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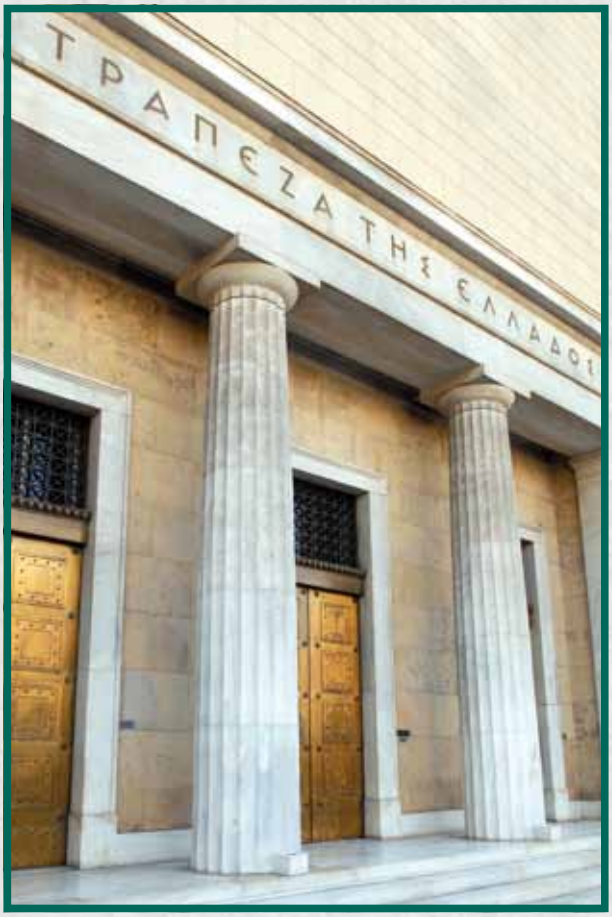

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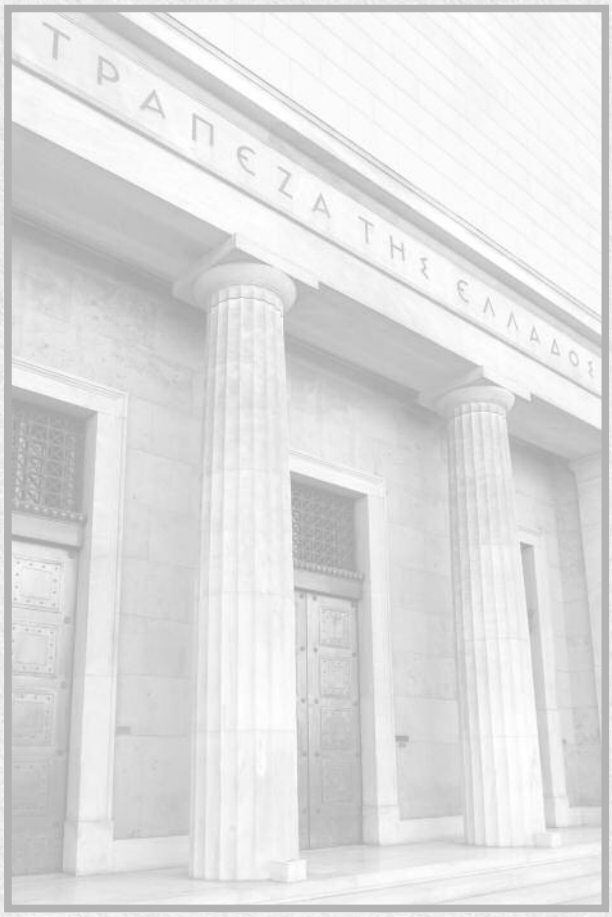

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THE EFFECTS OF MINIMUM WAGES ON WAGES AND EMPLOYMENT

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1 INTRODUCTION

The minimum monthly wage decreased by 22% in mid-February 2012, dropping from €751.4 to €581.1, where it remains still. The dramatic decline took place after unemployment surged from 10.5% in the fourth quarter of 2009 to 20.9% in the fourth quarter of 2011, while employment fell by around 14% in the same period. Greece, suffering the consequences of the fiscal derailment and the sovereign debt crisis, entered a fiscal adjustment programme as from May 2010, under an agreement between Greece on the one side and the IMF, the ECB and the European Commission on the other, which called for immediate cuts in wages in the public sector and pensions, causing average earnings to drop by 7.7% in the public sector and by 2.9% in the non-bank private sector in 2010. Respective reductions in 2011 were limited to 0.5% in the public sector and 1.7% in the private sector; only later, in 2012 and 2013, following the reduction in minimum wages and institutional reforms in the labour market, did a larger decline in average wages occur, which reached 6.5% per annum (Bank of Greece 2014b, p. 60; in Greek). Unemployment continued to increase, peaking at 27% in 2013, only to start falling in the second quarter of 2014; employment on the other hand followed the reverse course and has been recovering since mid-2014, particularly for wage-earners. The effects of minimum wages on the above-mentioned wage and employment developments have not been evaluated until now, empirically and systematically.

However, the impact from the levels of and changes in minimum wages on the labour market remains in the spotlight, with conflicting arguments in the public debate. On the one hand, supporters of an increase in minimum wages and daily wages argue that this would have a positive effect on the income of the low-paid and, thus, their contribution to limiting poverty and inequality, also emphasising their positive impact on aggregate demand. On the other hand, some claim that minimum wages above the wages that can actually be paid by the labour market would lead to job losses and in the end would lower employment. A comprehensive answer to this debate should be useful to government policies setting minimum wages in Greece which, in the absence of a comprehensive minimum social safety net for the protection of the financially distressed, have been the main instrument for the conduct of financial and social policy for decades, and appear to affect many workers. In fact, a clear answer would be particularly relevant in the current deep crisis, which involved the loss of 25% of Greece's pre-crisis GDP; closures of tens of thousands of businesses and excessive unemployment (in autumn 2014 over one in four of the labour force was unemployed, and one in five was already long-term unemployed); unconfirmed information suggesting that in several cases the wages are not actually paid, or at least not paid on time; and the intention of many young Greeks to seek work abroad. The benefits from setting minimum wages appear to be widely accepted and their abolition does not receive any serious support. Among such benefits are supporting a more effective use of the factors of production, putting pressure on employers to modernise technology, setting barriers to the infinite compression of wage costs, particularly in recessionary phases, in order to neutralise deflation dynamics, as well as encouraging the employed to be more productive at work. However, a minimum-wage policy for exiting the crisis that improves the financial position of low-wage workers without burdening employment is one thing, and a respective policy that has a sig-

1 Warm thanks are extended to Heather Gibson, Dimitris Malliaropoulos, Theodoros Mitrakos, Dimitrios Moschos, Hiona Balfoussia, Daphne Nicolitsas, Evangelia Papapetrou and George Simigiannis for their constructive comments. Any errors, omissions and judgements are the responsibility of the author.

nificant negative effect on employment is another.

This study aims to analyse the effects of minimum wages on the labour market in the private sector in Greece throughout the past decade, including the period after the onset of the current financial crisis. Mainly drawing on published IKA statistical data on employment and daily wages, combined with developments in minimum statutory daily wages, we aim to document the effects of minimum wages both on average daily wages and on employment in the labour market. The analysis of developments in the variables examined, as well as typical econometric estimates, clearly show that minimum wages are closely linked to developments in average remuneration in the private sector. However, an increase in minimum wages results in substantial job losses, which shows that Greece, in the current conjuncture of very high unemployment, needs to create more jobs at the minimum wage, rather than improve the position of low-wage labour by increasing minimum wages, which could make jobs more uncertain.

Next we begin by presenting the recent and current minimum wage setting framework in Greece, focusing on changes since the country adopted the fiscal adjustment programme (Section 2). We go on to briefly review recent developments in minimum remuneration, and present the relation between minimum wages and certain allowances, making some comparisons with other countries (Section 3). Then we review the literature on the effects of minimum wages (Section 4). Section 5 includes an empirical examination of the effects of minimum wages on average remuneration, while Section 6 assesses their impact on employment. The study concludes with a summary of our main findings (Section 7).

2 MINIMUM WAGE SETTING FRAMEWORK

Minimum statutory remuneration has a long history in Greece. It first appeared in publications of the Ministry of Labour in 1938, i.e. the year when it was adopted in the USA under the Fair Labor Standards Act. After an interruption during the war, it was reinstated at end-1944. Excluding periods of less than smooth political climate, when minimum wages are set by the government, as a rule they are determined after collective negotiations between employers and employees at a national level. It is worth noting that, while white-collar workers of both genders enjoyed the same minimum wages, minimum daily wages of female blue-collar workers were around 20% lower than those of male blue-collar workers, and gradually converged for reasons of gender equality in mid-1977. At the same time, the provision of lower wages paid to employees aged 18-20 was abolished, while lower minimum wages for employees aged 15-17 remained and was abolished in early 1989. Up until 1989 lower minimum wages were still in effect for the first, second and third year of employment of under-age workers, which have since converged with those of adults. By contrast, according to the National General Collective Labour Agreement 2002-2003, "*the general minimum wage levels in effect also apply to apprentice workers and technicians*".

Since 1982 the role of third-level trade union organisations in setting minimum remuneration has been upgraded, and up until 2011 minimum wages were determined centrally under the National General Collective Labour Agreement, which was negotiated by the General Confederation of Greek Labour (GSEE) and the three third-level employers' associations, and applied to all labour under employment contracts in private law, i.e either white-collar, defining the minimum salary, or blue-collar, defining the minimum daily wage for eight hours worked. If negotiations between employers and employees on the National General Collective Labour Agreement were unsuccessful, the interested parties turned to mediation. If mediation failed, disputes went to arbitration, which until 1990 was conducted by administrative arbitration courts formed by a judge, a government rep-

resentative and representatives of employers' and employees' organisations. In 1990 the dispute resolution procedure changed with the establishment of the independent Organisation for Mediation and Arbitration (OMED), which took up the tasks of arbitration courts. According to Fotoniata and Moutos (2010), 7 out of 17 NGCAs in the 1975-1990 period came from arbitration courts, while all NGCAs that followed stemmed from collective negotiations or mediation. Over time, government intervention in setting minimum wages has not been uncommon, either through the wage policy conducted or, when negotiations between employers and employees were unsuccessful, by putting minimum wage setting to compulsory arbitration by a government-appointed tribunal, the members of which were obviously influenced by the government's current policy towards pay increases (Burtless, 2001, p. 456).

According to legislation passed in 2011, the level of minimum remuneration is now defined by the government, specifically the Minister of Labour and Social Solidarity, after a recommendation from a special committee set up for this reason by the government, and following consultation with social partners. The transfer of the responsibility for setting the minimum wages from collective bargaining to the government following consultation, although within the framework of Greece's obligations and commitments arising from the Memorandum of Understanding, should still be seen us a step towards modernisation and Europeanisation, since this applies in the European countries that have introduced universal minimum labour earnings (with Belgium being the only exception). Accordingly, it should be noted that in certain specific advanced EU-countries (Denmark, Sweden, Finland, Italy, Austria, Cyprus) there are no statutory minimum wages (Eurostat, 2012, p. 223), while Germany, after the two major political parties reached an agreement, has applied since January 2015 a minimum hourly wage of €8.5, and sectoral hourly wages currently set below this level are projected to approach €8.5 by early 2017. The main argument behind the transfer of this task to the government was that the elected government, by setting minimum wages within the framework of the policies pursued, also takes into account the level of and outlook for unemployment, inflation, international competitiveness of the economy, economic conjuncture and social cohesion. By contrast, employers' and employees' organisations, as explicitly provided for in their statutes, aim to protect and promote the interests of their members, the former by increasing wages, the latter by averting any potential competition by new enterprises, ignoring other social groups (the unemployed, people displaced from the labour market, pensioners, the employed in the underground economy on the fringe of legality). Nor can the government-set minimum wages be seen as limiting the freedom of the collective bargaining process, since previous arrangements also provided for remuneration terms and conditions under collective agreements, which are concluded by a few, even though they are binding for the whole economy (Lixouriotis, 2011; in Greek). Empirical research has also shown that government-legislated minimum wages are less generous than minimum wages set through collective bargaining (Boeri , 2012).

Controlling compliance with legislation on minimum wages is a difficult task and is carried out by the competent state authority, the labour inspection service (SEPE), under the Ministry of Labour. SEPE makes recommendations to employers that fail to comply or break the law, imposes fines or even refers labour disputes to administrative courts, to which affected employees can always appeal. The SEPE annual Activity Reports do not imply an impressive increase in total labour disputes during the crisis (21,520 in 2012, against 20,550 in 2009, i.e. an increase of 4.7%); there is however a substantial increase in labour disputes as regards the delay or non-payment of wages earned (up by 22.6%), with the increase being stronger in sectors that are difficult to control.

In the period since 1974, minimum wages rose at a stronger pace than nominal GDP or the general wage level, thus helping to improve the position of low-wage workers, but also possibly increasing inflation (Centre of Planning and Economic Research (KEPE) 1990, p. 82; in Greek). During the 1980s, after a one-off increase by 48% at the beginning of 1982 following a decision of the Minister of Labour (by 27% in real terms) and a second increase in 1983, minimum wages (but often also the whole wage scale) were determined on the basis of an automatic indexation mechanism, called ATA. The implementation of the ATA was affected by economic developments (external deficits) and was either suspended or partial; as a result, the real minimum wage returned to around its 1993 level (Fotoniata and Moutos, 2010, Figure 1). Since the early 1990s, when the indexation mechanism was abandoned, minimum wages for long periods of time were determined by widely following the public sector wage policy announced. By contrast, the process to achieve the target of lower inflation in order for Greece to meet the Maastricht criteria to join the euro area was supported by the relatively moderate increase in minimum wages at the end of the 1990s. It appears that since the mid-90s minimum wages rose considerably over time, following the upward path of the economy. Specifically in the 2000s, as estimated by Ioannou and Ioannou (2013), minimum wages increased with the aim to make Greek wages converge towards euro area wages.

In May 2010, due to fiscal derailment and the sovereign debt crisis, Greece was cut-off from international money and capital markets and had to adopt a medium-term fiscal adjustment programme under the so-called "troika" (i.e. the European Commission (EC), the European Central Bank (ECB) and the International Monetary Fund (IMF)), which made it imperative to reduce unit labour costs. Losses in international competitiveness, as manifested in persistently high excessive deficits, called for a swift recovery. However, the then introduced tight fiscal policies and violent across the board wage cuts in the public sector did not help improve competitiveness. By contrast, the NGCE signed on July 15, 2010 provided for an increase in minimum wages as from the 1st of July 2011 by a percentage equal to the annual percentage change of the euro area inflation in 2010, which was estimated at 1.6%, and was paid. The NGCE itself provided for an increase in minimum wages as from the 1st of July of 2012, equal to the 2011-inflation in the euro area, which however was not implemented, due to the introduction of new legislation. Deprived of the external devaluation tool, since Greece is a member of the euro area, which would restore international competitiveness (and obviously reduce workers' real income), and under wage rigidity conditions with the dramatic decline in employment, Greece was led to successive legislation reforms in the second half of 2011 with the aim of reducing labour costs in the private sector, which culminated in the legislated cut in minimum wages, as from 14 February 2012, by 22% (by 32% for the young up to 25 years of age). Since then and until the completion of the fiscal adjustment programme, at end-2016, the minimum nominal salary remains at €581.1 for white-collar workers and the daily wage at €26.18 for full-time blue-collar workers. This reduction in minimum wages, which is close to the estimated loss of international competitiveness on the basis of relative labour costs during the 2000s, seems to have contributed to the subsequent recovery in competitiveness (Bank of Greece, 2014a, p. 72). This is also in line with the fact that average wages according to IKA data, which had been on an upward path until January 2012, i.e. the month preceding the reduction in minimum wages, have been showing a remarkable systematic decline ever since.

The new government that came to power after the elections of 25 January 2015 made it a political priority to gradually restore minimum wages to their levels before the above-mentioned reduction of February 2012. Specifically, the Minister of Finance, in his letter of 25 February 2015 addressed to the Eurogroup, included in the list of reforms that would war-

rant the extension of the loan agreement the Greek government's ambition "*to streamline and over time raise minimum wages in a manner that safeguards competitiveness and employment prospects. The scope and timing of changes to the minimum wage will be made in consultation with social partners and the European and international institutions, including the ILO, and take full account of advice from a new independent body on whether changes in wages are in line with productivity developments and competitiveness*". The careful wording obviously acknowledges that an immediate restoration of minimum wages to before-reduction levels, equivalent to an increase of 28.4% for people aged over 25 (and 47% for people aged up to 25), would have a strong impact on key labour market aggregates, particularly in the current conditions of high unemployment and the dramatic loss of Greece's GDP during the crisis years by almost 25%. Moreover, one cannot overlook additional social expenditure attributable to any increase in minimum wages, the most important being the rise in wage-associated unemployment and apprenticeship benefits. In this regard, it should be noted that the policy proposals formulated by international organisations that examined labour market developments and prospects in Greece in recent years, in addition to the three former-troika institutions, did not provide for any increase in minimum wages, or even wage equalisation across ages.[2] The OECD (OECD, 2013) suggests that the reduction in minimum wages contributed to a decline in unit labour costs, while the International Labour Organization (International Labour Organization, 2014) proposed to determine minimum wages only after the completion of the fiscal adjustment programme.

3 RECENT DEVELOPMENTS IN MINIMUM WAGES AND ASSOCIATED BENEFITS

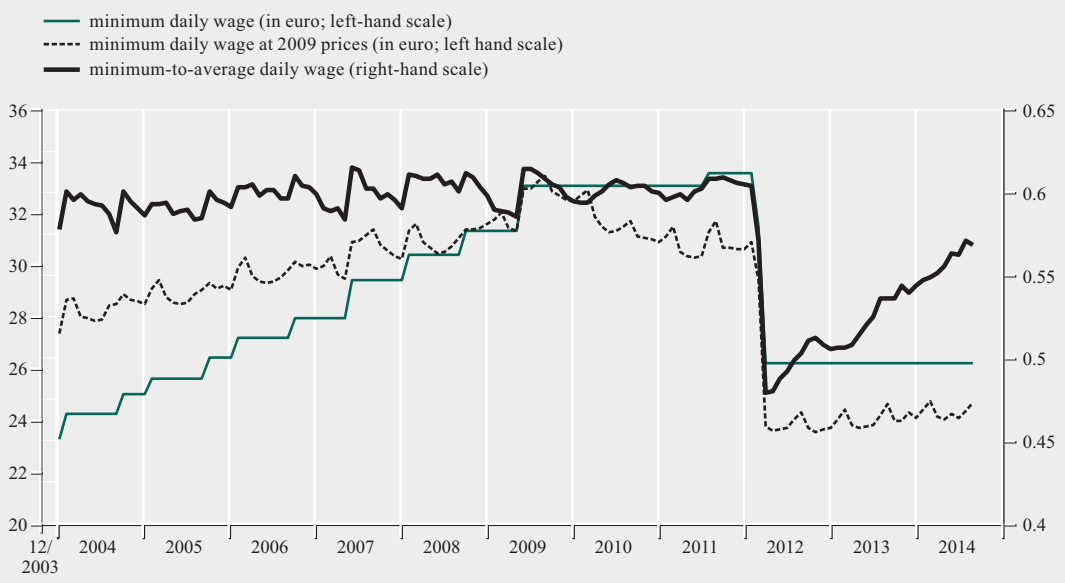
Minimum daily wage developments in the past decade are illustrated in Chart 1 in nominal terms and at constant prices deflated with the Consumer Price Index (2009=100). Minimum daily wages started from €24.22 at the beginning of 2004 and, after frequent increases, reached €33.04 in May 2009, where they remained until June 2011, to increase amid the crisis, albeit marginally, to €33.57 until mid-February 2012, when they were reduced by law to the current level of €26.18. Thus it appears that during the period under review the rise in minimum daily wages took place from early 2004 to the summer of 2009, and stood cumulatively at 36.4%, at constant prices at almost 17%, i.e. up by 3.7% per annum. Remarkably, the minimum daily wage at constant prices started to fall in the summer of 2009, as a result of erosion due to inflation, while the nominal daily wage was reduced by law as from mid-February 2012. Thus, while the nominal decrease in minimum wages is 22%, since the summer of 2009 it has fallen by 27.1% in real terms, which suggests that the purchasing power of the minimum wage in January 2014 was 10% lower than in 2004.

The right-hand axis of Chart 1 shows developments in minimum daily wages, i.e. the minimum-to-average daily wage ratio in enterprises with IKA-insured employees (excluding construction workers).[3] It is worth noting that during the 2004-2011 period, the minimum-to-average daily wage ratio is estimated at around 60%, with marginal divergences, and only in

2 A lower minimum wage for younger workers is provided for by legislation in many EU countries, among which Belgium, France, UK, Ireland, Latvia, Malta, the Netherlands, Poland, Slovakia and the Czech Republic (Funk and Lesch 2005; European Foundation for the Improvement of Living and Working Conditions 2007, p. 4). The rationale behind these arrangements is that younger workers, due to their lack of experience and skills, are more sensitive than older people to unemployment and the economic cycle. The misfortune of the young people that become unemployed might probably accompany them even later, which is apparent in low wage rates into people's forties, ("the wage scarring effects of youth unemployment"), while lower minimum wages motivate the young to prematurely abandon education and training, which should improve their long-term career opportunities (Low Pay Commission 2015, p. 119).

3 It should be noted that IKA data on wages, which stem from control procedures over nominal Detailed Periodic Statements submitted to IKA by enterprises, is the only official published data available on a monthly basis, even with a lag. The Hellenic Statistical Authority stopped publishing sectoral monthly remuneration data in 1998, and only in the summer of 2013 did they start publishing sectoral wage ratios (per hour) on a quarterly basis, starting from 2006. Additionally, the number of enterprises with IKA-insured employees is a fairly good approximation of the number of the respective enterprises in Greece.

Chart 1 Minimum daily wage at nominal constant prices and minimum-to-average daily wage



Sources: Minimum daily wage: Bank of Greece, Bulletin of Conjunctural Indicators. Average daily wage: IKA-ETAM Monthly Data on Employment (Table 01 for average daily wages, see respective months) [in Greek].

early-2012, after the sharp reduction in minimum daily wages, did the ratio fall to 48%, a level from which it has gradually been increasing, due to the downward course of average daily wages (smaller denominator), to stand at 55% in early 2014. These ratios suggest that minimum wages most probably concern a large share of employees, while their stability over time is in line with the assumption that increases in minimum wages give rise to similar increases in wages paid.

In this respect, it should be noted that the minimum wage in Greece as a percentage of the average wage in industry and services in 2008 is among the highest in the EU, with Luxembourg and Malta marginally exceeding it (European Commission 2011, p. 141). Moreover, according to the table of monthly minimum wages as a proportion of average monthly earnings (Nace rev. 2, B-S) compiled by Eurostat for 2011, Greece has the highest rate (56.4%), against 42.2% in Portugal, 36.7% in Spain and 44.5% in Ireland (Eurostat: earn_mw_avgr2). In addition, alternative indicators of the pressures on minimum wages, such as the minimum wage as a percentage of the GDP per capita or the percentile of the wage distribution that includes the minimum wage, estimated by Dolton and Bondibene (2012, p. 111) for several countries, rank Greece among the countries with the relatively highest levels. By contrast, OECD (OECD 2014) estimates for 2012 show that the ratio of minimum (including employers' social security contributions) to median wage in Greece is close to the average for the countries examined by the OECD. At the same time, the ratio of the minimum wage (gross or after deduction of employees' social security contributions and taxes) to the respective median wage is slightly smaller than the OECD average (OECD 2014, p. 68), suggesting that social security contributions in Greece are relatively high.

The above minimum daily wages and, accordingly, minimum monthly wages, owing to the Christmas bonus (one extra salary), the Easter bonus (half a salary) and the annual leave allowance (half a salary) to be paid to private

sector employees, stand at €684 a month. Indeed, this salary represents 11 months of labour because, as is also the case in several other EU countries, the 12th month of labour under the NGCE represents the annual regular leave provided to employees, after 10 full months of labour with the same employer.

Moreover, minimum wages refer to newly hired, unmarried employees. Beyond that, total minimum wages also include certain benefits as percentages of the minimum wage. Such benefits are the family benefit (10% on minimum wages for married employees); the seniority benefit, related to long-term employment with the same employer (5% per three years on the minimum wage and up to 6 cumulative three-year periods for workers, 10% per three years and up to 3 three-year periods for employees); the unhealthy and hazardous occupation benefit (10-15% on the minimum).[4] In this way, the total minimum legislated wage is determined, although the actual wage might exceed it, by individual employment agreements between employer and employee. However, according to legislation passed in June 2014, when a long-term unemployed is hired, the employer is now not required to pay the applicable seniority increases on minimum wages.

