularly the loss of capital. Hence, the paper performs an analysis of what would the capital needs be in case the banks decided to eliminate the full stock of NPEs. Obviously, the capital needs are larger, the higher the stock of NPEs and the lower the provisions banks carry in their books. But capital needs are also larger, the stricter the regulator becomes regarding the minimum CET1 ratio, or the lower the market price of the securitized NPEs.

The stock of NPEs and the amounts of provisions are characteristics of the banks themselves. But the required minimum capital ratio and the market prices in the securitizations are exogenous to the banks. The first depends on the desires of the regulator and the second depends on the expectations of market participants. This leads us to perform a sensitivity analysis of the bank capital needs based on different minimum CET1 ratios and different market prices of the NPE portfolios.

[85] The other banks have also completed significant sales of loan packages, such as Alpha Bank with its Venus, Jupiter, Mercury, and Neptune projects (total value €4.5 billion), Piraeus with its Amoeba, Arctos, Nemo, and Iris projects (total value €3.2 billion), and National Bank of Greece with its Earth, Symbol, Mirror, Leo and Icon projects (total value €5.9 billion). Earlier, Eurobank also had completed the Pilar project (total value of €2bn). Of course, the big securitization schemes are starting now.

The results of the sensitivity analysis differ substantially across the banks as some banks are in higher need of capital than others. We only present the aggregate results and invite the reader to make her/his own calculations for each individual bank separately, providing the tools to do it. We are nevertheless able to arrive at specific conclusions pertaining to the aggregate of all banks. Namely, we conclude that under specific conditions, it may become possible to clean up the balance sheets of the banks without new capital increases. The first condition is for the Greek economy to stand on its feet in 2021 and for the banks not to face a new generation of NPEs that would entail new requirements for provisions and equity. The second condition is to enhance the credit culture of borrowers, hardly an easy task in the age of the pandemic where banks are providing customers with a new grace period. A third condition is that the transfer prices of NPE portfolios should not undergo a huge reduction compared with pre-covid crisis prices. The fourth condition is that the SSM should maintain its tolerance policy towards the problems of the banks in Greece and other countries of the European Union. Fulfillment of all those conditions is hard, yet if satisfied, we can safely deduce that the banking sector and the real economy would enter a new virtuous cycle.

In the medium term, the challenges Greek banks face are very similar to those of European banks, though with some distinct features. The environment of low interest rates, intense competition with technology companies that are gradually penetrating retail banking, and the constant tightening of the supervisory framework, is putting pressure on their profitability. At the same time, the old customers of the banks are engaging in alternative sources of financing, while banks are also rapidly undergoing transformation, with fewer branches, more digital platforms, fewer employees, remote work, and executives who are constantly undergoing training in new technologies. The economy is changing, it is being digitized, the challenges are multiplying, and the drive to increase annual profitability remains a strategic one-way street for banks.

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