Except for NGCE minimum wages, industry-level, occupation-level and local-level employment agreements may also be in place that, however, in the past few years and after changes made to the institutional framework, are becoming fewer and fewer. By contrast, since 2012 the firm-level agreements concluded have multiplied. Collective agreements apart from the NGCE may improve on, but not reduce, NGCE minimum wages. Thus, certain sectors and enterprises pay wages above the general minimum.

On the enterprises' side, the role of minimum wages, particularly in labour-intensive sectors, becomes clearer when considering the concept of labour cost per time unit. In this case one should also take into account employers' mandatory social security contributions, that amount to 25.56% of gross earnings for the most common workers' group (those insured with IKA-ETEAM with occupational risk), as well as any other non-legislated labour costs, such as training costs. Moreover, minimum wages are taxed heavily in the form of mandatory social security contributions, i.e. 15.5% to IKA-ETEAM plus 4% to the Private Sector Welfare Fund, which reduces motivation to participate in the labour force and further increases the distance between the labour cost of minimum wage employees (around €852 per month) and net minimum wages (€545 per month).[5] In other words, out of the €100 paid by the enterprise, the employee receives €64.1. Thus, the net income of employees on minimum legislated wages depends on the level of the latter, contributions (and taxes) paid, as well as any tax reliefs and allowances due.

The above show that if the labour market policy serves the purpose of encouraging employment, minimum-wage setting should take into account both the productivity of poorly-paid work and the applicable grid of taxes and allowances (for workers, unemployed persons or persons outside the labour force). These linkages between net minimum wages and other variables make minimum-wage setting a complicated matter, which is also political in nature. In this context, several OECD countries have established independent authorities that determine appropriate minimum wages and propose adjustments that account for labour market conditions and policy developments. Examples of such advisory bodies are the Australian Fair Pay Commission, the Irish and the Mexican National Minimum Wage Commission, the UK Low Pay Commission and similar bodies in Korea and several US states (Immervoll and Pearson, 2009, p. 42).

4 Similar arrangements are also in place in other EU countries. Nevertheless, in several countries the minimum wage is legislated, while the demographic and social policy is conducted by the government, through taxes and benefits, rather than through (all) enterprises during production.

5 According to OECD estimates (OECD 2015; Table 1.2), in 2014 the employer and employee contributions for a Greek single individual without children at the average worker income level reached 33.3% of the labour cost, against an OECD average of 22.6%.

It is worth noting that since July 2014, and in line with the arrangements agreed upon in the Memorandum of Understanding, employers' contributions to special social security organisations were reduced by 2.9 percentage points and employees' contributions by 1 percentage point. The reduction in employers' contributions was appreciatively accepted by employers' representatives and further such reductions are among employers' perpetual requests, using the argument that (non-wage) labour costs remain high. However, employers' organisations have not submitted an official request to reduce minimum wages.[6]

The important question that therefore arises is whether the respective minimum wages presented above are in line with the productivity of newly-hired unskilled workers, so as to encourage employment, or exceed it, which would obviously cause this category to remain unemployed. While in theory the relation between (minimum) wages and productivity may, subject to certain conditions, be positive to a degree in a small open economy with free exports and imports and which is also a full member of the euro area, the association between minimum wages, labour productivity and employment is an inevitable fact of life at the end of the day, since no policy tools (such as devaluation or the conduct of an autonomous monetary policy) remain that imply it can be ignored, even in the short-run. Administratively imposed radical increases in minimum wages that lack financial justification, which cascade through to developments in all wages, would burden production costs, leading to an increase in domestic prices and, thus, a loss of the country's international competitiveness (more expensive exports, less expensive imports) and higher unemployment. Greece's euro area membership, apart from positive effects (monetary stability; freedom of imports; resources from the EU funds; and financial assistance during the crisis), inevitably has also had negative effects, i.e. the rule that labour costs should be in line with productivity developments to maintain international competitiveness.

4 EARLIER STUDIES ON MINIMUM WAGES

Systematic empirical research on the effects of minimum wages in Greece, particularly on employment, remains scant. This is probably due to a lack of the necessary statistical data on wages and employment. An earlier study of Koutsogeorgopoulou (1994) estimates a small negative employment elasticity of male and female industrial workers regarding minimum wages (between -0.05 and -0.11), and identifies a strong impact of minimum wages on average wages. More recent studies either fail to document negative effects of minimum wages on employment (Kapopoulos, Papadimitriou and Siokis, 2003; Karageorgiou, 2004) or ignore them (Gavroglou, 2013). The study of Fotoniata and Moutos (2010) has been remarkable in that, although they identify principal structural characteristics of the Greek economy which are theoretically expected to be causally related with minimum wages, they present no such empirical evidence. Among those characteristics recorded are systematically higher female unemployment compared with male unemployment; higher youth unemployment rates against the most productive age groups; relatively higher self-employed rates in Greece compared with total non-agricultural employment; as well as the relatively higher rate of micro businesses. However, since these studies do not identify a (simple) association between unemployment and minimum wages, they attribute the above characteristics of the Greek labour market to the applicable strict employment protection legislation that encourages employers to hire mostly men of productive age, which are estimated to remain in the enterprise for a long time, rather than women or young people, while the most dynamic unemployed turn to self-employment. Not identifying the effects of minimum wages on employment, as well as on other variables,

6 In this respect, it should be noted that, in order to save on public expenditure, the number of pensions paid per year were reduced from 14 to 12 (i.e. Christmas and Easter bonuses, as well as the annual leave allowance for pensioners were abolished); surprisingly, however, in the broader private sector, where the respective bonuses and allowances are still in effect, employers and employees still pay 14 pension contributions per year.

could most probably also be associated with deficiencies in the data used, which could stem from different sources and may not have the necessary representation of employment and (minimum) wages.

The study of Yannelis (2014) examines the effects of differential reductions in minimum wages in 2012 for workers aged below 25 (by 32%) and above 25 (by 22%) on youth employment. Limiting his analysis to workers aged 22-27 and assuming that, at these ages, those over 25 should follow the same trend in the labour market with those under 25, he concludes that persons that suffered a smaller reduction in minimum wages and, thus, maintained a relatively higher minimum wage, presented higher unemployment and smaller employment growth against those who suffered a stronger reduction in minimum wages. Exploiting the difference-in-difference regression technique, and using primary data from the Hellenic Labour Force Survey, Yannelis estimated the average negative effect of the relatively smaller reduction in minimum wages for those aged over 25 on their employment probability to 4.6 percentage points, which always appears to be significant and is also confirmed by other worker flow variables. The size of those estimates is higher than in earlier studies and the author attributes this both to the fact that Greece shows one of the highest minimum wages as a percentage of the average OECD wage, and to the fact that these estimates also include the effects of substitution by employers of older high-wage workers with younger workers on lower minimum wages, as well as the effects of production growth due to reduced labour costs and the resulting decline in product prices. Using common production functions and reasonable assumptions, Yannelis (2014) isolates the effects of labour substitution from more to less expensive workers, to estimate the youth employment elasticity regarding minimum wages between -0.28 and -0.46, depending on the method applied. Yannelis (2014) estimated that the negative effect of minimum wages on youth employment is mostly seen as a reduced rate of new hires aged over 25, rather than through separations of members of this group that had been employed when minimum wage cuts took place.

Matsaganis (2015, p. 82) noted that, even though total employment in 2014 still remains below its first quarter of 2012 levels (when minimum wages were cut), it has been rising for workers aged 20-29, while still falling for the general population. However, workers aged 20-24, with minimum wages dropping by 32%, appear to find jobs faster than those aged 25-29, whose minimum wages fell by 22%, which to a degree can be seen as evidence that different minimum wages have various degrees of influence on respective employment rates.

At the international level, the voluminous empirical research documents in short that minimum wages improve the position of low-wage workers and limit poverty. As regards the effects of minimum wages on employment, literature since mid-90s (Card and Krueger 1995) appears to converge towards the notion that contained increases in minimum wages lead to minimal or no employment losses, or could even have a small positive employment effect, as concluded by Schmitt (2013) in his recent review. This is attributable to the fact that businesses, after a rational increase in minimum wages, adjust to the new conditions through various channels, such as improving their organisational efficiency, slightly reducing the wages of higher-earners, reducing labour turnover or slightly increasing product prices. In addition to this, there is the reasoning provided earlier by Ashenfelter and Smith (1979) that many businesses do not fully comply with minimum wage legislation despite this being a factor that damages their reputation in the labour market, while a monopsony is not excluded in certain local labour markets. These results differ from the conclusions of other studies that minimum wages have a negative effect on youth employment (Neumark and Wascher 2007), which is indeed more detrimental in times of recession (Dolton and Bondibene 2012). Yet the assumption appears

to remain that "high" minimum wages, compared with median wages, are associated with high employment losses (Hamermesh, 1993, p. 191). Such recent studies are Kramarz and Philippon (2001) on France, Koning and Moller (2009) on construction in Germany, Sabia (2009) on retail trade in the USA, and Sabia, Burkhauser and Hansen (2012) on a case study for New York.

Thus, the effects of minimum wages on employment still remain a controversial issue among economists and, depending on their approach to the operation of labour markets, different effects could be expected after an increase in minimum wages. If low-wage labour markets operate under conditions of strong competition, which could probably be intensifying due to globalisation and the free movement of products and resources among countries, then, as argued by Stigler (1946), the most probable impact of minimum wages would be to exclude low-wagers from employment. By contrast, the subject matter of labour markets are people, whose behaviour is influenced by notions of fairness and the ability of businesses to pay wages, and are therefore imperfect, i.e. they do not operate like the product markets; thus tolerable increases in minimum wages, as mentioned above, may have no negative effects on employment, as argued by Lester since 1947. Other recent theoretical approaches, on the one hand, explain the lack of employment losses due to increased minimum wages by the efficiency wage theory, which claims that the marginal product of labour and, thereby, wages are positively affected by the wage level. On the other hand, job search theories highlight the dynamic and contrasting effects of minimum wages on worker flows, since they reduce labour demand, thus discouraging hirings, while at the same time increasing the work incentives of the unemployed.

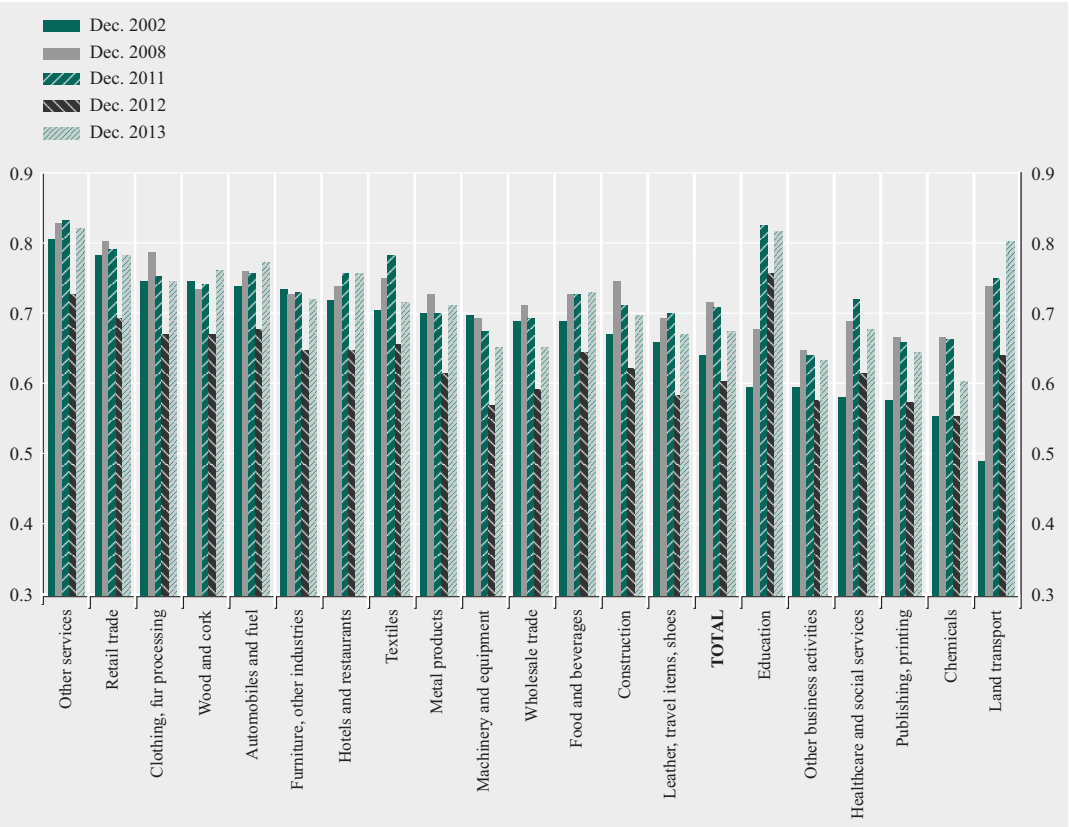
Regarding recent policy proposals by relevant international organisations to determine minimum wages, the June 2012 ILO, OECD, IMF and World Bank joint report concluded that "Maintaining the purchasing power of minimum wages at around 30 to 40 per cent of median wages sustains demand and reduces poverty and income inequalities. Statutory wage floors systematically set at levels significantly above that range entail the risk that these benefits would be more than offset by lost job opportunities, especially for youth and low-skilled workers" (ILO, OECD, IMF and the World Bank, 2012, p. 12).

5 MINIMUM WAGES AND AVERAGE DAILY WAGES

Any impact from minimum wages is obviously dependent on their association to the average wage paid. If minimum wages are much lower than wages paid, then they are of limited practical significance. By contrast, if minimum wages equal wages paid, the role played by the labour market and its participants in the determination of labour pay is substituted by the administrative mechanism, i.e. employers and employees cannot affect the process. Thus, economists formulate the minimum to average wage ratio (or median, if available), which is also known as the relevant minimum or the toughness indicator or the Kaitz index (1970) of minimum wages. The closer the index is to one, the stronger the effect of minimum wages on average wages and, probably, to employment; the opposite holds when the index is closer to zero.

On the basis of IKA data releases on average wages by sector and gender for both small (up to 10 employees) and large (10+) enterprises, we calculated Kaitz indices for December 2002 (the month furthest back with data releases), December 2008 (when IKA employment recorded a maximum), December 2012 (when IKA employment recorded a minimum) and December 2013, the latest available entry, which also shows a remarkable recovery on an annual basis. These calculations refer to fully employed IKA insured workers for double-digit sectors with relatively reliable employment rates in terms of quantity and appear on

Chart 2 Minimum-to-average daily wage for men by sector in small enterprises

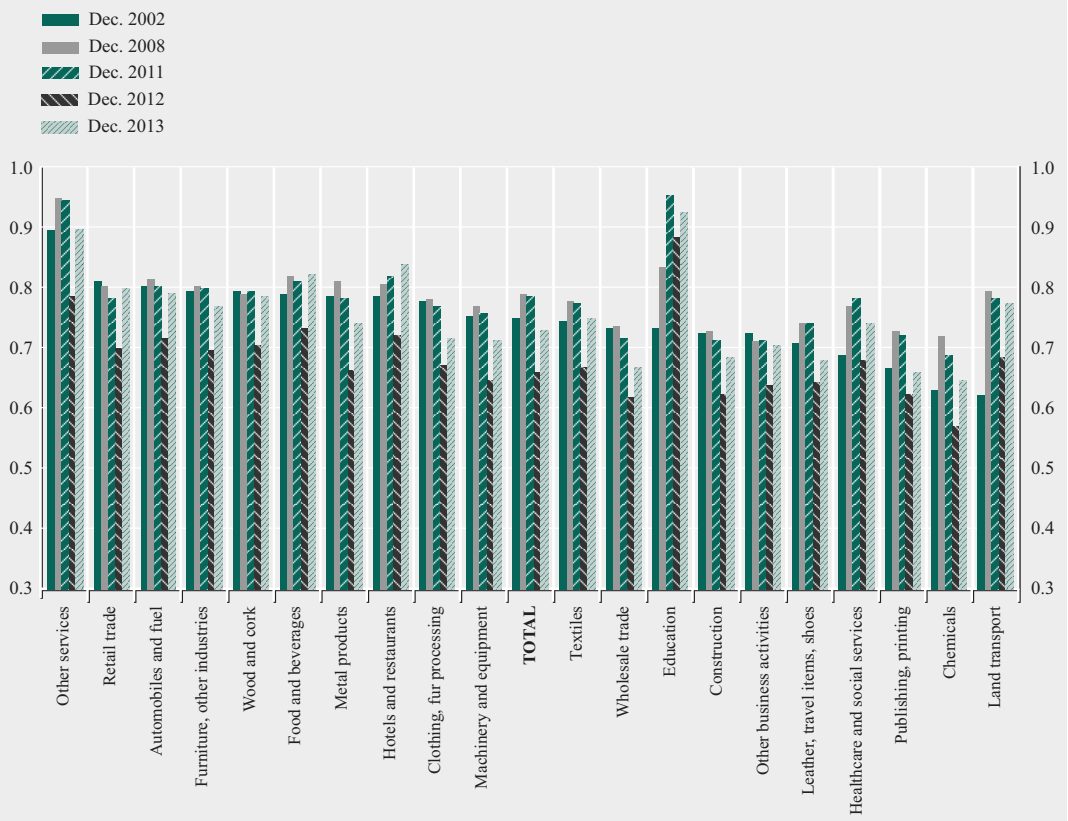


Sources: Minimum daily wage: Bank of Greece, Bulletin of Conjunctural Indicators; average daily wage: IKA-ETAM Monthly Data on Employment, December 2002, 2008, 2012 and 2013.

Charts 2 to 5, where sectors are ranked from the highest to the lowest Kaitz index level for 2002. It must be borne in mind that IKA wages do not include all company expenditure on labour remuneration, but rather exclude the typically small amounts spent on overtime and bonuses. Additionally, as the high social security contributions paid are dependent on the wage levels, as submitted to IKA, some enterprises, particularly the smaller ones, may deliberately report wage levels close to the minimum legal levels (Kanellopoulos 2014). The results would be more accurate if, instead of the general national minimum wage, a sectoral minimum wage was available, as evidenced by respective sectoral collective agreements; obviously, if such a minimum was available, it would be equal to or higher than the general national minimum. On the other hand, the IKA employment data used involve wage earners, i.e. only those workers protected by minimum wage arrangements, and therefore do not exclude those not covered by the minimum wage scheme.

It appears that for men employed in small enterprises the minimum wage at end-2013 is 68% of the average wage paid. In specific populous sectors, such as hotels and restaurants (76%), retail trade (78%), cars and fuel (77%), these indicators stand above that for the whole economy (68%), while in a few capital-intensive sectors such as chemicals (64%) or machinery and equipment (65%) the indicators are lower than the total (see Chart 2). These rates are consistently higher for

Chart 3 Minimum-to-average daily wage for women by sector in small enterprises



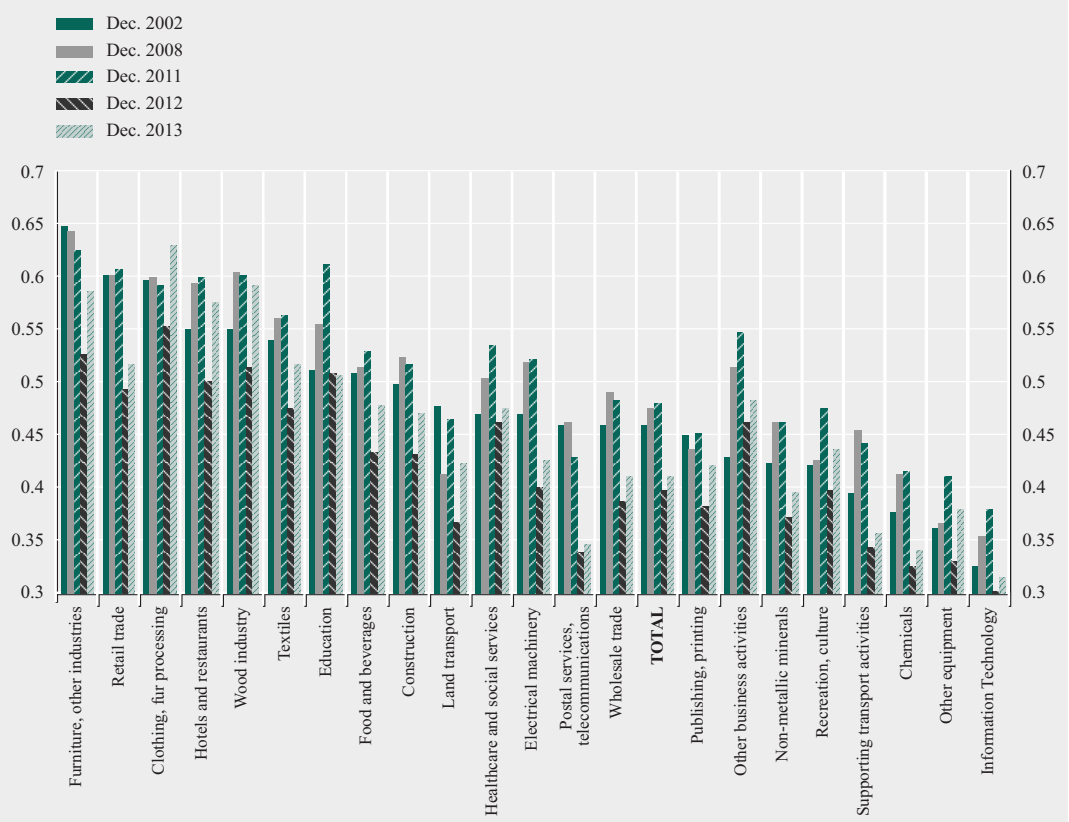
Sources: Minimum daily wage: Bank of Greece, Bulletin of Conjunctural Indicators; average daily wage: IKA-ETAM Monthly Data on Employment, December 2002, 2008, 2012 and 2013.

women employed in small enterprises, i.e. 73% of the total, 84% in hotels and restaurants, 80% in trade, 93% in education (see Chart 3).[7] Thus, it is to be expected that average wages show a remarkable downward rigidity, while any increase due to a rise in the minimum may cause job losses, particularly for these marginal small enterprises. Small businesses (after the collapse from mid-2008 to end-2012, when the number fell by 36% and employment losses reached 35%), have already shown a remarkable response to the crisis, and in June 2014 they employed a total of 481,000 wage earners, against 358,000 during the intense crisis period of December 2012, as well as at least 200,000 self-employed, which equals the number of small enterprises with IKA-insured employees, against almost 160,000 in December 2012, i.e. employment rose by almost 30%.

In December 2012, Kaitz indices for small enterprises were clearly smaller than in December 2011, owing to cuts in minimum wages in early 2012. By contrast, they appeared to be higher at end-2013, due to the ensuing reduction in wages paid; indeed, wages paid in certain industrial sectors exceeded the 2011 levels. At

7 An insightful commentator characterised these rates as exceptionally high, because they imply that almost all personnel in respective enterprises works on minimum wages rather than under a structured remuneration scheme, although in fact they could imply a concealment of part of the wages reported to the IKA by employers. Therefore, the findings of this study should inevitably be interpreted with caution. On the other hand, the closing down of tens of thousands of such businesses during the crisis or the non-timely payment of wages accrued are in line with the assumption that their operation is stretched to the limit, even on minimum wages.

Chart 4 Minimum-to-average daily wage for men by sector in large enterprises



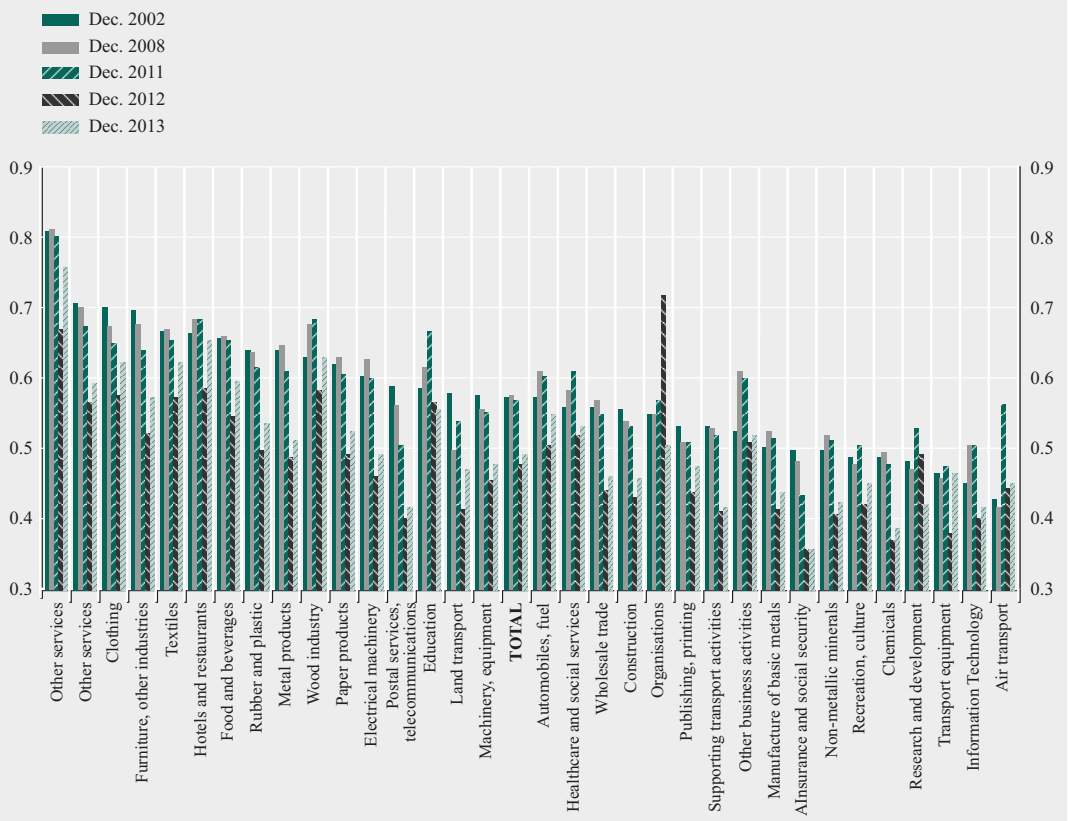
Sources: Minimum daily wage: Bank of Greece, Bulletin of Conjunctural Indicators; average daily wage: IKA-ETAM Monthly Data on Employment, December 2002, 2008, 2012 and 2013.

end-2013, employees in certain sectors appear to be working on minimum wages. Such sectors are, for instance, (private) education (0.93 for women, 0.82 for men); food (0.83 for women, 0.73 for men); hotels and restaurants (0.84 and 0.76, respectively). Taking into account that the only remarkable relief in the production cost components of businesses between end-2011 and end-2013, amid limited liquidity, new or increased taxes and higher tax burden of energy costs (Bank of Greece 2013, pp. 150-156) were lower labour costs, which was made possible by reducing minimum wages in early 2012; the recovery in employment in 2013 in small businesses with IKA-insured employees by 19.4% is also associated with the above significant reduction in minimum wages by 22%, as well as in average wages by 23.2% for the January 2012 to December 2013 period.[8] It should be noted that in June 2014 employees in small enterprises represented 26.6% of IKA-insured employees, while taking into account the rather high number of employers in these enterprises (almost 200,000, against 27,700 for large enterprises), they comprise 30.7% of what we approximate as the private sector labour market.

As regards large enterprises (with over 10 employees), the minimum-to-actually-paid wages ratios are below those of small enterprises, thus reflecting the relatively higher

8 The insightful commentator wondered whether small enterprises that showed an increase in employment actually represent large enterprises, which became small owing to the crisis. Although such cases cannot be excluded, the increase in employment also in large enterprises with IKA-insured employees by 11.8% in 2013 weakens this assumption.

Chart 5 Minimum-to-average daily wage for women by sector in large enterprises



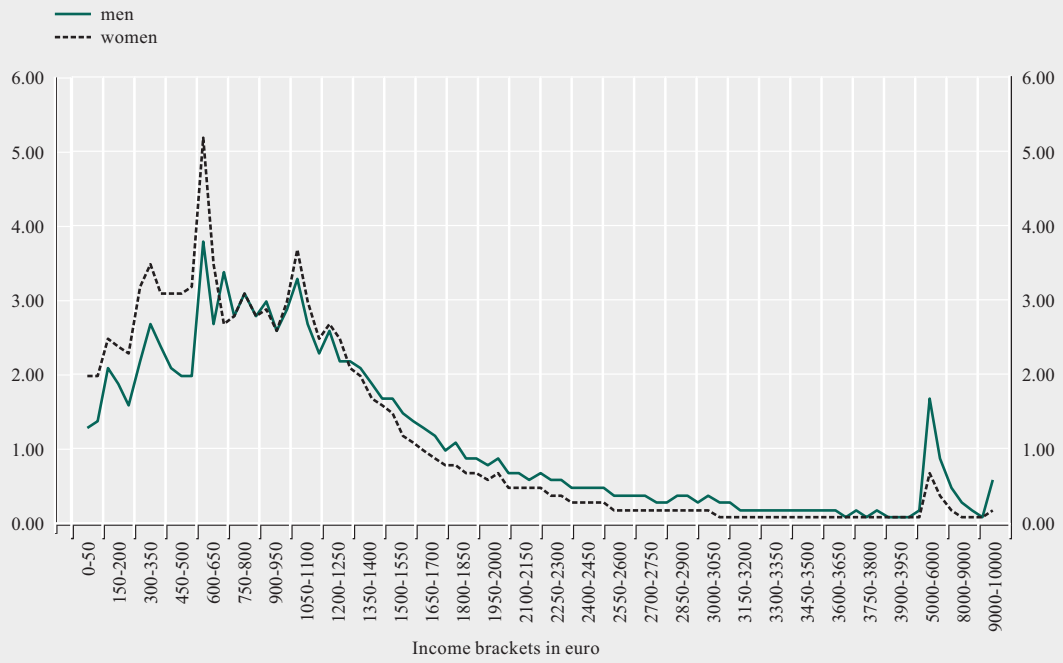
Sources: Minimum daily wage: Bank of Greece, Bulletin of Conjunctural Indicators; average daily wage: IKA-ETAM Monthly Data on Employment, December 2002, 2008, 2012 and 2013.

wages paid in large firms. In this case, employed men, on the basis of the average daily wages of all enterprises under review, showed minimum-to-average wages ratios of around 0.48 before the reduction in minimum wages, while after the reduction the ratio fell to 0.40; since then it recovered slightly and in June 2013 it is estimated at around 0.41. The Kaitz indices are higher in specific sectors, i.e. in retail trade (0.60-0.49); wholesale trade (0.46-0.39); hotels and restaurants (0.60-0.50); food (0.53-0.43) (see Chart 4). By contrast, in certain other sectors they are clearly lower, i.e. the chemicals industry (0.33-0.42) and transport equipment (0.33-0.41). These levels are generally below the respective levels for small enterprises and could be seen as tolerable for the operation of the respective businesses, to the extent that industry- or firm-level collective agreements do not provide for much higher wage levels. The ratios are clearly higher for employed women than for employed men in large enterprises (see Chart 5).

Sectors of production with relatively high Kaitz indices for large enterprises are almost the same with those in small enterprises, which highlights their importance in determining the average wages paid. Although developments in Kaitz indices for large enterprises over time are similar to those for small enterprises, in large enterprises the recovery in 2013 was clearly smaller than that in small enterprises, because the former made less radical wage reductions (-10.9% in Jan. 2012-Dec. 2013) than the latter (-23.2% in the same period).

Chart 6 Monthly income distribution, December 2013

(percentages)

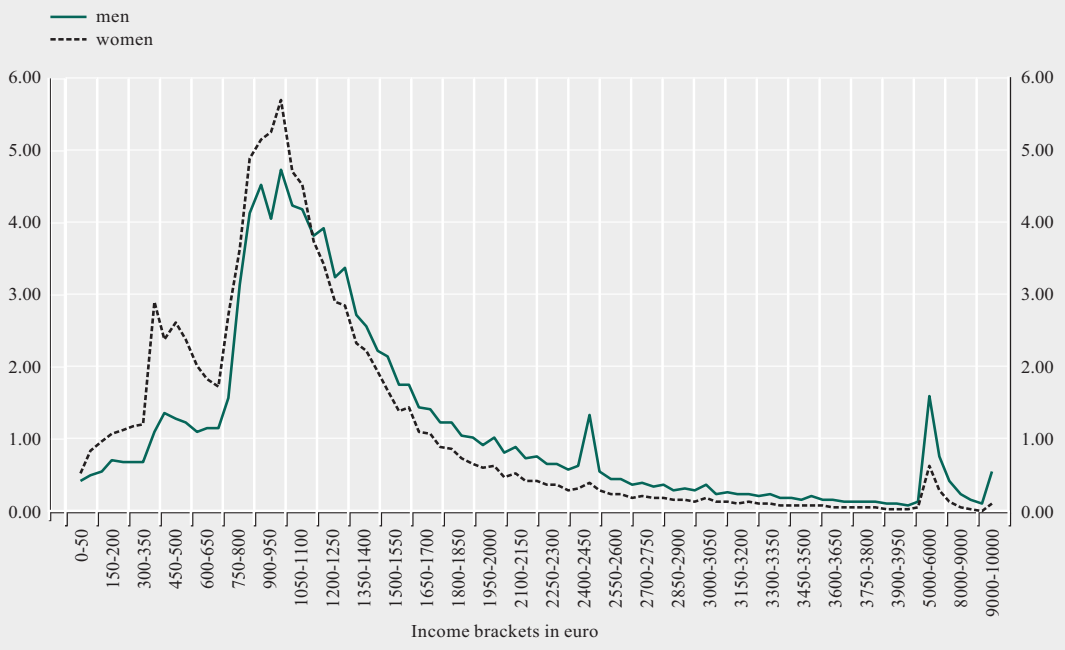


Source: IKA-ETAM Monthly Data on Employment, December 2013, p. 102.

Another indication regarding the impact of minimum wages on average wages, as also envisaged by international literature, comes from examining wage distribution, in the sense that if minimum wages have a strong impact, a relatively larger number of employees should receive wages slightly above the minimum, while more employees slightly below the minimum are displaced (Hamermesh 1993, p. 186). Chart 6 shows the distribution of monthly incomes by gender for December 2013 for all IKA-insured employees (including part-time employment). It is evident that the highest concentration (5.2% of women and 3.8% of men) is seen within the €550-600 range, which includes the minimum wage of €586. Despite any weaknesses of the data used, the higher IKA-insured employees' concentration closer to the minimum wage reflects its growing importance, in the sense that it concerns a relatively large number of employees, and it is difficult to assess how the distribution could recover its before-the-crisis characteristics, i.e. higher concentration much further to the right of the minimum. At higher-than-minimum levels, at end-2013, two peaks are evident (at €1,000 and at €5,000), which however are below the peaks of minimum wages. Moreover, it is impressive that over one in five male (21.7%) and almost one in three female employees (30.4%) are insured for less than their minimum wages. This is in line with the fact that 20.9% of men and 32.6% of women appear to be employed part-time, i.e. they work less than the full-time daily working hours, irrespective of the number of days per week. This usually refers to four-hour employment, which also means half social security contributions paid, as reflected by the peak on the left of the minimum wage peak. Since in the past few years IKA-insured part-time employment has seen a rapid increase, government control mechanisms should make in-depth and intensive inspections to ascertain that this increase actually reflects part-time employment rather than deliberate contribu-

Chart 7 Monthly income distribution, December 2008

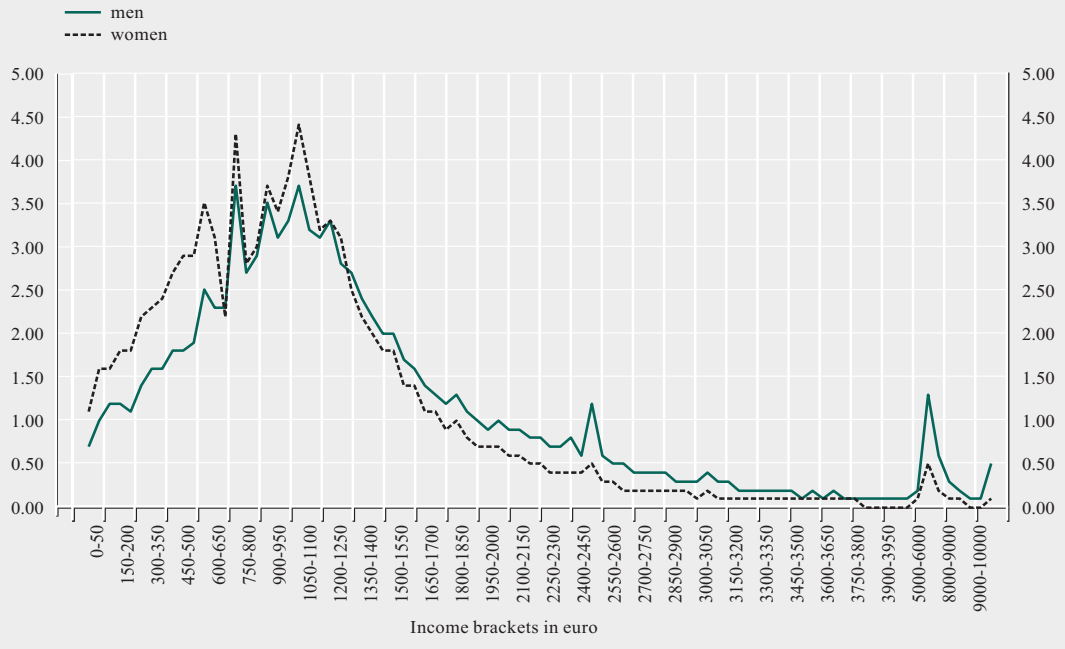
(percentages)



Source: IKA-ETAM Monthly Data on Employment, December 2008.

Chart 8 Monthly income distribution, December 2012

(percentages)



Source: IKA-ETAM Monthly Data on Employment, December 2012.

tion evasion. In any case, three out of ten men and four out of ten women appear to be employed on minimum wages or less, which highlights their importance for wage, and possibly also employment, distribution.

In December 2008 (see Chart 7), the year when the economy recorded a peak in employment, monthly wage distribution, despite a macroscopic similarity to December 2013, showed substantial differences, the most significant being that it had moved to the left, reflecting a decline in wages. The specific point representing the minimum wage (€751) shows a concentration of employed persons (3.2% men, 3.6% women), while directly to the left the concentration is much smaller. This finding is in line with the theoretical assumption that employers substitute employees whose productivity is slightly below that corresponding to the minimum wage, with comparable employees whose productivity is equal or slightly above that corresponding to the minimum wage. However, since they cost more, according to this approach, it is expected that these will be fewer than the displaced employees. In this case, the distribution peak stands 30% to the right of the minimum wage, within the range of €950-€1,000, which translates into bonuses also being accounted for on the NGCE minimum, or of industry- and firm-level collective agreements. In 2008, part-time employment was less widespread (10.8% for men; 23.5% for women), thus the peaks on the left of the minimum are below the 2013 levels. Another fact is the apparent concentration of a relatively higher rate at around €2,500, compared with bordering levels, which however was eliminated in 2013, revealing that some high-wage IKA-insured employees, probably civil servants, either retired or suffered large wage cuts.

At end-2012, with the new minimum wages already in effect for 10 months, the monthly wage distribution was substantially different than in 2008 and closer to the more recent distribution (see Chart 8). The peak at the new minimum wage is evident, a peak remains at the threshold of the previous minimum wage, while the peak on its right declines.

Lastly, to examine the effect of minimum wages on average wages, we fitted a typical logarithmic regression on time series data for wages by gender, using as the dependent vari-

Table 1 Average monthly daily IKA-registered wage regressions (2004-2013)

(dependent variable: logarithm of average monthly daily-wage)

Explanatory variables	Men	Women
Minimum daily wage	0.380 (0.030)	0.404 (0.032)
Consumer price index	1.083 (0.160)	1.151 (0.174)
Registered unemployment data of the Manpower Employment Organisation	-0.067 (0.020)	-0.077 (0.022)
Industrial production index	-0.097 (0.058)	-0.141 (0.063)
11 months	yes	yes
Trend	yes	yes
Constant term	-0.881 (0.829)	-1.198 (0.901)
R^2	0.961	0.966
Number of observations	121	121

Note: Variables in *ln*, standard errors in brackets.
Sources: IKA-ETAM, Bank of Greece, Manpower Employment Organisation and calculations by the author.

able the average monthly daily wage of IKA-insured employees in enterprises (excluding construction workers) and as explanatory variables the minimum daily wage, the Consumer Price Index, the registered unemployed of the Manpower Employment Organisation, the industrial production index, a trend, as well as dummy variables for the months. As suggested by Table 1, the minimum daily wage coefficient is 0.38 for men and is similar, i.e. 0.40, for women, which are both statistically significant, showing fairly high elasticity of the average daily wage as against the minimum daily wage.

6 MINIMUM WAGES AND EMPLOYMENT

A first impression of minimum wage and employment developments is presented in Charts 9 and 10, illustrating the evolution of IKA-insured employment in enterprises by gender and minimum daily wages during the period under review. It appears that both minimum wages and employment rose during the upturn, but when the economy entered the crisis and, subsequently, employment started to fall drastically, minimum wages either recorded a small increase initially, or remained stable. In the next phase, since minimum wages were reduced violently, total IKA-insured employment for both genders showed a recovery with a lag.

To focus on the impact of minimum wages on employment, we estimate two models, which are similar to those used in similar international studies (Card and Krueger 1995, Chapters 6 and 7, respectively). Initially we estimate a time series model by gender on monthly data covering the period from December 2003 to January 2014 as follows:

$$Y_t = \alpha MW_t + B_t\beta + \varepsilon_t$$

where the variable Y_t illustrates the total number of IKA-insured employed persons by gender as a function of the respective minimum wages, MW_t, other explanatory variables B_t, as well as a stochastic error term ε_t. In this case, the minimum wage is an approximation of the respective minimum-to-average daily wage (approximately the Kaitz indices),[9] while as control variables we included the industrial production index as an approximation of labour demand due to a change in the production volume, and the number of enterprises with IKA-insured employees, so that estimates include the economic conjuncture, a time trend, as well as monthly dummies to eliminate seasonality. All variables are in logarithms, thus the estimated coefficients represent minimum employment elasticities against them.

All independent variables show the expected signs and are statistically significant (see Table 2, first two columns). However, what is of interest here is that the daily wage for both genders shows a significant negative (and equal) association with their employment. For men, the employment elasticity in relation to the minimum relative daily wage is -0.176, suggesting that a 10% could lead to employment loss of 1.76%, and given that the average male employment in typical enterprises with IKA-insured employees is close to 900,000 in the medium-run, this share equals an employment loss of 16,000 jobs. The corresponding estimate for women is -0.168 and is calculated at 13,100.

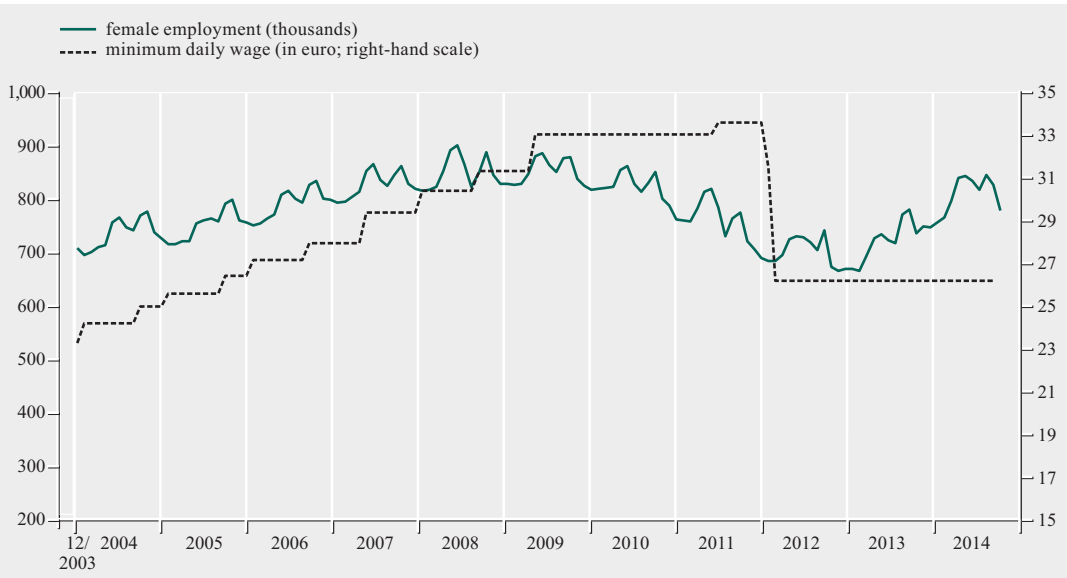
Such estimates are to be expected, if the relatively high (among the highest in the EU) minimum-to-average daily wage ratio registered during the period under review is taken into account, and suggest that the country may have suffered job losses due to high minimum wages. In addition, these estimates are in line with several characteristics of the Greek labour market in the past decades, which, as argued by Fotoniata and Moutos (2010), are to be anticipated when minimum wages have a significant impact. The employment rate (i.e. the per-

9 According to Dolton and Bondibene (2012, p. 116), this differentiation of minimum wages dominates the empirical international literature, since the absolute level of minimum wages cannot be considered as exogenous in defining employment, while the relevant minimum wage is an indicator for the possible substitution of unskilled workers paid minimum wages by higher-paid specialists. However, the relative minimum wage has other weaknesses, i.e. changes due to movement of average wages or the wage distribution rather than minimum wage levels.

Chart 9 Male employment and minimum daily wage

Source: IKA-ETAM Monthly Data on Employment (respective months).

Chart 10 Female employment and minimum daily wage



Source: IKA-ETAM Monthly Data on Employment (respective months).

centage of the employed among people in productive age) is one of the lowest in Europe. This is especially true for the young. Youth unemployment has systematically been among the highest in the OECD countries. Moreover, during the 1990s Greece absorbed a relatively

Table 2 Minimum daily wage and other variables' regression coefficients in employment

(dependent variable: logarithm of monthly employment)

	Monthly data for the total economy 2004-2013		June and December data by sector 2007-2013	
Explanatory variables	Men	Women	Men	Women
Minimum-to-average daily wage	-0.176 (0.056)	-0.16846 (0.04295)	-0.297 (0.072)	-0.147 (0.071)
Industrial Production Index	0.001 (0.0005)	0.000813 (0.000387)		
Number of enterprises with IKA-insured employees	0.613 (0.037)	0.745594 (0.027437)	0.778 (0.033)	0.859 (0.032)
Year/Half-year	0.001157 (0.000124)	0.002474 (9.69E-05)	-0.006 (0.002)	-0.013 (0.002)
Months/Sectors of economic activity	12	12	56	56
Constant term	6.514881 (0.292922)	4.67962 (0.214821)	3.419 (0.313)	2.713 (0.305)
Number of observations	121	121	797	797
R^2	0.952	0.968	0.989	0.994

Note: Variables in *ln*, standard errors in brackets. Half-year data refers to June and December each year.
Sources: IKA-ETAM, Bank of Greece and calculations by the author.

large number of foreigners, who worked or are still working - since many of them remain in the country - in specific industries and on relatively lower wages. Lastly, whole industries, mostly in manufacturing, disappeared due to competition from low-labour-cost countries or owing to the transfer of thousands of Greek enterprises to neighbouring countries with low labour costs (much lower than the Greek minimum), of which two (Bulgaria and Romania) are already full members of the European Union.[10]

The other model we estimated examines the impact of minimum wages on employment by industry and over time. Specifically, we make use of non-published IKA data on employment and wages by (double-digit) industry and gender for June and December, i.e. the months for which IKA collects more data, for the years 2007-2013, which allow as to estimate the following employment formula.

$$Y_{it} = \alpha MW_{it} + B_{it}\beta + \varepsilon_{it}$$

where the independent variable is employment by industry i and per month t and explanatory variables are the respective relative minimum wages MW_{it} and the control variables (B_{it}) and the regressions include industry and time dummies. This regression can be calculated for all sectors, as long as there is always a statutory minimum wage. However, we did not include "households as employers", since social security contributions to the IKA are limited to 50%, thus wages also appear to be very low, as well as two more sectors due to lack of data for certain months or genders. The coefficient for the relative minimum wage α estimates the effects of minimum wages on employment. Also in this case minimum wages are represented by the Kaitz index, which as mentioned previously is the ratio of minimum-to-average daily wage. These estimates perform better than the above-mentioned, as they are based on a larger number of observations and are not subject to monthly seasonality or the short-term economic outlook of previous estimates.

The last two columns of Table 2, that include semi-annual data, present the results of sec-

10 It is estimated that in the period before the current crisis around 3,500 Greek enterprises relocated their productive activities to neighbouring Balkan countries (Kanellopoulos, Gregou and Petralias 2006, p. 64).

toral estimates by gender, which appear to be in line with expectations as regards the variables included. It seems that relative minimum wages show a statistically significant association with male and female employment. While in the case of women the size of the negative effect (-0.147) is similar to that stemming from the monthly time series, the respective effect for men is clearly larger (-0.297 against -0.176). Since in this case no variable is provided for calculating sectoral production, the coefficient for the relative minimum wage may include the effects of this neglected variable on employment, which is why it appears to be relatively higher.

7 CONCLUSIONS

This study, drawing on published IKA statistical data on employment and daily wages, as well as minimum statutory wages, initially offers a descriptive examination of developments in minimum wages, average wages and employment in the Greek private sector over the past decade. Then we go on to present statistical estimates on the relation between minimum and average wages, as well as minimum wages and employment in the Greek labour market.

Taking into account the aforementioned weaknesses in the statistical data used, it appears that minimum wages affect a substantial proportion of employees, thus any significant increases, in order to be financially viable and socially effective, should be in line with increases in productivity and the average labour compensation.

Based on the findings, we conclude that minimum wages are closely and significantly linked to average wages for both men and women. Moreover, it appears that minimum wages substantially reduce employment for both genders (i.e. employment elasticity to relative minimum wages of -0.17), suggesting that, in the current conjuncture with the unacceptably high unemployment, employment policies should mainly give priority to job creation at the current minimum wage, by encouraging investment and hirings, rather than improving the position of low-wage workers by drastically increasing the minimum wage, as in this case their jobs would be more at risk.

Developments in minimum wages, average wages and employment during the crisis, as well as the negative relation between relative minimum wages and employment suggest that the effective implementation of economic adjustment programmes demands a comprehensive and simultaneous application throughout the targeted sectors. Had the reduction in minimum wages (and other related labour market reforms in the private sector) been implemented together with wage cuts in the public sector, as discussed since the beginning of the memoranda or at least a year earlier, the cumulative job losses and, thus, the depth and duration of the crisis in Greece would probably have been much shorter.

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THE USE OF CASH AND ELECTRONIC PAYMENT INSTRUMENTS IN THE ECONOMY[1]

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1 INTRODUCTION

Retail payments and the relevant infrastructure are essential for the smooth functioning of the economy and trade, as well as for maintaining and enhancing public confidence in the currency. Central banks and public authorities have an interest in promoting efficient and safe payment instruments, as they contribute to a stable and efficient financial system, enhance consumer confidence and foster economic welfare.

The past few decades have seen important developments in the area of retail payments, associated with technological innovation and initiatives aimed at promoting integrated retail payments and competition in the euro area. For example, the Single Euro Payments Area (SEPA) aims at creating an integrated, competitive and innovative market for retail payments at European level,[2] where non-cash euro payments will be conducted entirely electronically using a single payment account and a single set of payment instruments.[3] In this direction, a number of institutional measures have been adopted, which, supported by technological advances, have contributed to progress towards the integration of retail payments.[4,5] In general, electronic payments are becoming increasingly popular in Europe, steadily gaining ground: the number of electronic transactions has increased at an annual rate of 6% since 2000. The number of card transactions in the euro area exceeded 25 billion in 2013, the bulk being debit card payments. However, despite this global trend, the use of cash remains high in many countries, while national payment markets continue to vary significantly across countries.

In recent years, several research papers have tried to answer the question whether a wider adoption of electronic payment instruments and the growing integration of retail payment markets in Europe can lead to macroeconomic and social benefits. The purpose of the present paper is to raise public awareness and contribute to the debate by providing an overview of the literature and outlining the retail payments landscape in Greece based on the available data. To this end, the next section describes the individual payment instruments and the value chain of retail payments. Section 3 discusses the particular features of cash. Sections 4 and 5 examine the potential macroeconomic and social benefits arising from a wider adoption of electronic means of payment, as well as the efficiency gains and the social costs of payments according to the literature. Section 6 presents data on retail payments in Greece, and the last section concludes.

2 INDIVIDUAL PAYMENT INSTRUMENTS AND THE PAYMENT CHAIN

Retail payments refer to low-value and typically low-urgency payments between non-financial units, such as households, non-financial corporations and government entities. The most common payment instruments include cash (banknotes and coins), payment cards (debit and credit cards), credit transfers, direct debits, cheques and e-money. Some of these instruments entail the management of physical paper (such as cash, cheques and some credit transfers), while a gradually increasing number

1 The views expressed in this paper are those of the author and do not necessarily reflect those of the Bank of Greece. Thanks are extended to Heather Gibson, Hercules Voridis and Hiona Balfoussia for their useful comments and remarks.
2 In particular, SEPA encompasses the 28 countries of the EU plus Iceland, Norway, Liechtenstein, Switzerland, San Marino and Monaco.
3 See in this regard http://www.bankofgreece.gr/Pages/en/PaymentsSystems/SEPA/default.aspx.
4 Martikainen et al. (2013) provide empirical evidence of convergence across euro area countries with regard to credit transfers, direct debits and payment cards, and find that the pace of convergence has picked up since the introduction of the euro for most of the payment instruments.
5 For example, 2014 saw the completion of the Single Euro Payments Area for credit transfers and direct debits in the euro area.

of payments is related to transactions conducted entirely electronically, i.e. entailing the transfer of money between accounts (including payment cards, electronic credit transfers, as well as more innovating means of payment such as e-money or mobile payments).

In particular, *credit transfers* allow a payer to order the bank with which its account is held to transfer funds to the account of a payee. The order may be submitted in printed or electronic form, but it can be processed further electronically. *Direct debits* are payment instruments for debiting a payer's bank account whereby the payment is initiated by the payee on the basis of an authorisation given by the payer. These include standing orders for the payment of utility bills. With regard to payment cards, *debit cards* enable their holders to withdraw cash or have their purchases directly charged to their bank account. The amount is charged either immediately or within 1-2 days, without in essence any postponement of the payment. A *credit card* provides a credit facility to its holder, that is to say the possibility to delay payment, while the amount and duration of the credit facility provided depend on the agreement between the card issuer and the card holder. *Delayed debit* cards allow the postponement of a payment, but the amount due must be paid in full at the end of a defined period. A cheque is a written order from the payer (drawer of the cheque) requiring a drawee, most frequently a bank, to pay a specific amount to the drawer of the cheque. *Electronic money* (e-money) is a monetary value, represented by a claim on the issuer, which is stored on an electronic device (usually a prepaid card or an electronic server) and is accepted as a means of payment by entities other than the issuer. Electronic money is a means of settlement rather than a means of payment, as it entails the use of another payment instrument – namely cash, payment cards, direct debits or credit transfers.[6]

Payments are conducted through a production chain with many participants: the central bank, banks and associated infrastructures, cash-in transit companies, retailers and consumers. At the same time, technological developments and innovations in the sector of retail payments have strengthened competition and have led to the emergence of payment service providers other than banks. This production chain generates cost and income flows between participants – income for one participant represents a cost for another. As far as payments with cards are concerned, the payment goes through almost all these participants before it is completed. In the case of cash, the payment is conducted directly between the payer and the payee, while other participants will be involved at another point in time, when cash is withdrawn or deposited at the bank (Gresvik and Haare, 2009).

3 THE CHARACTERISTICS AND THE USE OF CASH

Despite the upward trend in the use of electronic means of payment at international level, cash remains the most common payment instrument in Europe and, as already mentioned, its use is particularly high in some countries, including Greece, Italy, Romania, Bulgaria and Malta (see Chart 1). In particular, cash accounts for 65% of the volume (i.e. number) of transactions in EU-27 and 95% in Greece (Schmiedel et al., 2012).

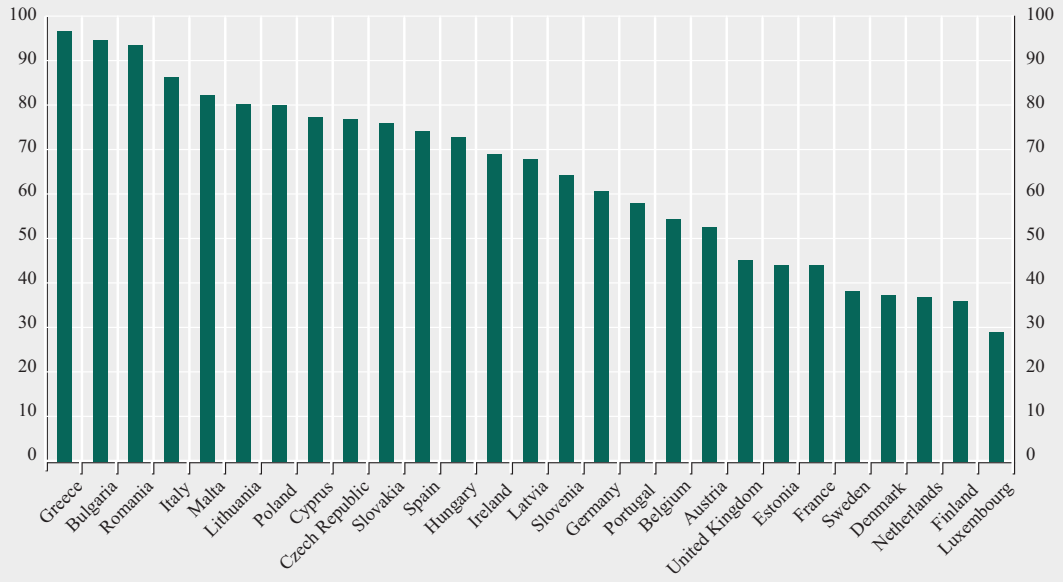
The use of cash is primarily related to low-value transactions, which, however, account for the bulk of transactions in terms of volume. The value of the transaction is a significant factor for the choice between cash or other payment instruments (European Payments Council, 2007; Briglevics and Schuh, 2014), whereas factors such as the type of goods and services to be purchased, the location and the acceptance or not of alternative means of payment by retailers also influence the choice of the instrument to be used.

Cash possesses particular features that make it popular among consumers: it is universally

6 For more details, see European Central Bank (2007 and 2010).

Chart 1 The use of cash in the EU-27[1]

(as a percentage of the total number of transactions in each country)



Source: Schmiedel, Kostova and Ruttenberg, 2012.
1 Reference year: 2009.

accepted, it ensures simple and fast transactions, liquidity, anonymity, while it is often thought that it entails no costs. Moreover, cash enables the control and monitoring of expenses and family budgets (von Kalckreuth et al. 2011), particularly for those with low income and those facing liquidity constraints (Hernandez et al. 2014).

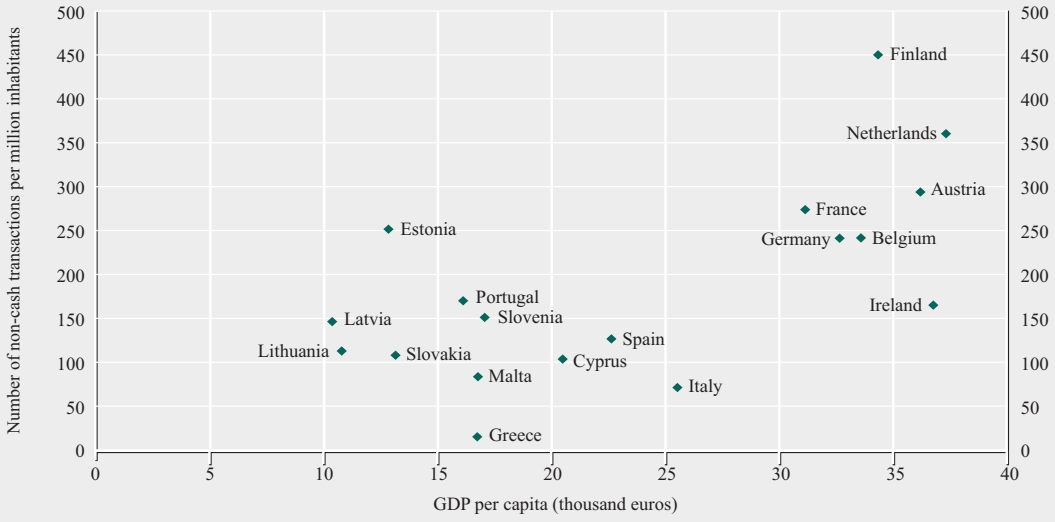
However, the production, transport and management of cash entail costs, complex procedures and technological investment in security or counterfeit recognition, mostly by retailers and banks, as well as by the central bank, which is responsible for the distribution of euro banknotes and coins and the management of money supply in the economy.[7] The public's inadequate information regarding the costs of the various payment instruments, as well as its inability to differentiate among these costs have been cited as important factors leading to an inefficient choice of payment instruments. Moreover, an increase in the price of cash (or cards) has been associated with a significant decrease in their usage (de Grauwe et al., 2006), while, in general, relevant studies widely point to the importance of the pricing of payment instruments on the basis of the cost that each of them entails (Banco de Portugal, 2007; Joncker 2013; Van Hove, 2004).

4 MACROECONOMIC AND SOCIAL BENEFITS FROM THE USE OF ELECTRONIC MEANS OF PAYMENT

Chart 2 illustrates the number of non-cash payments per inhabitant in relation to GDP per capita in euro area countries. The chart shows a positive correlation between the level of adoption of non-cash payments and the level of economic growth in each country, which possibly reflects broader factors influencing the payment culture and payment habits in

7 Due to their issuing privilege, central banks enjoy an income flow (seigniorage), which is assessed on the basis of a yield on certain assets. In particular, in the context of the European System of Central Banks, the monetary income, i.e. income from the Eurosystem's monetary policy operations, is distributed among national central banks in proportion to their share in the capital of the ECB (Scheller, 2004).

Chart 2 Non-cash transactions and GDP per capita (2013)



Sources: ECB and Ameco data base.

each economy. Such factors relate to a country's institutional environment (e.g. the size of shadow economy or legislation pertaining to transactions in the shadow economy), the structure and degree of competition in the banking system, the level of adoption of new technologies, as well as the social and demographic characteristics of the population (such as income, average age, educational level or perceived safety of transactions). Indicatively, it has been reported that in Germany the use of cash has been found to be higher among elderly people (Deutsche Bundesbank, 2010).

A relatively limited but growing number of empirical studies in the literature examines the effect of electronic payments and the integration of retail payments in Europe. In a recent study, Hasan et al. (2013) use data from 27 EU countries over the 1995-2009 period to show that the migration from traditional to electronic means of payment exerted a positive impact on economic growth, trade and consumption. This impact has been stronger for euro area countries in relation to the remaining EU countries. Among the different instruments, payment cards had the most significant impact on GDP per capita and trade per capita in euro area countries. The same authors show that the adoption of payment technologies in relation to the diffusion of ATMs and POS terminals is positively associated with macroeconomic aggregates. They estimate that if SEPA instruments were effectively adopted and implemented, this would bring about a positive effect of 0.02% on a country's GDP, as well as that an increase in the use of cards in Europe by 1 million transactions would contribute to an increase in GDP by 0.07%.

In addition, since the late 2000s, payment services have been increasingly seen as a measure of financial inclusion, i.e. as a means of increasing the number of people having access to financial services (BIS, 2012). From a social point of view, a deeper integration of retail payments in Europe can bring about enhanced price convergence among the different payment instruments across EU countries and can, therefore, contribute to ensuring cheap and direct access to retail payment services for all citizens —including those with lower income— thereby promoting social welfare (Cœuré, 2013). According to World Bank data, in 2014

about 10% of Europeans and 12% of Greeks did not have a bank account (see Demirguç-Kunt et al., 2015). In any case, a diversification of the payment instruments available to consumers is desirable from a social point of view.

Moreover, it has been suggested that an economy's migration from cash to electronic transactions is consistent with efforts against the shadow economy and tax evasion, as electronic transactions are recorded and easier to track down (European Payments Council, 2007). De Grauwe et al. (2006) empirically examined the relationship between the shadow economy (as a percent of GDP) and the degree of use of debit cards over cash in 13 EU countries, finding that the size of the shadow economy shows a high negative correlation with the degree of use of debit cards over cash. It has also been pointed out that the bulk of cash in circulation, apart from payment transactions, relates to hoarding purposes, illegal activities or holdings abroad (Gresvik and Haare, 2009; Mooslechner et al., 2006).

5 EFFICIENCY GAINS AND THE SOCIAL COST OF PAYMENTS

A second group of studies takes into account potential efficiency gains[8] that may arise for participants in the payment chain and the broader economy as a result of a better allocation of financial resources. On the supply side, the production of payment services is subject to economies of scale and scope, which can be achieved when the average cost of producing a payment service decreases with the quantity produced or when the joint production of two or more services using the same infrastructure reduces their cost or improves their quality. On the demand side, payment services are subject to network effects, arising from the fact that each additional user increases the value of the payment network for already existing users.

Due to the high fixed costs of payment infrastructure, a minimum number of users (critical mass) is often required for the total value of payments to exceed operating costs (BIS, 2012), while this necessary number of users must be ensured both on the side of consumers and on the side of the retailers using a particular payment instrument (two-sided market) (BIS, 2012). In a period of transition from an existing technology to a new one that will be more cost-efficient in the long term, operating costs can temporarily increase and for this reason investment in new technologies is more attractive when these technologies can operate in synergy with other existing infrastructure and the broader financial system (BIS, 2012; 2014).

In one of the first relevant studies, Humphrey et al. (2003) estimated that payment costs in 12 European countries represent 3% of GDP and suggested that, as the cost of electronic payments ranges between one third and one half of the cost of a traditional payment instrument, a country may save annually 1% of its GDP by fully migrating to electronic payments.

The importance of retail payments for banks has also increased as a result of the recent economic and financial crisis, during which banks' profitability declined significantly due to the worsening in the quality of their assets. For this reason, banks started adapting their strategies and their business model to these new conditions by, inter alia, focusing on profitable core business, diversifying their income sources and improving cost efficiency (European Central Bank, 2014c). In this context, the contribution of payment services can be significant, as they form a relatively stable source of income (Hasan et al., 2009; Cœuré, 2013).[9]

Using data from 27 EU countries for the period 2000-2007, Hasan et al. (2009) provide

8 Efficiency is a broad concept and refers to the way in which the factors of production (inputs) are combined in the production process. Cost efficiency is achieved by producing a given level of services with given input prices at the lowest cost, while profit efficiency refers to producing a given level of services with given inputs in a way that maximises profits (Athanasoglou and Brissimis, 2004).

9 For example, the operating income of European banking groups increased marginally in 2013 after four years of steady declines. The increase was attributable to higher net fee and commission income and higher gains on financial assets, while net interest income and other operating income continued their downward trend (European Central Bank, 2014b).

empirical evidence that a higher use of electronic payments contributed to improved bank performance (in terms of return on equity, return on assets and profit and cost efficiency). This relationship was found to be stronger in countries with a relatively high adoption of retail payment technologies, while banks in countries with developed retail payment services tend to be associated with higher financial stability. In this regard, Bolt and Humphrey (2007) also argue that standardising retail payments at European level can lead to economies of scale in Europe.

Moreover, several central banks have carried out detailed analyses of the cost of payments in European economies with a view to assessing the efficiency of domestic retail payment markets and, to this end, they have estimated the quantity of resources absorbed by each payment instrument used in transactions.

In particular, these analyses are based on survey data among groups of participants in the payment chain (mainly banks and retailers) regarding the cost they incur for the different payment instruments. One frequently used cost estimating method is Activity-Based Costing, which allocates the cost of the activities along the payment chain to the different payment instruments for each participant.

A major distinction regarding the cost of payments in these studies is the one between private and social costs of payments. *Private* costs of payments refer to the cost incurred by each participant separately and include not only the cost of used resources (labour, capital, materials and time spent), but also fees paid to other participants in the payment chain. *Social* costs of payments are the costs to society, reflecting the use of resources in the production of payment services, excluding any fees, or other expenses that constitute revenues for other participants within the payment chain. In essence, the social cost represents the operating cost of payments for the economy, which is to a large extent "hidden".

These studies vary significantly in terms of methodology, range of payment instruments and participants covered, as well as their results. For this reason, different estimates are not fully comparable and, for each country, domestic features and the extent of use of each payment instrument should be taken into account. However, the results of these studies provide a rough estimate of the possible benefits that a country can derive from improving the cost efficiency of domestic retail payment markets.

Table 1 summarises estimates of the social cost of payments in several European countries and the allocation of these costs between participants in the payment chain. In the majority of studies, social costs are allocated between banks, retailers and the central bank.

The social costs of payments are considerable and are estimated to range between 0.49% of GDP in Norway and 1.50% of GDP in Hungary. It should also be pointed out that a large part of these costs, comparable to that allocated to banks, burdens retailers. In particular, an ECB study (Schmiedel et al., 2012) estimated the social costs of various payment instruments for 13 EU countries at 0.96% of GDP (1% of GDP when extrapolating this estimate to 27 EU Member States).

Several of these studies (Banca d'Italia, 2012; National Bank of Belgium, 2005; Brits and Winder, 2005) point out the different cost structure among cash and non-cash electronic payments. It is estimated that the cost of electronic payments is largely fixed and mainly concerns technological infrastructures, while the cost of cash is estimated to be largely variable, i.e. it increases with the volume or value of transactions, and mostly concerns transport and management infrastructure.[10] The different cost structure can potentially lead to cost savings and improved efficiency if payment instruments with high variable

10 The relevant estimates show that about 60%-65% of the cost of cash is variable, while the cost of electronic payment instruments is basically fixed.

Table 1 The social costs of payments in different countries

Country	Social costs of payment (as a percentage of GDP)	Cash	Non-cash	Allocated to:			
				Banks	Retailers	Central bank	Other
Netherlands (2005)	0.65	0.48	0.17	48%	50%	2%	-
Belgium (2005)	0.74	0.58	0.17	48%	50%	2%	-
Italy (2012)	1	0.52	0.31	51%	49%	-	-
Portugal (2007)	0.77	0.13	0.64	-	-	-	-
Hungary (2011)	1.50	0.80	0.70	47%	32%	2%	19%
Denmark (2012)	1	0.35	0.65	16%	57%	-	27%
Norway (2003)	0.49	0.15	0.34	-	-	-	-
Sweden (2012)	0.66	0.26	0.40	45%	46%	1%	8%
EU-13 (2012)	0.96	0.49	0.47	51%	46%	3%	-

Note: Any comparison between countries requires caution, as the different assessments vary in terms of methodology, range of covered payment instruments and participants, reference period, etc. EU-13 refers to the 13 European countries (Denmark, Greece, Estonia, Ireland, Spain, Italy, Latvia, the Netherlands, Hungary, Portugal, Romania, Sweden, Finland) examined in the study by Schmiedel et al. (2012) with the contribution of experts from the relevant central banks.
Sources: Brits and Winder (2005), National Bank of Belgium (2005), Banca d'Italia (2012), Banco de Portugal (2007), Turján et al. (2011), Danmarks Nationalbank (2012), Gresvik and Haare (2009), Segendorf and Jansson (2012a) and Schmiedel et al. (2012).

costs are substituted with other ones of lower variable costs.[11]

However, the answer given ultimately by these studies to the question which payment instrument is the most cost efficient seems to depend on the value of the transaction. Cash is considered to be more efficient for small transactions up to a certain threshold (National Bank of Belgium, 2005; Brits and Winder, 2005; Segendorf and Jansson, 2012a), above which the use of debit cards is considered more efficient.[12]

Another distinction made in the relevant literature regarding the cost of different payment instruments is the one between social costs per transaction and social costs per unit of transaction value. In particular, the total cost for each payment instrument is divided by the total number of transactions or the total value of transactions carried out using this particular payment instrument, respectively. However, estimating costs per transaction tends to favour payment instruments with a large volume but low average value of transactions, such as cash. On the other hand, estimating costs per unit of value favours payment instruments used for transactions of a higher value.

Table 2 summarises estimates of the cost of cash, debit and credit cards, as compiled by central banks either per transaction or per unit of transaction value. An examination of these data shows that credit cards tend to have higher social costs than debit cards both in terms of cost per transaction and in terms of cost per 1 euro of value. Cash frequently has the lowest cost on the basis of the number of transactions, while the cost of debit cards is lower than that of cash per 1 euro of value.

The ECB study mentioned above (Schmiedel et al., 2012) also points out the important differences in the social costs of payments across European countries, as payment markets in

11 For example, the central bank of Hungary (Turján et al. 2011) has estimated that cost savings amounting to 0.4% of GDP could be achieved under a scenario assuming that cash transactions would decrease by 950 million and would be substituted by 850 million debit card transactions and 100 million electronic credit transfers. Brits and Winder (2005) estimated that cost savings of €106 million over a horizon of 3-5 years could be achieved in the Netherlands by substituting 1,500 million cash transactions for 1,000 debit card transactions and 500 million e-money transactions.

12 Indicatively, this threshold has been estimated at €10.24 in Belgium and €11.63 in the Netherlands.

Table 2 Unit social cost of cash and cards

A. Social cost per transaction (in euro)			
Country	Cash	Debit card	Credit card
Netherlands (2002)	0.30	0.49	3.59
Belgium (2005)	0.53	0.55	2.62
Italy (2012)	0.33	0.74	1.91
Portugal (2007)	1.85	0.23	2.44
Denmark (2012)	0.99	0.49	2.85
Sweden (2012)	0.78	0.42	1.10
EU-13 (2012)	0.42	0.70	2.39

B. Social cost per 1 euro of transaction (in euro)			
Country	Cash	Debit card	Credit card
Netherlands (2005)	0.032	0.011	0.031
Belgium (2005)	0.03	0.01	0.03
Italy (2012)	0.02	0.01	0.20
EU-13 (2012)	0.024	0.014	0.034

Note: Any comparison between countries requires caution, as the different assessments vary in terms of methodology, range of covered participants, etc. EU-13 refers to the 13 European countries (Denmark, Greece, Estonia, Ireland, Spain, Italy, Latvia, the Netherlands, Hungary, Portugal, Romania, Sweden, Finland) examined in the study by Schmiedel et al. (2012) with the contribution of experts from the relevant central banks.
Sources: Brits and Winder (2005), National Bank of Belgium (2005), Banca d'Italia (2012), Banco de Portugal (2007), Danmarks Nationalbank (2012), Segendorf and Jansson (2012a) and Schmiedel et al. (2012).

these countries present different characteristics and structures. The 27 EU countries have been placed in five clusters with similar payment and economic characteristics, as shown in Table 3. On the basis of this grouping, northern European countries such as Denmark, Sweden and Finland have been placed in the group of countries with the lowest social cost of payments (0.80% of GDP): these countries feature relatively high GDP per capita, low number of cash transactions and high number of card and credit transfer payments. By contrast, countries such as Greece, Malta, Cyprus, Italy, Ireland and France have been placed among the countries with the highest social cost of retail payments (1.20% of GDP) and

Table 3 Retail payments in European countries

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
	Denmark Sweden Finland	Austria Germany Netherlands Luxembourg	Belgium Estonia Slovenia Portugal United Kingdom Spain	Cyprus Malta Greece Italy Ireland France	Bulgaria Czech Republic Slovakia Poland Romania Hungary Lithuania Latvia
Social cost (GDP percentage)	0.80	0.92	1.11	1.20	1.01
Cash transactions per resident	154	358	266	306	270
Cheque transactions per resident	1	0	6	23	0
Card transactions per resident	171	64	83	59	17
Direct debits per resident	25	77	31	16	5
Credit transfers per resident	98	102	55	24	35
GDP per capita (in euro)	34,782	42,904	20,526	24,380	8,620

Source: Schmiedel, Kostova and Ruttenberg (2012).

feature medium levels of per capita GDP, high number of cash and cheque transactions, and a relatively low number of card transactions, direct debits and credit transfers.

6 RETAIL PAYMENTS IN GREECE

As already mentioned, retail payments in Greece are primarily conducted with cash. Unlike electronic payments, the volume of cash transactions is not readily and accurately available, but can be proxied by other indicators, such as the circulation of euro banknotes (and coins) or cash withdrawals from banks.

Estimated currency in circulation in Greece (in real terms) followed a relatively stable upward trend at an average annual rate of 12%, i.e. about three times the growth rate of private consumption, over the period 2002-2009. Thereafter, with the outbreak of the debt crisis in Greece, the strong trend for hoarding observed due to the uncertainty prevailing in the Greek economy led to a sharp rise and strong fluctuations in currency in circulation.[13] Thereby, developments in the latter were largely disconnected from developments in domestic transactions.

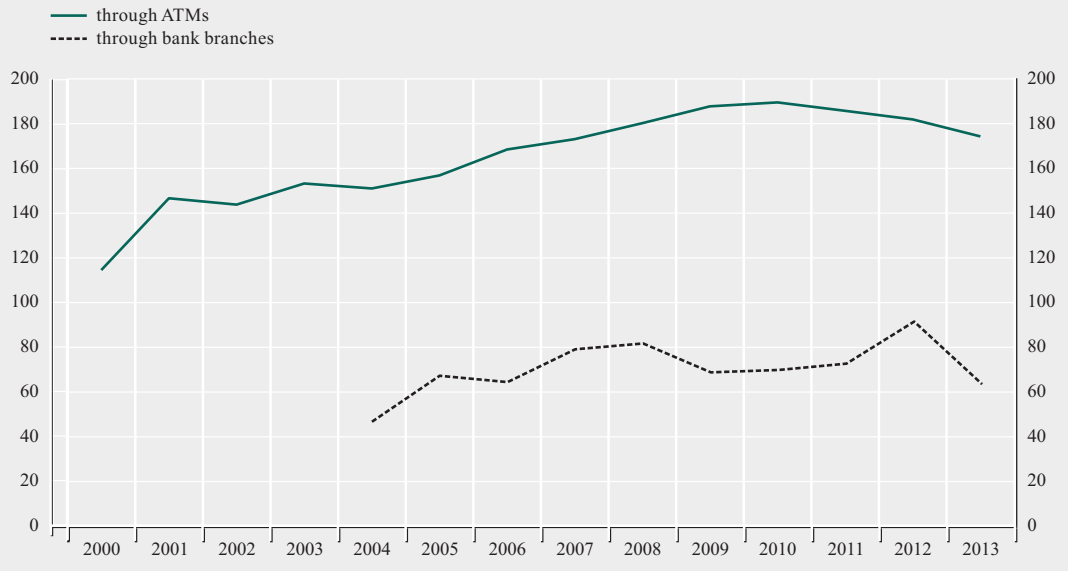
Alternatively, the use of cash can be proxied by the number of cash withdrawals either from ATMs or from banks, as shown in Chart 3. Over the period 2000-2009, the use of cash recorded a rising trend, while thereafter developments in the use of cash were influenced by hoarding and a preference for liquidity due to uncertainty connected with the crisis.

Table 4 and Chart 4 summarise developments in the number of transactions and the relevant importance of non-cash payment instruments

13 According to Keynes (1936), there are three motives for holding money: the transactions motive, in which money is held to meet every day needs, the precautionary motive, related to the need to address unexpected future needs (mostly consumption), and the speculative motive, related to possible changes in the prices of assets, while Friedman's contribution (1956 and 1959) was also very important, as he treated holding money as an alternative form of holding assets. Therefore, demand for money is expected to relate to key macroeconomic aggregates (such as, for example, economic activity, price level and interest rates). However, in times of economic crisis or prolonged uncertainty, other factors such as portfolio shifts and investors' preference for liquidity appear to gain particular importance.

Chart 3 Cash withdrawals through ATMs and bank branches

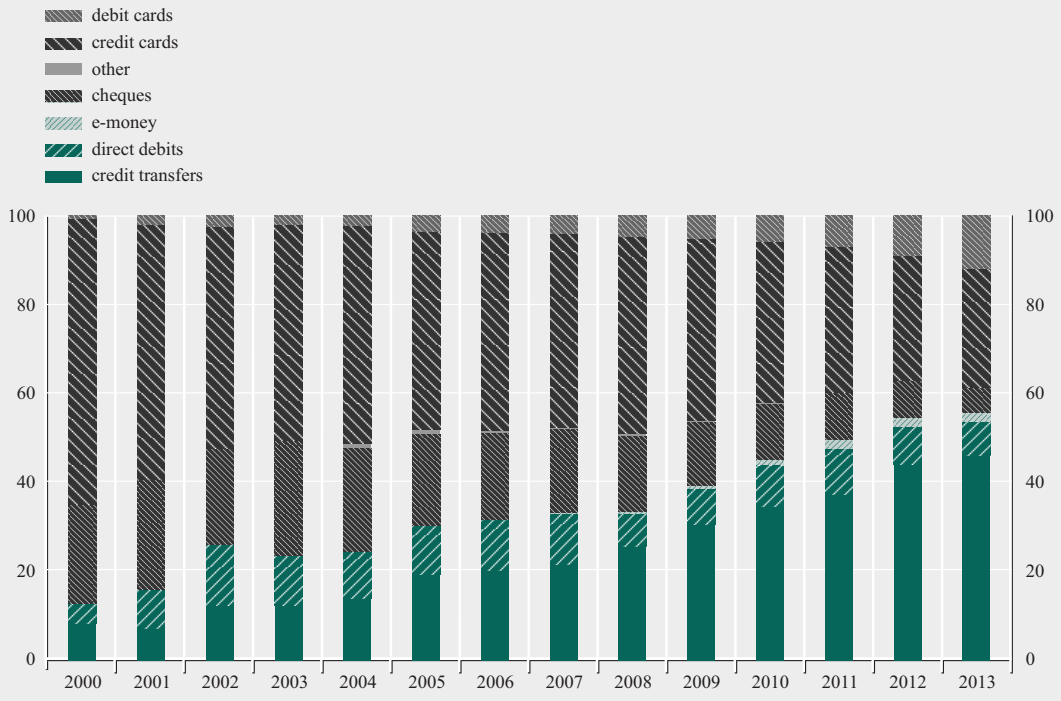
(number of withdrawals in millions)



Sources: Bank of Greece and ECB.

Chart 4 Relative importance of payment instruments in Greece

(as a percentage of the total number of transactions)



Sources: Bank of Greece and ECB.

Table 4 Non-cash transactions in Greece

(number of transactions in millions and annual growth rate %)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average annual growth rate*
Credit transfers	6.6	5.3	9.8	12.8	17.0	26.4	29.3	34.5	43.5	54.8	63.4	69.1	85.7	91.2	22.4
Direct debits	3.4	6.5	10.9	11.8	13.1	15.0	16.4	17.9	12.2	14.0	17.0	18.5	16.3	14.3	11.7
Credit cards	50.2	41.9	39.3	50.5	59.9	60.7	64.4	69.3	75.3	73.3	66.3	60.5	54.8	52.8	0.4
Debit cards	0.6	1.5	2.0	2.3	2.9	4.9	5.4	6.4	7.9	9.2	10.9	12.8	17.7	23.5	32.6
Deferred debit cards	-	5.9	6.0	6.5	1.8	1.5	1.9	1.9	2.1	2.0	1.8	1.6	1.5	1.4	-11.2
e-money	-	-	0.0	0.0	0.0	0.0	0.1	0.5	0.9	1.8	2.6	4.0	4.5	4.4	71.7
Cheques	17.4	18.0	17.1	26.9	28.2	27.8	27.8	29.5	28.8	25.3	22.6	19.4	15.5	11.1	-3.4
Other	-	-	-	-	1.2	1.0	0.7	0.7	0.5	0.4	0.3	0.2	0.2	0.1	-21.3
Total	78.2	79.0	85.1	110.6	124.4	137.7	146.3	161.0	171.7	181.1	185.1	186.4	196.3	199.0	7.4

Sources: Bank of Greece and ECB.
* Compounded Annual Growth Rate.

in Greece from 2000 onwards. The total number of these payments increased steadily by some 7% annually, including during the crisis period from 2009 onwards. This increase was larger for debit cards, credit transfers and direct debits. Credit transfers increased their

share in the total number of these transactions, reaching 45% in 2013. Besides, debit cards[14] are gradually gaining ground, accounting for some 12% of the market in 2013, while direct debits maintained a relatively stable share (5%-10%). By contrast, the use of credit cards, after reaching a peak in 2008, fell significantly as a result of lower private consumption and tightened bank lending standards that limited the access of consumers to bank credit. Thus, the share of credit cards fell from 65% in 2000 to 25% in 2013. Also, the use of cheques has followed a significant downward trend over time, in the context of substitution of traditional with electronic payment instruments, but also due to the increased credit risk during the crisis. As a result, the share of cheques fell from 20% in 2000 to 5% in 2013. Finally, the use of e-money, although higher in recent years, remains very low.

7 CONCLUDING REMARKS

Over the last decade, retail payment markets have been growing at a fast rate all over the world, supported by technological developments and innovations. In Europe, a series of measures are being adopted with a view to creating an integrated and competitive retail payments market, while electronic means of payment are steadily gaining ground. However, despite this trend, there are significant differences in retail payment markets across European countries which relate, on the one hand, to the extent of the use of cash and, on the other, to the choice among alternative payment instrument.

According to the literature, the promotion of efficient payment instruments and efforts to integrate retail payments in Europe are considered to contribute to economic and social welfare.

Estimating the cost of retail payments to society is an important step towards achieving an efficient retail payments system and falls within the scope of central banks in monitoring weaknesses in payment infrastructures and methods and in promoting the use of safe and efficient payment instruments. The relevant estimates have shown that the social cost of payments is not negligible and that, in general, it is lower in countries where a large number of payments is conducted electronically.

In the case of Greece, available data reflect the high social cost of retail payments and the particularly extensive use of cash in the economy. Non-cash payments have increased over time, but remain very low in comparison with the euro area average, suggesting that there is scope to improve efficiency in this area. As a result, participants in the payment chain should focus on promoting efficient payment instruments. They should also equally focus on improving their practices and internal procedures in the payments production process, so as to benefit from the economies of scale or scope that characterise it.

Technological developments and the financial and economic crisis have created a new situation in the area of retail payments. For instance, the trend of growing e-commerce at the EU level creates new opportunities to enhance the use of electronic payments. The orientation of participants in the payment chain towards secure, accessible and efficient means of payment will contribute in strengthening public confidence in the currency and promoting economic growth. Main prerequisites for this[15] include consensus and cooperation among relevant stakeholders; pricing transactions on the basis of the relative cost of the various payment instruments; providing incentives and value added to payment instruments for consumers and retailers; standardising and interconnecting procedures; making available point of sale devices at retail outlets; establishing an appropriate open institutional framework; and lowering the prices of payment instruments taking into account the efficiency gains achieved.

14 Debit cards, a close substitute of cash, are preferred by consumers over cash in many countries for low-value transactions, while they are also used for internet and mobile payments.
15 European Payments Council (2007).

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ALTERNATIVE NPLs RESOLUTION REGIMES A CASE STUDIES APPROACH

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1 INTRODUCTORY OBSERVATIONS

Banking is an inherently risky business. Any credit originating or investment decision entails the possibility that counterparties may default on their obligations. Such uncertainty affects the value of bank assets, but the bank has all the tools required for assessing the risk parameters and estimating the level of potential loss. It may decide to write-down or write-off the claim, which under normal circumstances will be absorbed by its profitability and/or accumulated provisions. Every bank's business model is structured around this approach, and the relevant procedure represents the typical way of addressing a "bad investment".

However, this approach assumes that no extreme changes take place in the economic environment. In case external conditions deteriorate considerably and the number of defaults and troubled assets increase, a bank's profitability and provisions may not suffice to cover the loss, which thereby affects its capital and puts its financial solvency in question. Uncertainty multiplies since distressed assets are difficult to value, as historical evidence leads to no reliable outcome, and the toxic characteristics these assets exhibit may affect sound assets of that same or any other bank(s).

Contagion influences many economic decisions, such as business investment behaviour, consumer patterns, bank lending attitudes etc., and may lead to a credit crunch. Under these circumstances the banks' ability for active management of their troubled assets is limited, especially in anticipation of market reactions (e.g. increased margins) and supervisory reactions (e.g. higher capital requirements). So, when the problem escalates to such toxic proportions, the way of addressing it can no longer rely on the "bad investment" approach, which has to be differentiated. A key aspect of this differentiation is a central intervention that can be effectively implemented by the government, with a view to strengthening the troubled assets restructuring procedure with minimal burden on the economic environment, so as to restore creditor-borrower relations and smooth out the flow of funding.

In recent economic history numerous developed and less developed countries have faced problems in their banking sector. The government interventions vary, but can generally be grouped into two types: closed bank resolution and open bank resolution. In the former case, troubled banks are liquidated according to the formal bankruptcy procedures, whereas in the latter case they remain open with some sort of assistance. The banks can be refinanced or recapitalised, or there can be a direct intervention for restructuring their portfolios, particularly if the size of non-performing loans (NPLs) increases considerably. The present study focuses exclusively on this last type of direct intervention and examines alternative approaches to the resolution of bank portfolios, based on an analysis of international experiences.

Overall, it is possible to distinguish two types of interventions for restructuring troubled portfolios, according to the desired "ownership" status of NPLs: the "on balance sheet intervention", where the troubled assets are isolated but remain on the bank's balance sheet and the government may provide some sort of guarantees, and the "off balance sheet intervention", where distressed elements are transferred off the bank's balance sheet, usually to a specialised asset management company. In

* The views expressed in this paper are personal and do not necessarily reflect those of the Bank of Greece. Thanks are extended to Heather Gibson and the participants of an in-house seminar held at the Economic Analysis and Research Department of the Bank of Greece for their useful comments.

the first case, the bank is obliged to set up a mechanism for managing NPLs, either internally or by creating a subsidiary management company (decentralised approach). In the second case, a special management company is set up to aggregate all troubled portfolios, or a company is formed for each bank, or one company is created for each specialisation of the troubled portfolio (centralised approach).

The international literature and experience suggest that the optimum solution is not unique, but depends on the economic and political environment, the intensity of the problem, as well as its root causes. Each solution comes both with advantages and disadvantages and the question is which model best fits the given context.

The present study examines in detail these two types of intervention, as well as the experience of some countries that have applied the respective policies. The aim is not to analytically present the model applied by each country, but to focus on the characteristics that lead to the success or failure of each such attempt. The analysis seeks to answer two questions:

a. Does the transfer of distressed elements off balance sheet help restore the banks' lending activity?

b. Which type of intervention leads to a more efficient management of troubled portfolios?

In this context, section 2 examines the problem of NPLs and the necessity of a central intervention in order to duly address the difficulties. Section 3 analyses the "off balance sheet intervention", and more specifically the issues connected with the process of gathering and transferring assets to a "bad bank". Section 4 analyses the "on balance sheet intervention", and more specifically the issues connected with retaining the distressed elements and managing them within the bank. Then, section 5 analyses a number of international experiences involving "off balance sheet interventions". The study's main objective is to highlight the issues at stake for each alternative and record their handling according to some recent examples.

2 THE PROBLEM OF NPLs AND THE CENTRAL INTERVENTION

A common feature of all banking crises —whether it is a small-size crisis limited to particular bank(s) or a systemic wide crisis— is the burdening of banks with a significant number of non-performing loans (NPLs). The relevant academic literature abounds and has both theoretically and empirically documented the relationship between NPLs and bank bankruptcies (see Campbell 2007). In all cases government intervention was deemed necessary to prevent a deepening of the crisis.

NON PERFORMING LOANS (NPLS): DEFINITION, CALCULATION, COMPARISON

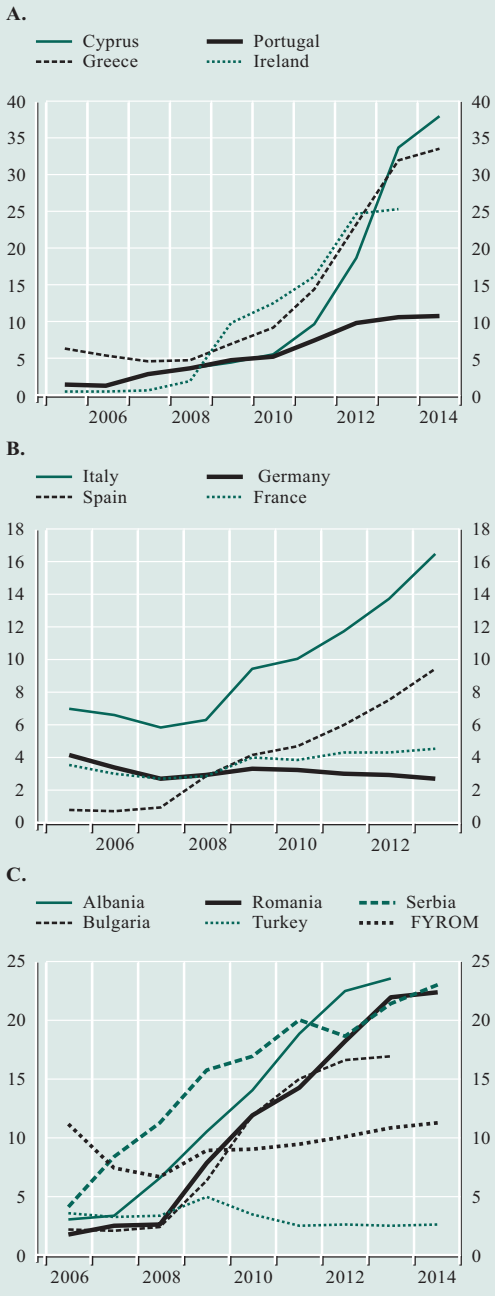
All empirical research efforts on NPLs, and in particular comparative studies, face an important challenge, associated with the absence of a single definition for "non-performing loans".[1] The two primary criteria[2] usually applied reflect the two dimensions of a credit event: the time dimension, i.e. the days past the date of repayment, and the quality dimension, i.e. the possibility of non-repayment. Thus, the term "non-performing loan" implies failure to repay, but also

1 Another challenge relates to terminology. Often, terms such as 'past due loans', 'bad loans', 'problem loans', 'overdue loans', 'substandard loans', etc., are commonly used, without having the exact same sense. There are also the terms 'impaired loans', used in accounting, and 'defaulted loans', used for specifying capital adequacy. The notion of 'non-performing loans' is an umbrella concept that covers a broader scope than the other two – see EBA (2014), "Standards on supervisory reporting on forbearance and non-performing exposures under article 99(4) of Regulation (EU) No 575/2013".

a possible inability to repay. Thereafter, there are also secondary criteria, which specify the definition and the level of NPLs, such as the treatment of loans under restructuring, of technical defaults, and of collaterals and guarantees. Additional questions arise as well, such as the inclusion of the non-repaid instalments or the entire loan in the calculations, and the calculation of the defaulted loan (NPLs product view) or of all the loans of the counterparty (NPLs customer view). The application of both these criteria varies across EU countries (see Barisitz 2013a and 2013b), a fact that has led the European Banking Authority (EBA) to establish harmonised definitions and calculation methods. It set a limit of 90 days in arrears for the definition of all sorts of non-performing exposures (not only loans) and specified, as a supplementary criterion, possible adjustments made by the bank to some loan parameters, e.g. tolerance of an omission of a scheduled payment. Early warning criteria are not specified in detail, but left at the banks' discretion. It also specified a number of issues regarding the secondary criteria, as e.g. that all loans of a counterparty should be considered to be non-performing if a loan with more than 90 days in arrears accounts for more than 20% of the total exposure. Given the existence of alternative approaches across the EU, harmonisation has an impact on the level of NPLs and therefore on the need for bank recapitalisation in each country.

Countries outside the EU have established various other definitions, depending on the prevailing banking practices and/or the type of portfolios concerned. This casts some doubt on international comparative studies between countries. The World Bank has developed a database with, presumably, harmonised definitions. Parts A, B and C of the Chart present comparative data relating to groups of countries.

NPLs ratios



Source: World Bank DataBank.
Note: The ratio's nominator represents the total level of loans defined as NPLs and the denominator the gross value of loans (including NPLs before special provisioning).

2 A third criterion applied in some cases relates to supervisory loan classification (standard – watch/special mention – substandard – doubtful – loss/write-off), with the three last categories reflecting the sense of non-performing loans. This criterion is more important for less developed countries.

The theoretical arguments in favour of government intervention rely on the externalities created by the accumulation of troubled assets in the banks' balance sheets and the classic paradigm of the lemons problem. When the real value of a specific good cannot be objectively identified, buyers are only inclined to proceed with transactions at the average value of that good. Uncertain of its value, they take for granted that sellers are better informed and offer the lowest possible quality of the good in question (lemons). The market collapses, unless a credible external mechanism is introduced to indicate an approximate value. The banks' troubled portfolios exhibit the characteristics of underrated goods. Their value cannot readily be defined and the current market value usually deviates from intrinsic value. The market collapses and government intervention becomes necessary to address the information asymmetry, calculate the level of the loss, and initiate the required solutions.

Beyond that, two perspectives can be used to approach the NPLs problem, those of microprudential policy and macroprudential policy. In the former case, NPLs are seen as a microeconomic phenomenon, i.e. as a quality problem of the banks' portfolios and as an attitude problem of the banks in relation to their lending activity. In the latter case, NPLs are seen as a macroeconomic phenomenon, i.e. as a problem that affects financial stability, the banking sector's effectiveness, and ultimately economic growth. Regardless of the perspective adopted for the analysis, a consensus exists that some form of centralised intervention is needed to contain the consequences. If the problem is located in one or a small group of banks, the intervention is mainly of a preventive nature, of limited scope, and targeted. But if NPLs grow in size and acquire toxic characteristics, the intervention has to be more active and diversified, since it must tackle both the stock of existing NPLs and the root causes of their creation.

(a) Examining NPLs from a microprudential perspective

Considering banks as investment institutions, those with a growing troubled portfolio tend to move away from the efficient frontier, as they fail to optimise the portfolio creation decisions. Particularly as regards lending decisions, the size of the NPLs affects the ability and the incentives to extend loans, in at least three ways. First, NPLs affect profitability, since they decrease interest income and increase provisions, operating costs and financing costs. This generates less internal funds available to finance investments and loans. Second, NPLs require higher regulatory capital due to higher risk weights on impaired assets, a fact that sets limitations to a bank's credit expansion.[1] Third, banks with increased NPLs are less willing to finance businesses of marginal creditworthiness. Therefore, banks with high NPLs tend to limit their lending activity, and this negative relationship has also been empirically documented (see IMF 2014, Annex 1.3). A simulation in three countries (Italy, Spain and France) showed that decreasing NPLs combined with increasing capital buffers lead to higher bank lending. It also showed that the effect of capital is of a longer term, which emphasises the importance of sweeping NPLs off balance sheets. The argument is further supported by the fact that a financing shock has a permanent negative impact on GDP, which underlines the importance of speeding up the intervention (see IMF 2014, Box 1.1). In addition, the level of NPLs also affects monetary policy efforts to increase financing in the economy. An IMF study on the euro area quantitative easing programme deems that solving the NPLs problem would improve the programme's effectiveness (see IMF 2015, Chapter 1).

1 Supposing that we have a performing loan of €100, then the required capital is 100 x 100% x 8%=€8. The same loan, if it is in arrears, requires 100 x 150% x 8%=€12 of capital. Reversely, a loan in arrears that becomes performing, releases €4 of capital that can be used to support an additional lending of €50 (or 50% increase).

Aside from limiting loans, the size of NPLs in a bank has a number of more general effects on its financial soundness. Occasionally banks face NPLs problems that under normal circumstances are manageable without difficulties. This is achieved, in a first step, through the development of an internal control system and the application of effective risk management procedures so as to ensure that troubled loans are being properly monitored and managed. Supervisors usually have a particular interest in such systems and their effective implementation represents the first layer of supervisory intervention.

In a second step, smooth management depends on loss absorption capacity. The impairment of a bank asset must be recognised and reflected on the balance sheet by a total or partial write-off of the value. Motives for this write-off are weak,[2] as, in lack of sufficient provisions, it will affect capital. Consequently, a bank's first line of defence is the adequacy of provisions, the second layer of supervisory intervention. In accordance with accounting standards, as of the balance sheet date, banks perform an impairment test of their loans and form provisions when objective evidence suggests that they will not collect the total loaned funds under the terms of each agreement. Certainly, they have a degree of discretion that can be used to reveal information relating to expected losses, or to mask the real loss level. Accounting provisions are not always in line with supervisory logic and thus intervention aims at bridging the gap[3] and averting any opportunistic behaviour.

If, nevertheless, provisions do not suffice, a bank's second line of defence is to have capital buffers, so as to absorb losses with the lowest possible disturbances. The regulatory framework uses the regime of minimum capital and effective procedures as an intervention tool for the bank's soundness. Banks are obligated to meet the minimum capital requirements and calculate a safety buffer. This in several cases has proven to be insufficient and the evolution of the regulatory framework (Basel III) recognised the need to institutionally and clearly define the level of additional capital buffers a bank must hold,[4] as well as the restrictions imposed when this requirement is not met. So the third layer of microprudential intervention focuses on forming sufficient capital to absorb unexpected losses.

These two lines of defence create the conditions for a smooth absorption of the shocks generated by NPLs, but still have certain limits, defined mostly by the external environment. If deterioration is too intense, then the problem acquires different characteristics and escapes the narrow scope of a bank or group of banks. This case necessitates a centralised intervention to solve the problem, e.g. write-off of NPLs and capital injection to the bank or transfer of NPLs off the bank's balance sheet and capital injection, whereby issues of a macroprudential nature start to arise.

(b) Examining NPLs from a macroprudential perspective

Macroprudential policy aims at defining the sensitive issues in the banking system and applying policy measures that safeguard finan-

2 A bank has very limited incentives to recognise and write-off a troubled loan. First of all, the accounting framework facilitates holding rather than writing-off. Moreover, supply and demand factors can be acknowledged to explain this behaviour (see Jassaud and Kang 2015). The bank has a motive to delay the write-off in order not to disrupt its relation with the borrower, particularly a long-standing one and built with great efforts. The same holds true in cases of collateral lending, in which the collateral liquidation process is long-term. Another counter-incentive is the order at which creditors are satisfied in a liquidation process, as the government typically enjoys a preference. Finally, there are also publicity reasons; e.g. the doubtful claims coverage ratio, commonly used as a proxy of credit risk decreases, thereby indicating deterioration, when a loan for which provisions have been formed is written off.

3 The new accounting standards (IFRS 9) are expected to narrow the gap when applied.

4 A conservation buffer equal to 2.5% of weighted assets has been set to ensure that banks hold additional capital which can be used to absorb losses during crisis periods. Such capital shall be held by banks in periods of favourable market conditions and shall be used, only if need be, in periods of high market volatility. A counter-cyclical buffer equal to 0%-2.5% of weighted assets has also been provided for. The specific percentage to be applied at national level shall be defined by the supervisory authority, using excessive credit expansion as the main criterion, but possibly also on the basis of other measures of risk concentration. Finally, an additional percentage shall be applied for systemically important banks, defined based on their particular characteristics and aimed at covering systemic risk. It should also be noted that limits have been set on the disbursements (dividends, bonuses etc.) a bank can make when it does not meet the minima imposed by the regulations.

cial stability. The total NPLs ratio identifies such vulnerabilities, given the threats of "financial contagion", i.e. the transmission of credit market frictions to the rest of the system, with negative effects on stability and growth. A plethora of academic studies analyse the interventions of governments with a view to restoring the banking systems, particularly after the crisis of 2007-2008, and reach the general conclusion that the removal of distressed elements from the banking sector has a positive impact on financial stability, particularly if the problem shows signs of persistence (see ECB 2009). Three distinct fields of analysis support the above conclusion: (i) the factors that create NPLs and the adverse feedback effect on the economy; (ii) the level of NPLs beyond which central intervention is deemed necessary; and (iii) the form of intervention required to address the problem.

(i) Feedback effect on the economy

Since burgeoning NPLs affect the economy in a negative way and worsen the economic variables, the NPLs ratio is typically included in every macroprudential policy toolbox. Modelling this adverse feedback effect constitutes a complementary exercise in the models that identify the factors that create NPLs. These models rely on the traditional theory of economic cycles, enriched by instances of financial market frictions, to derive the dynamic relationships between the real economy and the financial market. Bank credit and impaired loans follow a cyclical pattern, as in upturns optimism leads to relaxed credit standards, higher lending and investment, and low percentages of troubled loans. The extent of this relaxation depends on the existing regulatory and supervisory framework and represents the main problem-generating factor in the next phase of the economic cycle, the downturn. Failure of certain investment plans, asset price reduction and higher risk aversion among investors lead to increased numbers of impaired loans, resulting in stricter credit standards and reduced lending. In this context empirical studies of NPLs have been developed and carried out for a large number of countries, groups of countries, or comparisons between countries.

Despite the solid theoretical background, in the earlier stages researchers focused on bank-specific factors to explain the differences observed across banks. Thus, they used variables depicting differences in ownership, management, efficiency, risk management, or even randomness. Then researchers started to introduce in their models macroeconomic variables as well, whereby measuring a statistically significant negative relationship of troubled loans with the rate of change in GDP, which indicates that the level of impaired loans depends on the upward or downward phase of the economic cycle, in line with theory. This trend was particularly strengthened in recent years after the economic crisis episodes in the global economy, and the majority of researchers conclude that the causes of NPLs creation reflect a combination of macroeconomic factors and bank-specific variables. Other main macroeconomic factors reported, in addition to the GDP growth rate, typically include unemployment and long-term interest rates, without excluding additional variables such as inflation, real estate prices, stock market prices, etc.[5]

The major negative feedback loop in the economy set into motion by surged NPLs relates to the banks' lending behaviour. As analysed previously, when NPLs exceed a certain level, banks are unwilling to take up new risks and the supply of loanable funds is less than demand. If the phenomenon spreads over the entire banking sector, it becomes acuter, as enterprises with profitable investment proposals, given the current interest rates, fail to be financed. This is described as a "credit crunch". Credit crunch is a disequilibrium phenomenon that reflects financial market weak-

5 For the euro area as a whole see Makri V., A. Tsagkanos and A. Bellas (2014), "Determinants of Non-Performing Loans: The Case of Eurozone", Panoeconomicus, 2, 193-206, and for Greece in particular see Louzis D., A. Vouldis and V. Metaxas (2012), "Macroeconomic and bank-specific determinants of nonperforming loans in Greece: A comparative study of mortgage, business and consumer loan portfolios", *Journal of Banking & Finance*, 36, 1012-1027.

nesses and affects the economic cycle's dynamics.[6] In order to address these weaknesses and restore financing, central intervention is a key parameter for financial stability.

Aside from the credit crunch, the side-effects of surged NPLs also extend to other parameters of the economy. These are partially captured by the autoregressive factor (NPLst-1) usually imputed in the models and found statistically significant. A more comprehensive modelling uses feedback mechanisms (impulse functions) of the macroeconomic environment when NPLs reach a certain level. It is empirically documented that NPLs play an important role in the macrofinancial linkages, that is the link between the macroeconomy and the financial sector (see Nkusu 2011). Out of all the variables examined, NPLs are the only one that affects and is affected by all the other statistically significant economic variables. Thus, the prices of financial instruments, credit to the private sector, economic growth and the level of NPLs itself deteriorate on account of an initial shock in NPLs and the intensity of the feedback loop affects financial stability.

(ii) The size of NPLs

Although it is documented that burgeoning NPLs affect the economy, no specific level of NPLs has been clearly defined, beyond which a credit crunch and negative feedback effects exacerbate macrofinancial vulnerabilities. A small percentage clearly poses no threat, but the identification of the upper limit is not always feasible, as it largely depends on each country's level of sophistication. The same NPLs ratio means different things for a mature economy than for a less mature one. Theoretically, a developed country has the infrastructure and the institutional framework that can address a surge in NPLs with less disturbances and more effectively. Therefore, the level of NPLs alone provides incomplete information, since the critical size is a function of the economic development level and the financial system's ability to smoothly absorb losses. Chart 1 shows the level of NPLs before the formation of a special asset management company in selected countries.

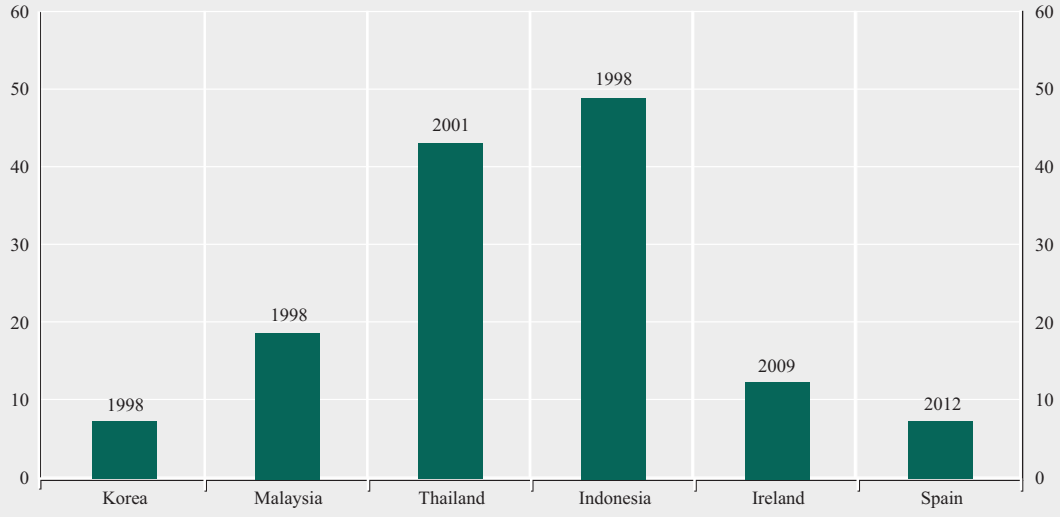
(iii) Alternative policies

Literature on the alternative policies available for dealing with NPLs abounds, along with international experience. The approaches vary across countries, and for the optimal policy it is important to determine the root causes of NPLs, that is whether the NPLs result from conjunctural causes or from endogenous, systemic causes, as well as to assess the overall condition of the economic/legal/political environment in which the NPLs are observed. It is possible to categorise two types of solutions: immediate solutions and structural solutions. If the underlying cause for the emergence of NPLs is conjunctural, i.e. attributable to factors that alter the status quo, then an immediate solution could suffice. Immediate solutions are usually short-term in nature and include a financial restructuring of the banks combined with measures such as supervisory forbearance, capital injection and simultaneous write-off of NPLs, assistance for managing NPLs within the bank, and/or transfer of NPLs to a special asset management company. These are backward-looking measures that seek to immediately address the problem, without however ensuring against its re-emergence, i.e. a further creation of NPLs.

In contrast, forward-looking measures need to be taken when the underlying cause of NPLs emergence is systemic, i.e. attributable to the economic, political and institutional environment. In this case structural measures are required to cope with the existing stock as well as with the root causes of NPLs. Indicatively, measures of a structural nature include restructuring of the banking sector, enhancing the prudential supervision of banks, strengthening

6 A pivotal point in the analysis is the notion of "financial accelerator", according to which the financial system is not an independent source of uncertainty but acts as an accelerator of an external shock. This notion reflects the role played by the financial market in transmitting an initial financial shock (see Bernanke B.S., M. Gertler and S. Gilchrist (1999), "The financial accelerator in a quantitative business cycle framework", *Handbook of Macroeconomics*, Volume 1, edited by J.B. Taylor and M. Woodford, Elsevier).

Chart 1 NPLs ratios in the year of AMC formation



Source: World Bank DataBank.
Note: The ratio's nominator represents the total level of loans defined as NPLs and the denominator the gross value of loans (including NPLs before special provisioning).

the institutional and legal frameworks, putting bank resolution measures in place, using advance financial instruments, etc. All of them aim at preventing, to the extent possible, the re-emergence of new NPLs.

In reality, the causes never exclusively fall into one of the two categories, but are a combination of both. Successfully solving the problem relies on applying the proper mix of these two forms of policy. But the ideal solution cannot be described in strictly economic terms, as the institutional factors, the political scene and the relationships developed between banks, governments and enterprises play a catalytic role in the final selection (see Grossman and Woll 2014).

3 THE "BAD BANK" SOLUTION

The "off balance sheet" intervention, through the formation of a special Asset Management Company (AMC), or "bad bank" as is commonly referred to, has proved to be the most widespread solution for addressing the problem of the banks' asset value deterioration. We shall examine the approach based on the two questions posed in the introduction of this study, related to the alienation from and the management of impaired assets, and then we shall analyse various characteristics that determine the success or failure of each attempt.

(a) Key questions

The basic idea behind the establishment of an AMC is simple but the practice is quite complicated; if distressed assets are removed from balance sheets, banks can more easily carry on with their activities unhampered and fulfil their financial intermediation functions. First, they need not devote resources for NPLs management, but can instead redirect them to more productive activities, and second, uncertainty regarding the value of NPLs is reduced, as balance sheet transparency increases and "contagion" to healthy items is prevented. Thus ambiguity about the bank's soundness declines and its access to money and capital markets is facilitated.

The opacity of banks' balance sheets is an issue extensively examined in the academic litera-

ture from several perspectives. Even in normal periods asset valuation is quite hard, let alone in times of turbulences. The credit crunch of the 2007-2008 crisis has been directly associated with the market's failure to evaluate the impaired assets and impose the necessary discipline. It has been empirically established that bank opacity increased during the crisis (see Flannery et al. 2013) due to the disclosure of undervalued losses, especially associated with real-estate data, which is grounded on the discretions allowed by the accounting standards and the exploitation of supervisory forbearance, in order to "preserve the value of the equity capital" (see Huizinga and Laeven 2012). On the contrary, Calomiris and Nissim (2014) conclude that only a small part of opacity is linked to the quality of the loan portfolios and instead list other parameters such as deposits, interest rate risk, etc. In general, international literature has established that bank transparency[7] has positive effects on financial stability, through limiting the information asymmetry (see Van Roy 2008). In this context, supervisory initiatives, such as the disclosure of stress-testing outcomes, reinforce efforts towards that goal (see Morgan et al. 2014) and can convince market participants that the message contains important information (see Gick and Pausch 2012). It logically follows that the removal of troubled portfolios from the banks' balance sheets will increase transparency and restore the borrowing ability of the banks and thereby the financing of the economy. It can also signal an active management of the problem and create conditions for financial stability (see Hauck et al. 2014).

Transferring assets from the banks to the AMC does not automatically result in the resolution of these assets, but it is a risk-shifting effort which is expected to result in a more efficient management. Managing distressed elements represents the sole activity of an AMC, which potentially has the means to combine specialised resources and expertise and to use specialised schemes to actively manage the portfolio. It also has the advantage of time, as it is not bound by banking practices and/or regulatory obligations to immediately liquidate the troubled assets. Free of capital adequacy pressures, it can better manage time so as to avoid fire sales that are usually accompanied by considerable losses. On the contrary, its ability to hold the assets in order to select the optimum liquidation timing, i.e. during a more favourable phase of the business cycle, can prevent or at least limit the level of recorded losses.[8] Indeed, if it succeeds in gathering a critical mass of assets, it has the opportunity to improve the efficiency of their management, exploit economies of scale and use alternative financial instruments.

Consequently, AMC formation has a dual purpose, first, to isolate and free the banks' balance sheets from distressed elements, and second, having gathered these assets, to implement a programme of efficient management. But it faces an inherent problem, that of moral hazard. Moral hazard exists whenever governments attempt to solve a banking crisis by shifting the burden to third parties. If the state contribution is taken for granted, distorted incentives are created both for borrowers, with enhanced tendencies for strategic default, and for banks, with relaxed discipline as regards lending decisions. As a notion, strategic default is quite different than default, in the sense that the counterparty defaults not out of inability but out of unwillingness to pay. There are a number of reasons for such behaviour, including "common belief" about a lax attitude an AMC may potentially exhibit. As regards banks, if the dissociation from the troubled assets is not accompa-

7 The difference between disclosure of data and transparency, i.e. publication of timely and valid information, is of the essence. The regulatory framework for the operation of banks requires them to disclose data regarding the results of their activities (mandatory disclosure), while in parallel the banks on their own take the initiative to publish additional information (voluntary disclosure). Voluntary disclosure forms part of a bank's corporate governance and, if timely and valid, enhances transparency. In light of this, voluntary disclosure can be analysed as a signalling game.

8 It should be noted that this possibility implies that the troubled assets do have an internal value that the market simply cannot recognise. One school of thought deems this approach outdated, as it implies that there are no bad assets but only "misunderstood" ones, and the AMC formation policy or any policy that does not immediately recognise and record the loss, merely passes through the cost to third parties (see Paul Krugman (2009), "Zombie Financial Ideas", http://krugman.blogs.nytimes.com/2009/03/03/ zombie-financial-ideas/).

nied by organisational and operational restructuring and a readjustment of incentives, then the relaxation of credit standards will continue and will spawn the next generation of NPLs. A key instrument in preventing such behaviour is the appropriate asset valuation (see below) and the imposition of some cost on banks as "penalty" for past behaviours.

(b) Issues for effective implementation

The form an AMC will take shall affect its ability to exploit advantages in managing the distressed elements and successfully cope with moral hazard and other challenges. What follows is an overview of certain issues that are key to a successful implementation of the policy.

(i) Mandate

A key element is the mandate of an AMC regarding the management of the NPLs to be transferred. The ultimate objective is to maximise the assets' recovery value, and the mandate may include two directions, disposition of assets or corporate restructuring, or a combination thereof. For asset disposition the AMC aggregates NPLs and collaterals from banks and through active management policies aims at their fastest possible liquidation, so as to prevent further value deterioration. Eventual AMC specialisation facilitates target achievement, but a more crucial factor is the completeness of the legal and regulatory frameworks. In the case of corporate restructuring the objective is to address the problems that led businesses to the non-servicing of the loans, restore and then liquidate the enterprises. This solution is de facto more longer-term, and involves difficulties and uncertainties, particularly if a restructured enterprise re-enters into a troubled status, a fact that leaves the AMC open to criticism and reflects the reputation risk of the "bad bank".[9]

In practice, usually a mixed situation prevails, where the AMC carries out both activities. A World Bank case study (see Klingebiel 2000) concluded that AMCs are less effective in restructuring enterprises whereas, under certain conditions, can prove to be more effective in liquidating assets. Practically, a more balanced policy can prevail, which does not exclude enterprise restructuring but focuses on asset disposition as the AMC's main activity.

The mandate of an AMC regarding portfolio management also determines its form. In any case it must have a long-term horizon of operation and the ability to make a broad range of decisions, both of which must be facilitated by the legal framework. If it operates as a bank, it is subject to banking law restrictions and prudential supervision rules. This limits to a great extent its room for flexibility and the scope of its activities. If it operates as a simple undertaking, it broadens its scope of activities but cannot take certain actions of a banking nature, when necessary. Finally, if it operates as a state agency it is subject to a variety of restrictions and more vulnerable to external interferences. Possibly the ideal solution is the form of a special purpose vehicle, the operation of which is covered by a special legal status.

(ii) Ownership

The ownership of the AMC depends on the eligible assets policy and the size of the legacy assets portfolio. These may lead to the creation of an AMC that manages all NPLs, or the establishment of an upper limit and the creation of different AMCs according to some specification of the eligible assets (category, branch, level, etc.). Selection depends on the intensity of the problem, the assets' homogeneity, the capacity of managing these assets and the availability of financial instruments. The eligibility criteria cannot be horizontal for all banks and must obey certain rules that shall

9 A typical example is that of Slovenia, where the government urged by the IMF, decided to set up an AMC, but was fiercely criticised and a referendum was demanded. Referendum advocates relied on the accusation that corruption issues were lying behind the formation of the AMC (crony capitalism). In the end the AMC was formed without a referendum, since the constitutional court rejected these accusations as groundless, arguing that AMC formation is an international practice that the country cannot but follow (see http://www.reuters.com/article/2012/12/19/slovenia-referendums-idUSL5E8NJ8GL20121219).

not create a competitive disadvantage for any bank.[10] Thus, the transfer has to be neutral as to the banks' capital adequacy and each bank should remain with roughly the same relative proportion of NPLs. Also, to avoid disrupting the bank-customer relationship, the transfer has to have voluntary features, allowing banks the final decision. Finally, the NPLs to be transferred should have characteristics that facilitate their tradability, so that the AMC may have a broader scope of financial management tools.

A direct consequence of the eligible assets policy is the ownership of the AMC. The public nature of an AMC is the prevailing scheme, as NPLs management also has a social dimension. Yet it has been recognised that in such cases it is more vulnerable to external pressures, while there are also an interests alignment problem and an incentives problem. The formation of a purely private AMC partially overcomes these problems, but it is difficult, due to the uncertainty surrounding asset valuation and the size of funding required. The case of a mixed undertaking, as a third alternative, has some advantages in relation to incentives and funding, but the contribution of private capital is usually accompanied by some form of state guarantee and cost sharing agreement.[11] No ideal solution exists and the decision has to be based on a cost/benefit analysis.

(iii) Strategy and incentives

As in every organisation, strategy is a crucial factor for success. An AMC usually manages a large volume of assets, in many cases politically and socially sensitive ones. Therefore there is a need to create conditions of absolute transparency and accountability with straightforward objectives, whereby minimising interventions as much as possible. At the same time managers need to be legally shielded, as they are called to make hard decisions, including debt restructuring and/or write-off, etc.

A pivotal strategy point is the decision concerning the NPLs' servicing agency. If the AMC itself undertakes this responsibility, it has to create the relevant infrastructure from scratch and attract specialised personnel to carry it out. But every AMC has an inherent incentives problem given that, if it proves to be successful, it shall dispose its assets quickly and cease to exist. This is a counterincentive when it comes to attracting highly qualified staff for a short period of time. As a result, there is a clear incentive for extending the life of an AMC and converting it into an "NPLs warehouse". This can be avoided by a clearly defined exit strategy, a liquidation schedule and an incentives framework for the achievement of specific and measurable results. Alternatively, management can be assigned to the banks, which undoubtedly have the information advantage and the infrastructure to carry it through, particularly with customers with whom they have developed a long standing banking relationship. But this absorbs considerable resources and at the same time raises conflict of interest issues, given that a bank involved in the loans' origination process may not be able to have an unbiased view and make the required decisions.[12]

(iv) Asset valuation

The value at which the assets will be transferred from the banks to the AMC is one of the most difficult parts in the AMC formation and

10 The European Union has laid down competition rules that cannot be violated. For this reason any attempt to create an AMC is subject to approval by the European Commission's Directorate General for Competition.

11 In several countries concerns regarding AMC ownership are associated with the state of public finances. For state participation not to be included in debt calculation, Eurostat requirements have to be met. According to the rules if (a) private involvement is at least 51%; (b) the AMC is of a limited timeframe; (c) there is a business plan; and (d) assets are transferred with a considerable discount, the financing gap is not included in the debt. Newer decisions (ESA 2010) have rebated the 51% threshold and associated the criterion with the risk bearer, meaning that a mixed AMC which has a state guarantee or where the state assumes the first loss, is considered to be a "state company", in the sense that it is debt-increasing (see Gandrud and Hallerberg 2014).

12 Management can be assigned to a specialised non-banking undertaking, so as for the manager to be different from the originator of the problem. This approach was partly followed by NAMA (Ireland), which has assigned the management of a €41-billion portfolio for 4 years to a specialised company, at an estimated cost of €80 million (0.2% of the portfolio's value). The company announced that it will increase its staff by 140 as a result of this agreement.

operation.[13] The basic rule suggests that transfer of the assets must be carried out at their "true value", and it is clear that this may not be the current value,[14] as in most cases this is determined on the basis of occasional transactions, leading supply and demand factors to deviate from the fundamental value. If the transfer is carried out at a value higher than the true one, this constitutes indirect bank funding,[15] the AMC assumes the economic risk and the creditors of the AMC are overburdened. By contrast, if the transfer is carried out at a lower price, then losses are "imposed" on banks, the banks' incentive to transfer weakens, larger financing is required and profits are shifted to the AMC. Furthermore, the valuation issue is much more important when the AMC is a subsidiary of the bank, as in this case it can be used for "window dressing" and artificially enhancing the bank's capital adequacy.

The valuation of NPLs and more generally of any illiquid asset is extremely hard, especially in times of turmoil and crises. The idiosyncratic features of toxic elements generate uncertainties about their inherent value and therefore call for the calculation of an approximation. Several methods are proposed, either mark to model using some of the existing models found in the literature, or due diligence by experts, or estimations of haircuts. Each one has its advantages and drawbacks. The use of models takes into account various factors, such as loan recovery probability, the undertaking's cash flow projections, valuations of collaterals, etc., but the animal spirits described by Keynes are present, creating complications, e.g. non-linearity, that are difficult to incorporate. Expert opinion may be able to correct some drawbacks of the models, but it is time-consuming, costly and subjective. Impairment rates are usually calculated using value-at-risk models but their application on credit risk has yet to be widely accepted.

Furthermore, the appropriate valuation of assets is the main incentive for banks to participate and agree to transfer the troubled portfolio. Banks enjoy an information advantage and have an incentive to transfer the assets if the price is higher than the real value and such that limits the stigma effect the bank may suffer. All this is also confirmed by models that investigate the role of the "bad bank" in financial stability (see Hauck et al. 2014) and conclude that a minimum threshold value contributes to financial stability.

As it becomes obvious, asset valuation is pivotal for the success of creating a "bad bank". No perfect methodology exists and selection must take into account the inverse relationship between accuracy and speed.

(v) Financing and cost sharing

The financing of the AMC and the allocation of costs is another practical issue that must be addressed, given that an AMC is expected to be a loss-making organisation. Usually, there are two alternative sources of financing, government bond issuance, or AMC bond issuance with government guarantee. The choice depends on the capabilities of the government, but also on the point in time at which the government wants to undertake the costs of restructuring the banking system.

If the initial capital is not sufficient for the transfer of all NPLs meeting the eligibility cri-

13 The difficulty of proper valuation of toxic assets is considered to be one of the fundamental reasons for the initial failure of the Troubled Assets Relief Program (TARP) in the US. Originally the program was aimed at acquiring troubled assets from banks and liquidating them. But it soon changed its targeting and was used for an immediate capital injection to troubled banks (see Goddard 2009 and Bebchuk 2009).

14 The European Commission requires that the transfer be carried out at the Real Economic Value (REV), which is defined as the sum of discounted expected cash flows until the asset's maturity, i.e. the net present value of the expected cash flows. Despite the straightforwardness of the definition, the valuation is full of challenges, as there are many uncertain parameters, such as the probability of default (see Boudghene and Maes 2012).

15 In the European Union an additional restriction is set by the regulation on state aid to banks (State Aid – 2013 Banking Communication). This explicitly states that only the European Commission can authorise troubled asset management measures following a restructuring plan submitted in advance. It also examines any potential indirect financing of the banks transferring the assets, unless the competitive bids system is used, in which case it examines the existence of competition distorting conditions. The regulatory framework has been implemented in the Netherlands, where the European Commission deemed that the transfer of troubled assets from the SNS Reaal bank had to be considered a state aid due to the high price involved and calculated it at €859 million (see http://europa.eu/rapid/press-release_IP-131280_en.htm).

teria, then leverage may be used, that is the AMC may seek additional funds to finance the transfer. Such funds may be raised through various sources. If they are raised through banks whose assets have been transferred, this does not help remove uncertainty, as the loans' repayment depends on the successful management of AMC assets, i.e. the problem remains, although in a different form. If they are raised by autonomous means, e.g. issuance of bonds, this raises questions regarding the bonds' tradability and value, as well as whether the payment of coupons deteriorates the operational effectiveness of the AMC.

Finally, the distribution of costs among stakeholders, namely the asset management company, the banks and the taxpayers, depends on the degree of risk aversion of each group, and the size of financial risk they are willing to undertake. These vary in terms of the intensity of the problem and the external economic conditions. More practically, it depends on the willingness and/or ability of the state to endorse the risk of problem loans. Of course, there is always the possibility of imposing a specific cost allocation, jeopardizing, however, bank participation in the project.[16] Box 2 presents a simplistic example.

16 In the European Union cost sharing is rather more complex, as the single resolution mechanism is expected to be launched, laying down that the contribution of state or ESM funds in a bank (bail out) must be preceded by a contribution from all other sources, i.e. shareholders' and creditors' funds up to 8% of the capital (bail in). This regulation hampers the formation of a purely public AMC.

Box 2

EXAMPLE OF FINANCING NEEDS

The following table illustrates the example.

BANK NPLs Portfolio	
Face value	100
Book value	80
Transfer value	50
Current value	25

Financing gap 25

Cash 25

AMC			
Assets		Liabilities	
		State	15
NPLs portfolio	50	Bonds to the private sector	25
		Borrowing	10

Let us assume that the NPLs portfolio of a bank has a book value of 80 and a current value of 25. Valuation by the AMC has determined the true value (i.e. the value after taking potential recoveries into account) at 50. If the bank decides to transfer the portfolio to the AMC, such a transfer will be carried out at the true value, and thus at a transfer value of 50. The bank faces an immediate loss of 30 (Book value 80 – Transfer value 50), which may be absorbed by the bank's profitability and/or provisions. Otherwise, new funds will be required. Therefore a source of financing must be found to cover the difference. It is clear that the bank is deleveraged, but it improves its capital adequacy ratio.

The AMC is required to finance the portfolio amounting to 50, and has a large number of options. In this example, it finances the real value of the NPLs, i.e. 25, through the issuance of bonds to the private sector and transfers the cash to the bank. The financing gap of 25 remains, and requires an alternative way of funding. If possible, leverage can be employed (10 in the example), and the government may also contribute (15 in the example).

The AMC faces a potential future loss equal to (Transfer value 50 – Current value 25 + Recovery amount – Costs), which depends on the ultimate verification of the estimates regarding the recovery amount. Since there is a degree of uncertainty, cost sharing may be agreed between the bank and the AMC, depending on the shortfall of the expected recovery amount. If the State also participates in the project, cost sharing among the bank, the AMC and the government can be provided for through a clause included in the financing contract.

4 THE SOLUTION OF MANAGEMENT WITHIN THE BANK

The solution of management within the bank through an internal workout unit is an alternative to the creation of an aggregative "bad bank", with its own risk and accountability issues (see Dado and Klingebiel 2002). The impaired portfolio is ring-fenced and remains on the balance sheet of the banks, being managed by a special NPLs management unit or a special subsidiary established solely for this purpose. In addition, government assistance may be provided, in the form of guarantees, to reduce uncertainty and allow banks to proceed with the management in the absence of outside pressures. We shall examine this approach based on the two questions posed in the introduction of the study, related to the alienation from and the management of impaired assets.

The "on balance sheet" management approach does not enjoy the merits of a removal of distressed elements from the banks' balance sheets. From that perspective it carries signalling risk, since the retention of problematic items on the balance sheet does not send the proper message to markets and stakeholders that there is an irrevocable commitment to consolidate the portfolios, as there is not a clear break of the troubled portfolio from healthy items. This can be alleviated if there is an organisational and functional separation of the problematic assets from the healthy ones (see ECB 2013). It is also alleviated through the government guarantee, which aims at "substituting" troubled assets with healthy ones, so as to improve the banks' capital adequacy, help them access the money markets to raise funds and finance the economy. Government guarantees usually leave the first loss to the bank, and are accompanied by a commission fee and restrictions to the policies regarding expansion, dividends, bonuses to executives, staff remuneration, etc.

Furthermore, the internal work-out solution does not entail a pressing need for the government to immediately contribute funds, thereby alleviating immediate pressures for a rational valuation of the assets. This is particularly important in times of tensions in public finances, although essentially the government undertakes a contingent cost to replace a current cost. In the "off balance sheet" solution the current cost is large and potentially the future cost may be small, whereas in the "on balance sheet" solution the current cost is small but potentially the future cost may be large. In addition, the guarantee that usually accompanies the "on balance sheet" solution allows a greater extent of flexibility and is much easier to specify for each bank or group of products, and/or enlarge the eligible assets policy. For example, a bank could choose to receive a smaller guarantee and thus pay a lower commission fee, at the price of assuming a larger part of the potential loss. Such arrangements are harder to make in a "bad bank" that aggregates the problematic assets. Furthermore, guarantees may constitute an incentive for a bank to retain certain assets until maturity, without having to determine their current value and the immediate obligation to absorb the losses.

As regards the management of NPLs, this is not unfamiliar work to banks, so they can immediately capitalise on experience already

held. Of course the business model for managing NPLs is different from the business model for loans origination, as it requires special expertise and experience. Banks could not treat performing customers in the same way as delinquent customers, since the latter are treated in a more individualistic and possibly more legalistic way. It is too simplistic to assume that a bank can easily transform from "good bank" to "bad bank" (see Sheehan 2011).

Despite difficulties, each bank can directly allocate qualified resources to NPLs management and does not need to build them from scratch. Thus, the big advantage of this solution is that it can be applied quickly without disrupting the continuity of the management, since the portfolio remains with the bank where it was created. The bank has all the necessary information, and thus decisions can be based around the history of the loan, from the initial underwriting decision to the transfer to special management. An external institution would take much more time and expertise to understand all the dimensions of a credit and may not have the appropriate incentives. The disadvantages, and thus points in favour of AMC creation, are that the bank resources devoted to the task cannot be diverted to other productive activities and that the bank cannot exploit economies of scale. But, most importantly, the bank cannot easily alienate itself from a banking relationship and manage the problem in an unbiased manner. In many cases it has an incentive to maintain the relationship at any cost, which can prevent the smooth management of a problematic loan. This can have a negative connotation if the relationship is not based on sound banking practices. Finally, the whole project involves operating risk and reputation risk. Banks certainly have at their disposal management structures and procedures, but usually these do not suffice to cope with the increased volume of NPLs. Therefore, they should be enriched and extended, something that involves increased operational risks. Equally, the risk to the reputation of banks is important since it always accompanies efforts to liquidate problematic assets, and especially socially sensitive assets.

Historically, the idea of "bad bank" originated in the US as an internal work-out solution. It emerged as a private initiative when in 1988 Mellon Bank was split into two banks and the "bad bank", named Grant Street, took all the problematic loans. Mellon Bank remained a "good bank" and, having transferred all of its NPLs, managed to recapitalise and continue its operations successfully, while Grand Street was wound up over a period of seven years, without requiring additional funds. The success of the experiment led to the adoption of analogous solutions in similar cases.

A recent example of an "on balance sheet" solution involves the Bank of America, to which in 2009 the US administration agreed to provide guarantees for a portfolio worth $118 billion for 10 years for assets covered by residential real estate and for 5 years for all other assets. The bank retained the first loss, amounting to $10 billion after the initial valuation of the assets; the government undertook 90% of the next $10 billion of loss, and the bank the remaining $1 billion. In addition to these funds the Fed granted a credit line to cover 90% of the remaining $98 billion, with the bank seeking $9.8 billion more. The cost for the bank was the target interest rate plus 3%, and 0.2% per year as commitment fee. Furthermore, commission for the guarantee was set at $4 billion, in the form of preference shares plus additional warrants equal to 10% of the value of the preference shares. As a result of the project, risk weighted assets reduced by 20% and capital adequacy improved (see Elliott 2009). This example clearly shows that the supposedly simple solution of guarantees may involve a very complex structure.

5 HISTORICAL EXAMPLES OF "BAD BANKS"

The first aggregative "bad bank" created by government intervention was formed in 1989,

in the wake of the crisis in savings and loans (S&L) banks in the US. It was the Resolution Trust Corporation (RTC) which between 1989 and 1995 undertook loans amounting to $394 billion from 747 S&Ls. The total cost incurred by the government for the RTC amounted to $76 billion (see Schäfer and Zimmermann 2009). In Europe, the first attempt to apply this policy was carried out in Sweden after the crisis in the early 1990s. It involved the formation of two AMCs (Securum and Retriva, which subsequently merged) and all banks were given the opportunity to discharge their NPLs. The decision to participate was voluntary, but the size of the aid provided to each bank was the result of a due diligence based on scenarios regarding the banks' balance sheet expansion in a given financial environment. Three different categories were created, based on the banks' expected capital adequacy ratio (CAR), and each group was treated accordingly.[17] It was deemed that the cases of two banks required central management and therefore 21% of the NPLs of Nordbanken were transferred to Securum and 45% of the NPLs of Gota Bank were transferred to Retriva. The two banks retained 58% and 10% of NPLs, respectively. The remaining banks chose to manage their NPLs on their own, through special work-out units.

The two AMCs enjoyed a special legal status for greater flexibility in decision-making and thus did not operate subject to the banking law or the restrictions of the regulatory framework and particularly those relating to capital adequacy. Although much of their activity was of a banking nature, it was deemed that they should need to cover a broader range of operations. Thus they were allowed to supply capital to ailing firms, acquire nearly bankrupt enterprises, manage corporations under liquidation, change the Board of Directors, etc. This means that they had to have the authority to make all the decisions a shareholder makes, and such decisions are not always of a banking nature. In addition, they were given increased powers in relation to collateral management, as the banking supervision rules provided for collateral liquidation within three years, but there was also the justifiable fear that a mass liquidation of collaterals would put an excessive pressure on prices. For this reason it became clear from the outset that the "bad bank" attempt is a long-term effort involving many uncertainties.

The framework of Sweden has been extensively analysed in the literature and today this model is considered one of the most successful international attempts to resolve the NPLs problem, and from many aspects a textbook case for implementing the "bad bank" policy.[18] Although the initial plan was for 15 years, the two bad banks managed to liquidate 98% of the transferred NPLs within a 5-year period without requiring additional funds (see Van Suntum and Ilgmann 2013). The Swedish project had three main features that contributed to its success.[19]

17 Interestingly, in one report the methodology is presented as equivalent to the choices made during times of war or other disasters, where: (a) the fatally wounded are abandoned (but honoured in an official burial service); (b) the heavily wounded receive immediate but temporary treatment; and (c) the lightly wounded receive immediate treatment in order to survive. Selection was carried out along these lines for banks as well, and was seen as very successful, particularly as regards the communication front and acceptance by the general public (see Ingves et al. 2009).

18 In many cases the Swedish approach is contrasted to the policy adopted also in the 1990s in Japan, where no "bad bank" was formed but the NPLs remained on the banks' balance sheets to be managed. Tax incentives were given through deferred taxation for banks to proceed with write-offs, but owing to the special relationships they had established with businesses banks did not engage in write-offs, but used the incentives for corporate restructuring. In addition, in cases where they proceeded with write-offs, a new generation of NPLs emerged, because they did not address the root cause of the problem (see Calomiris et al. 2012). The attempt was not considered to be successful, since banks implemented a gradual deleveraging programme and reduced their lending, which contributed to the deflationary spiral that daunted the Japanese economy with a great loss in GDP (the lost decade). Eventually two AMCs were created in 2002, a fact that contributed to financial stability, although they were seen as small compared to the size of the losses that had emerged. Comparison of the two policies shows the importance of an immediate recognition of the losses and an implementation of policies that do not shadow the problems but provide an immediate solution (see Claessens et al. 2011).

19 Analysis focuses exclusively on the issues concerning the formation of a "bad bank". With a view to containing the crisis other measures were also taken to restructure the banking system, which however fall outside the analytical scope of this study. For an overview of the crisis management in Sweden, see Andersson, M. and S. Viotti (1999), "Managing and preventing financial crises. Lessons from the Swedish experience", *Sveriges Riksbank Quarterly Reviews*, vol. 10, 71-89. An overall assessment of the project by the European Commission (see Jonung 2009) concludes that "...the Swedish model of bank resolution can nevertheless serve as a source of inspiration – indeed as a benchmark or template – for countries facing financial crisis".

(a) Transparency

As mentioned, the accounting system allows banks to defer the loss from asset valuation, in case of impairment. This may be beneficial in normal times, since it smooths out the variability in the banks' earnings and capital levels, but in crisis times may prove to be detrimental for the selection of the most effective solution. Generally, there are two approaches to loss management: the first calls for deferring the loss as long as the regulatory framework allows and preventing fire sales; and the second calls for immediately recognising the expected loss and taking action that crystallises the magnitude of the problem. In Sweden, as opposed to what was the case in the US, the latter approach was chosen, with warnings issued about "uncomfortable truths", i.e. that the resolution would involve cost and that "someone" should bear the burden. This helped create conditions of wide acceptance in the country vis-à-vis the project and had a positive effect on the final outcome (see Ingves and Lind 1996).

(b) Asset valuation

As mentioned, the valuation of assets to be transferred is a critical success factor. Initially, the responsibility for the valuation remained with the banks, within a framework of rules designed by regulatory authorities, and then a Valuation Board was created, consisting of specialists from the real estate market, in order to achieve as much as possible homogeneity in estimates. The guidelines were in favour of a conservative valuation policy, and thus in general low values were assessed, which in the short term aggravated the problem in banks' balance sheets, but in the medium term facilitated the liquidation of assets. The assessed values were considered as a "minimum threshold", a fact that revitalised the real estate market and triggered the interest of buyers, while at the same time strengthening confidence in the banking system.

(c) Asset liquidation

The policy for asset liquidation focused on the time dimension, so as to prevent liquidation under pressure. The guidelines called for seeking the "right price", taking into account both the expected price changes and the cost of asset retention. Under this framework, loss-making liquidation was allowed in order to avoid the transformation of bad banks into warehouses of NPLs, but had no side-effects due to the transparency of the policy implemented. AMCs were given the possibility of corporate restructuring, but given that ultimately over 70% of businesses immediately went bankrupt, they began the process of collateral recovery, which largely involved real estate. The average transfer price was at a 70-80% of the asset's value, while the liquidation value was at around 50%.

The success of the Swedish model was based on specific initiatives taken and decisions made, but also had some special characteristics that contributed to its positive final outcome. Prior to the crisis, Sweden had experienced a long period of economic growth, liberalisation of the banking system, increase in bank credit, and a large surge of property prices. The turn of the economic cycle was sharp and deep, but the crisis was limited to the local level, or at least to the Nordic countries. The country had a bank-based economy, but the size of the banking sector was relatively small, with a small number of banks that did not have an international presence or large international interconnections. Also, the banks had traditional banking products and were not involved in complex structures. The problem was focused mainly in real estate, which lost about 50% of its value, thus the problematic portfolios were relatively homogeneous and simple. But the largest contribution to the success of the scheme was the traditional confidence in the local institutions and political system (see Jonung 2009, p. 18), as well as in the effective forensic system of the country (Calomiris et al. 2012, p. 16). These are considered to be the basic differ-

ences from the "bad bank" schemes experienced in the next crisis, that of Southeast Asia in 1997-1998.

The crisis in Southeast Asia began as a currency crisis and evolved into a banking crisis, as the banks' balance sheets were burdened with large volumes of NPLs, usually in overvalued prices, which inevitably led to losses and forced governments to intervene. All countries[20] followed the centralised approach for NPLs resolution and each created a state AMC shortly after the outbreak of the crisis. This model was chosen due to the inability of domestic private capital to participate, the inability of banks to handle the large volume of NPLs, the problematic legal and regulatory framework, the problematic documentation, as well as the special relationship that had developed between banks and enterprises. However, the countries varied as regards the exit strategy, since the respective AMCs in Indonesia and Malaysia had a specified lifetime of 5 years, in Thailand of 12 years, whereas in Korea no time limit was set and the AMC established at the time still operates. In countries that had set specific lifespans, AMCs ceased to operate on the scheduled date, but then were replaced with other AMCs, as e.g. in Malaysia. It is rather obvious that the creation of a "bad bank" represents a long-term endeavour, regardless of the initial assessment of its expected duration. The example of Sweden, where the AMC completed its operation within five years, is the exception rather than the rule (see Kokko and Suzuki 2009).

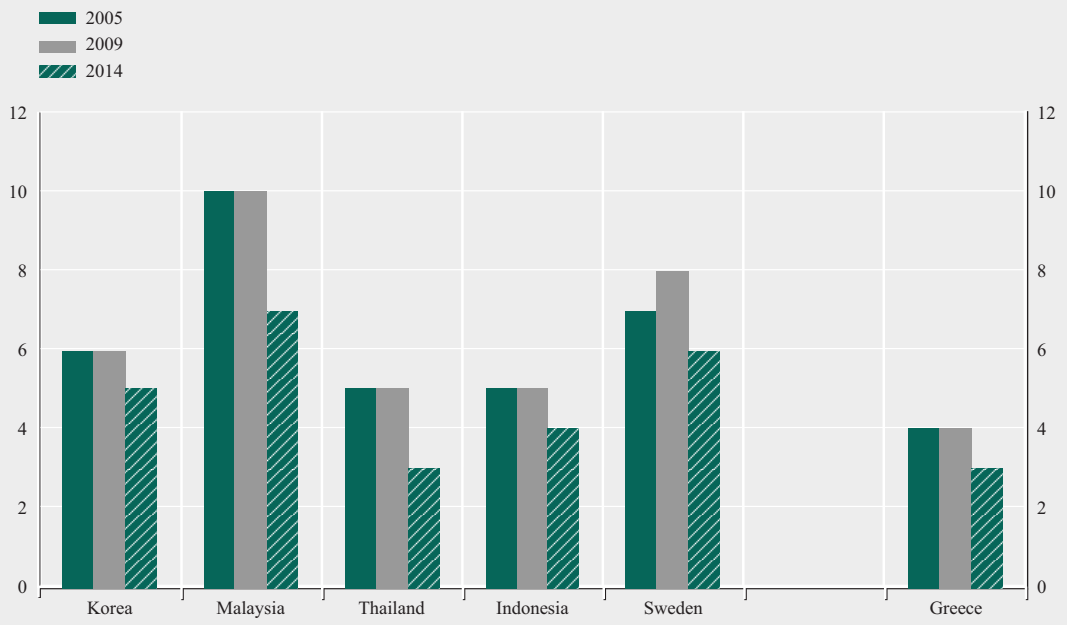
As regards the eligibility policy, it was based on voluntary transfers of distressed elements, but banks came under moral pressures, as for example in Malaysia where if a bank did not accept the transfer, it had to write-down an amount equal to 80% of the offer price, or in Thailand where private banks had the option but state banks "were forced" to convey the troubled assets. Finally, 80% of NPLs were transferred in all countries except Thailand, where this percentage was limited to 40%. It becomes obvious that the selection was more of an administrative solution than a voluntary transfer.

Considerable cross-country differences can also be detected in the asset management policies applied. All AMCs were authorised to engage in asset disposition and/or corporate restructuring. Due to weaknesses of the institutional framework, AMCs were granted a special legal status and special powers for managing ailing firms, but these were not widely used or were used as a negotiation tool (see Fung et al. 2004a). In practice, immediate liquidation proved difficult, due to high uncertainty regarding the valuations, shallow secondary market, fear of sale at low prices, as well as social and political pressure. In most cases the procedures ended with a restructuring of the corporations. Special arrangements were applied for SMEs (see Box 3) and for the first time governments introduced out-of-court restructuring, albeit with mixed results (see Mako 2005). In Malaysia and Korea the two techniques were applied evenly and each covered about half of the cases, while in Indonesia immediate liquidation of assets dominated, in contrast to Thailand where the restructuring of ailing companies was preferred. Therefore, the AMC must have the authorisation and legal coverage to pursue the most profitable method according to its judgement, but also the respective accountability. Which technique will prevail is a matter that largely depends on the legal framework. In the countries of Southeast Asia problems emerged with the creditors' legal rights and in the literature there are examples where courts refused to

20 The countries analysed are Indonesia (IBRA), Korea (KAMCO), Malaysia (Danaharta) and Thailand (TAMC). It is recalled that Thailand was the epicentre of the crisis and Indonesia the country most affected. All countries requested the help of the International Monetary Fund, apart from Malaysia, and the creation of AMCs was the solution proposed by the IMF for solving the problem of accumulated NPLs. All countries immediately established an AMC, except Thailand which delayed it for 3 years and is thus considered to represent the less successful case. During the same period, China also launched its own "bad bank" project and established four state AMCs, one for each state bank (non-centralised approach). But the creation of these AMCs cannot be regarded as a direct consequence of the crisis in Southeast Asia, and is rather attributed to the government's decision to restructure the banking sector.

Chart 2 Strength of Legal Rights Index

(0=weak, 12=strong)



Source: World Bank DataBank.
Note: The Strength of Legal Rights Index measures the degree to which the respective collateral and the bankruptcy law protect the rights of borrowers and lenders, and thus facilitate lending.

implement bankruptcy laws in favour of the lenders, a fact that increased the burden on the banking system (see Calomiris et al. 2012). Chart 2 presents a legal rights indicator compiled by the World Bank. The indicator is not available for the dates of interest, and is only presented for certain selected dates for illustrative purposes.

Box 3

SPECIAL ARRANGEMENTS FOR SMEs

The governments of the countries of Southeast Asia responded to the special challenges posed by the resolution of NPLs of small- and medium-sized enterprises (SMEs). The big difference from larger corporations is that the bankruptcy of an SME usually entails a personal default of the owner. So, they established special arrangements to solve the debt problems of SMEs, in order to facilitate their further financing (see Claessens 2005).

In Korea, as the crisis deepened in 1998, the authorities strengthened the banks' incentives for lending to SMEs through guarantees, so as to reduce default risk for the banks and lower regulatory capital. In addition, the authorities forced the banks to set up special units for individualised management, with a view to restructuring the SMEs. The choices included fund recycling, longer grace periods, lower interest rates and extended guarantees. Criticism to this programme, about incentive distortions and bail out of enterprises bound to go bankrupt, typifies the criticism observed in such cases.

In Malaysia, SMEs indebted less than a certain limit could request financial support (bridge financing) by a special monitoring unit of the central bank, while engaging in parallel in restructuring procedures.

In Thailand, the central bank was particularly active with regard to SMEs. It set up an Advisory Committee, which introduced a simplified out-of-court procedure for the conclusion of an agreement within 45 days. Quantitative monthly targets for settlements (15,000 cases) were set, and a joint venture was formed that bought SME promissory notes at a discount.

In Indonesia, no special policy was implemented for SMEs, and all enterprises transferred to the AMC were treated the same.

The issue of special arrangements for the NPLs of SMEs is important. Recently the IMF published a study on the NPLs of SMEs in Europe.[1] The study identifies considerable problems in three areas: the procedures, social acceptance and the banks. The procedures for liquidating impaired assets are long-term, costly and inefficient, resulting in a quick underrating of the assets. In addition, they are complex and of a high fixed cost, a fact particularly deterring for SMEs. But there is also an issue of social culture, as bankruptcy in many cases is accompanied by social stigma and an inability for a fresh start. Both phenomena raise obstacles to the policy alternatives for NPLs management. Finally, problems are also detected in the banks themselves, particularly in smaller ones, as they appear unable to cope with the volume of NPLs, due to shortages in infrastructure and expertise.

In many countries, initiatives have been taken to revise the bankruptcy code, while procedures for out-of-court agreements or special management frameworks for SMEs have also started to be established. The European Commission intervened by launching a consultation on a non-binding proposal,[2] based on two elements: first, on the characteristics of a mechanism for restructuring with minimal court intervention, and second, on the ability of small entrepreneurs for a fresh start. The characteristics are proposed to be of a preventive nature and informal, while emphasis is placed on the fact that the ability for a fresh start should be provided to honest entrepreneurs.

1 See Bergthaler, W., K. Kang, Y. Liu, and D. Monaghan (2015), "Tackling Small and Medium Sized Enterprise Problem Loans in Europe", IMF Staff Discussion Notes, No. 15/4.
2 See http://europa.eu/rapid/press-release_IP-14-254_en.htm.

Nevertheless, it must be noted that international literature on NPLs resolution usually highlights the case of Korea (KAMCO), because it managed to create and develop an active secondary market for NPLs. It developed several securitisation schemes and managed to reduce the liquidation time. It also used the available resources more effectively and, most of all, helped develop the market for securitised products of performing assets (see He 2004). In general, the policy for the creation of a secondary market has many advantages and positive long-term results, as it establishes an additional means to credit risk management. It accelerates market completeness, broadens the range of market participants and helps in corporate restructuring. Securitisations are a useful tool that improves the banks' risk management options.[21]

The overall process of AMC formation in the countries of Southeast Asia was charac-

21 In an analysis by Deutsche Bank for Germany, NPLs were considered to be an established asset class (see Deutsche Bank Research (2007), "Non-performing loans: An established asset class. Trading in loan portfolios in Germany"). Furthermore, the revitalisation of securitisations is a strategic option not yet implemented. A recent IMF study examines the possibilities of developing a secondary market for NPLs in Italy and the reasons why this is hindered, while, in parallel, analyses the strategy that can facilitate its implementation (see Jassaud and Kang 2015). The issues and the obstacles examined are similar in all countries.

terised by a rather strong political bias,[22] unlike the apolitical process in Sweden, due to the particular characteristics of the countries in the region. Pre-crisis governments have sought an aggressive industrial policy, according to China's standards, with intense intervention in economic activity, which created an interrelationship between businesses, banks and governments. When the crisis erupted, the outdated institutional framework could not prevent this interventionist policy in AMCs' operations. Instead, they were accused of acting as a governmental arm, in favour of specific groups of interest. The AMCs had failed to dispose large parts of the transferred NPLs in a reasonable time, and they were blamed of turning into "NPLs warehouses" favouring connected interests. Some schools of thought argue that the AMC policy is not appropriate for countries with weak institutional arrangements, directing their criticism to less developing countries (see Calomiris et al. 2012). Even though a unified conclusion for all countries in the region would be unwarranted, there is a general consensus that the AMC experiment in Southeast Asia was not as successful as in Sweden with respect to the revitalisation of the economies (see Kokko and Suzuki 2009). Table 1 presents a number of characteristic comparisons that confirm this.

After the crisis in Southeast Asia, interest in AMC creation re-emerged during the crisis of 2007-2008. This was also fuelled by the approach of the US with the TARP programme, which brought forward numerous analyses, discussions and differences of opinion. In Europe two illustrative examples are those of Ireland, with the formation of NAMA, and Spain, with the formation of SAREB, on which this study will now focus. Obviously, so far no safe conclusions can be drawn as the projects are still ongoing.

NAMA was established in 2009[23] in the wake of the financial crisis in Ireland as a mixed AMC (51% private, 49% state) to abide with Eurostat rules,[24] with an initial lifespan of 10 years.[25] It was designed to facilitate the speedy removal of property-related NPLs from the balance sheets of banks. The significant drop in real estate prices, as well as the banks' practice to delay recognition of the losses, resulted in their exclusion from the interbank market which led them to favour capital preservation instead of financing the economy. NAMA was intended to break this holdup. As was clearly stated in its founding act, NAMA is not a bank but a 'statutory work-out vehicle', authorised to restore confidence in the banking system and protect the interests of taxpayers, with the removal of uncertainty in the property market and in particular as regards valuation. It was also authorised to obtain the best achievable return for the state.

Banks were free to choose whether or not to participate in the scheme established under the NAMA Act, but once a bank decided to participate, it had no discretion over which assets were to be transferred.[26] After due diligence, NAMA had the option of accepting the assets or not, provided they fell within the statutory definition of the "eligible assets"

22 This same conclusion is also drawn by a similar study from a political science perspective (see Apanard, A. and T. Willett. (2008), "Political influences on the costs of banking crises in emerging market economies: testing the U-shaped veto player hypothesis", *Macroeconomics and Finance in Emerging Market Economies*, 1(2), 279-297).

23 The Irish government reviewed all alternative policies and especially the "on balance sheet" solution that had recently been used in the United Kingdom (cases of RBS and Lloyds). It characterised it as a choice of intuitive attractiveness, since it entails no direct cost for the budget. But, examining all the potential obligations created, as well as the implications of keeping the troubled loans in the banks' balance sheets, finally opted for the "off balance sheet" solution (see Bacon, P., "Evaluation of Options for Resolving Property Loan Impairments and Associated Capital Adequacy of Irish Credit Institutions: Proposal for a National Asset Management Agency (NAMA)", National Treasury Management Agency, Dublin 2009).

24 Originally NAMA was planned to be exclusively public, but this would put more pressure on the already burdened state budget. To overcome the problem and meet Eurostat rules it was formed as a special purpose vehicle (SPV) with private participation from banks. But in 2010 the government nationalised the banks and, to comply with the regulation, sold to private investors the banks' share in the SPV.

25 The selection of the lifespan was deliberate. The NAMA business plan anticipated the transfer of €81 billion with an average discount of 30% on the nominal value. On the assumption that the property market would develop by 10% annually, the break-even NAMA would be achieved in 10 years. Eventually loans of €74 billion euro were transferred at an average discount of 57% (see D'Arcy 2015).

26 Five banks filed for participation and in 2010 the European Commission approved the first group of assets transferred, stating that it would monitor transfer values continuously.

Table 1 Comparative data for the countries' AMCs

	Year of AMC formation	Maximum NPLs ratio	NPLs ratio in 2006	Transfer value in relation to book value (1)	Recovery value in relation to transfer value (2)	(1)x(2)
Indonesia	1998	48,6% (1998)	6,1%	31,4%	44,6%	14,0%
Malaysia	1998	11,5% (2001)	4,8%	34,1%	58,7%	20,0%
Korea	1998	13,6% (1999)	0,9%	29,2%	47,4%	13,8%
Thailand	2001	45,0% (1998)	8,1%	33%	20%	6,6%
Sweden	1991	13% (1991)	0,1%	75%	50%	37,5%

Source: Various papers included in the study's References.

set.[27] For the accepted assets the bank would be paid the long-term economic value of the assets rather than the lower current market value, or the higher book value, but the borrower would remain liable for the full value of the loan, regardless of the discount that would be decided. Thus banks suffered a loss equal to the difference between face value and transfer value, a fact that had an impact on their capital. In that way NAMA forced the banks to immediately recognise the loss and go ahead with write-offs so as to achieve a smaller but healthy balance sheet rather than a larger but not creditworthy one. The transfer value was covered by government guaranteed bonds eligible to be used as collateral in Eurosystem refinancing operations. The substitution of distressed elements with "risk-free" bonds, at least according to the regulatory framework, provided liquidity, improved the banks' capital adequacy and allowed them to return to the interbank market.

As with all AMCs, transparency in the valuation of the assets was at the heart of the scheme. The primary responsibility for determining the value of every loan transferred to NAMA remained with the banks, which had to use a valuation model that calculates the present value of the cash flows. Two values were calculated, the current market value and the long-term economic value, and then NAMA appointed an audit coordinator to check the loan valuations and carry out a series of validation checks. In the end, the long-term value was calculated by taking into account the value of the real estate collateral, based on the present value of expected cash flows, and the current market value of other (non-real estate) collateral. Further adjustments were then made to also take account of the operating costs of NAMA. This process appears to be transparent albeit somewhat bureaucratic and the success of the objective of real estate market restoration will be decided by the effectiveness of its implementation. There is some evidence of weaknesses in the system, linked mainly to the fact that the model of NAMA was based on the assumption of real estate market restoration.

Spain decided to follow the same path as Ireland and in 2012 established SAREB along the lines of NAMA, with a 45% public and 55% private participation so as to meet the

27 It should be noted that the definition of "eligible assets" could also include non-troubled assets. This may be common practice, but one can easily discern there a distortion of incentives, since there is motive for the acceptance of non-troubled assets in order to cover losses from troubled assets. Banks, however, end up with a portfolio of lower quality.

Eurostat criteria. Although typically it can be called a private AMC, since private participants hold a majority, the initiative nevertheless came from the government and the government controls all its basic functions. Its lifespan was set to 15 years; it is not considered to be a bank and falls under the law on companies. It is authorised to manage and liquidate the real estate property resulting from the restructuring of the banking system, transferred to it at an average discount of 63%. Although it was created according to the standards set by NAMA, there are some differences that differentiate its targeting:

- In NAMA a significant percentage (approximately 40%) of the real estate assets is located outside Ireland, mainly in the United Kingdom, whereas in SAREB all are exclusively in Spain.

- The portfolio of NAMA consists predominantly of commercial properties, while that of SAREB of residential properties.

- NAMA was financed by government bonds, whereas SAREB issued corporate bonds guaranteed by the government.

- In the NAMA scheme all banks could participate, whereas in SAREB only those banks that had received support under the program of financial aid to Spain.

- NAMA was authorised to normalise valuation in the real estate market, while the valuation by SAREB was not intended to be used as a reference value.

- NAMA valuated the properties using a model and due diligence, whereas SAREB mainly relied on stress testing and some degree of due diligence.

In Europe, the cases of NAMA and SAREB are the most celebrated. Yet other countries have also adopted or have plans to adopt the "bad bank" approach for managing NPLs. Between 2008 and 2014, in the European Union 12 countries created 15 AMCs to help at least 37 banks (see Gandrud and Hallerberg 2014). The outcome of the attempts cannot yet be determined, but it seems that NPLs resolution is an essential tool in the management of banking crises.

6 CONCLUSIONS

The intensity of the banking crises in recent decades has forced governments to directly intervene for saving the banking systems and protecting the depositors. A common feature of all these banking crises was the surge of NPLs and the need for central intervention to ensure a more effective management. The two alternative approaches examined in this study were (a) the aggregation of all troubled assets in a "bad bank" created in order to manage them effectively, and (b) the management of NPLs by internal work-out units or special purpose subsidiaries, with or without the issuance of government guarantees. In the introduction to this study, two questions were posed relating to bank alienation from the troubled portfolio and management effectiveness. Strong academic and empirical evidence suggests that removing NPLs from bank balance sheets can contribute to the rehabilitation of bank financial activities. A "bad bank" can exploit economies of scale, but cannot always attract the necessary expertise and experience. Management within the bank has the advantage of banking relationship continuity, but at the same time the disadvantage of reduced incentives, to avoid disrupting this relationship. It also has the disadvantage of the different business model that has to be used.

More generally, each approach has advantages and disadvantages, which can however be reversed if it is not implemented appropriately. The advantages of a "bad bank" cannot be fully exploited if the removal of the troubled portfolio from the banks is not accompanied by operational and functional improvements in such banks, so as to prevent the creation of

new NPLs. In addition, the ability to exploit economies of scale can be reversed in the absence of transparency and accountability. The drawbacks of a "bad bank" relating to moral hazard can be addressed through a proper pricing policy. On the other hand, the advantages of internal work-out solutions as regards maintaining the banking relationships with businesses can be reversed if this relationship is not based on sound banking practices. The drawbacks of management within the banks, mainly as regards signalling their commitment to portfolio resolution, can be reversed if an appropriate legal framework exists that facilitates swift decision-making and respects ownership rights. It is clear therefore that the advantages of each solution can turn into drawbacks, and vice versa, if the implementation of each approach is not the appropriate one.

Worldwide and in Europe both policies have been implemented, although lately the creation of a "bad bank" in aggregative form tends to dominate. There are successful and less successful examples, but each attempt has unique features that depend on the culture and infrastructure of the country. Therefore, the regulatory authorities must take into account the positive and negative historical experience and adapt it to the specificities of each case. Despite the differences, there is a common denominator for success: commitment to the objective, transparency and accountability. It must be made absolutely clear how the residual risk is to be shared, given the complex relationship developed between banks, the management company and the government, and a framework that best supports this choice should be adopted. The reputation risk of the attempt is significant in the absence of these elements.

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HOW CAN THE USE OF HISTORICAL MACROECONOMIC DATA SERIES SUPPORT ECONOMIC ANALYSIS AND POLICY-MAKING? THE NEW GREEK MACRO HISTORY DATABASE 1833-1949 AS PART OF THE LARGE DATABASE OF SOUTHEAST EUROPEAN (SEE) COUNTRIES

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1 INTRODUCTION

In times of crisis, there is growing interest in identifying appropriate policy responses and in comparing with similar episodes in the past. Policy responses are typically consistent with the current economic orthodoxy. After all, every crisis that emerges is perceived as unprecedented in intensity and duration. From an economic perspective, there are many alternative policies with different benefits and costs, so economists need to look for the option that is the least costly in terms of employment and output. Besides, the world economy has so far experienced several crises that repeat themselves over and over, but with important variations from time to time that make each of them unique, given the different local and international economic, social, cultural and ethical contexts of their development. This uniqueness implies that the ways to tackle the crises cannot be the same. Still, what remains the same is the question: "what is to blame" and "what went wrong".

The current European crisis triggered a heated debate about the optimal solution. It also made it amply clear that each country is affected differently, depending on the specific features and weaknesses of its economic structure and governance. Those to suffer the most were countries with imbalances, namely with long-standing current account deficits, either because of weak export activity due to low competitiveness or because of strong demand for imports due to unsustainable, domestic consumption-led growth. With the outbreak of the global crisis, the persistent external imbalances of these countries also caused internal imbalances, with rapid accumulation of private and public debt, mass capital outflows, credit crunch, disinvestment, job losses and recession.

Under the pressure of an abrupt drying-up of private financial flows, deficit countries made painstaking efforts to reverse their external imbalances by increasing competitiveness and exports and reducing wages and incomes. Adjustment was achieved at the cost of high unemployment and capacity underutilisation, while, at the same time, any efforts to restore growth by increasing exports and total investment activity were hampered both by significant financing constraints and by weak aggregate demand in the European and the global economy. Therefore, in countries with low industrial production, shortage of natural resources and low tourism activity, adjustment has been more painful, as it was achieved mainly through lower domestic demand.

Greece is one of the countries that were dramatically affected by the recent crisis, as in six years it lost more than one fourth of its national product and one fifth of total employment.[2] Although its economic and monetary history is rich in crises and defaults, it has not been systematically studied, thus remaining largely unknown and hazy. This is partly due to the lack of data and of systematic data collection. To address this shortcoming, the Bank of Greece, along with six other European national central banks, has participated in a research

1 I would like to thank the participants in the seminar series (2014-2015) of the Greek Economic History Association, National Hellenic Research Foundation, on 20 October 2014, for their comments and suggestions. Special thanks go to George Kostelenos, Maria Christina Chatziioannou, Leda Papastefanaki and Socratis Petmezas for a constructive exchange of views, as well as to Heather Gibson and Hiona Balfoussia for their pertinent remarks. The Greek statistical database is included in the volume entitled *South Eastern European Monetary and Economic Statistics from the Nineteenth Century to World War II* (SEEMHN 2014) published by the Bank of Greece, the Bulgarian National Bank, the National Bank of Romania and the Oesterreichische Nationalbank (Chapter III: "Greece: from 1833 to 1949", pp. 101-170). The publication is prefaced by the governors of the central banks of Austria, Bulgaria, Romania and Greece, as well as by Michael Bordo, Luis Catão and Nikos Christodoulakis. The publication is available on the Bank of Greece website: http://www.bankofgreece.gr/Pages/en/Publications/Studies/ and http://www.bankofgreece.gr/Pages/en/Statistics/default.aspx.
The views expressed in this article do not necessarily reflect those of the Bank of Greece. The author is solely responsible for any errors or omissions.

2 Between 2007 and 2013, the gross domestic product at constant 2010 prices dropped by 26.3%. Between 2008 and 2014, total employment fell by 23%.

network established in 2006 for the purpose of preparing a joint publication providing, for the first time, a complete, harmonised and comparable long-run statistical database on key macroeconomic and monetary variables for Southeast European (SEE) countries (see SEEMHN 2014). Part of this large statistical database is the Greek database, which spans over 100 years (1833-1949).

The availability of historical data series supports analysis of past events from a quantitative perspective. This knowledge can serve as important input in decision-making that will shape the future. The purpose of this article is twofold: first, to present the Greek statistical database and, second, using specific examples of historical data series, to demonstrate the value of their use in understanding the mechanics behind the creation and evolution of phenomena.

The article is structured as follows. Section 2, in the light of the current crisis, discusses the reasons why economics has moved away from analysing historical experience. Section 3 explains why history and its quantitative documentation are necessary for appropriate policy-making. Section 4 provides an outline of the Greek statistical database and the underlying methodology, while Section 5 offers policy examples using historical quantitative data. Finally, Section 6 summarises and concludes.

2 ECONOMIC SCIENCE AND CRISES

As soon as the crisis erupted in 2008, the contemporary economic thought was put to question. Some have argued that the "dismal science", as it had been called earlier is in decline as an academic discipline[3] (see *Financial Times*, "Economics needs to reflect a post-crisis world", 25 September 2014) and that, to stay relevant, it must be grounded in reality, reflecting the post-crisis world (see *Financial Times*, "Universities to revamp economic courses", 22 September 2014). The debate was dominated by three questions: first, why did economists and economic historians fail to predict the crisis? Second, could economic policy-makers have addressed the crisis more effectively, limiting its painful consequences for the real economy? And third, why have we not learned from history and from experience of past crisis episodes to avoid repeating the same mistakes and failings? As regards the first question, it would probably be unfair to expect economists, with the tools available to them, to provide safe and successful predictions about a complex reality. This is so for two reasons:

(i) Conventional economic thought has so far relied on a number of critical assumptions such as regularity, linearity, rational behaviour of economic agents, market clearing, full adaptability and risk certainty. Although these assumptions are useful for solving mathematical economic models, they tend to oversimplify the real world, often leading to policy implications that only come with a "normal conditions" caveat. This approach can provide a more or less safe simulation of historical reality but, as a rule, fails to adequately predict the future, since it overlooks information derived from outliers that are frequent and sizeable enough to effectively shape reality.

(ii) From the mid-1980s to 2008, economic thought was dominated by the concept of Great Moderation (see Stock and Watson 2003, Hakkio 2013, Clark 2009). This refers to the perceived and measurable reduction in business cycle volatility after the high volatility that prevailed in the preceding decades. This statistical finding, reflected in low inflation, moderate economic fluctuations and predictable outcomes, was interpreted (Bernanke 2004) as the result of a combination of factors:[4] (a) an improved monetary policy framework through the recognition of central bank independence, which relieved monetary policy

3 Thomas Carlyle (1795-1881), a racial supremacist and anti-abolitionist, coined this phrase in his dispute with John Stuart Mill about whether the economic development of a nation was determined by race or by institutions.

4 The phrase "good luck, good policy, good conduct" best exemplifies the coexistence of all these factors. For a discussion of these factors, see Coric (2011).

from pressure to accommodate the government's fiscal agenda and made monetary policy implementation more transparent; (b) better financial supervision;[5] (c) the development of counter-cyclical automatic stabilisers that mitigate the adverse impact of business cycle shocks; (d) a structural shift from highly volatile sectors, such as the primary and secondary sectors, to more predictable and less volatile ones, such as the tertiary sector; and (e) the absence of frequent and severe external shocks.

Furthermore, institutional reforms to the functioning of the labour market through the introduction of more flexible forms of employment, as well as firms' improved inventory management thanks to ICT advances were additional factors behind lower macroeconomic volatility. This environment of economic stability made economists believe that they had developed sufficient tools to control the volatility of the business cycle and created expectations of "perpetual growth". However, this same environment in turn shaped a financial environment that encouraged the accumulation of debt and excessive risk-taking, sowing the seeds of the crisis in the years that followed.

One might argue that a historical parallel to Great Moderation was the New Age period on the aftermath of World War I. Rapid economic growth in that period led to a fast rise in asset prices in the late 1920s. High volatility in money and capital markets was also blamed for the foreign exchange crises of the 19th century. It was then considered necessary to introduce a new monetary institution in every country, the central bank,[6] which would have the exclusive privilege of issuing legal tender and would be mandated to maintain monetary and financial stability. However, as the experience of the Great Depression showed, this new institution failed to prevent the crisis or mitigate its impact on the business cycle; still, it demonstrated the importance of strict supervision of the banking system's on-balance-sheet activities and the need for counter-cyclical fiscal policies.

Turning to the second question, despite the marked progress of economics and the improvement in analytical tools at its disposal, it has not been possible to incorporate the impact of financial uncertainty and instability into the neoclassical model of optimal behaviour, nor to formulate a comprehensive theory that would explain the interaction between financial developments and the macroeconomy.[7] Economists focus on macroeconomic models that do not properly depict the financial system. Financial analysts, on the other hand, usually disregard the effects of financial instability on the macroeconomy. The recent crisis is a case in point: in its initial phase, the steep fall in real estate prices undermined, through mortgage loans, the stability of the financial system and of the real economy in general.

Concerning the third question and the ability to learn from historical experience, right after the outbreak of the crisis economists delved into the past trying to draw useful lessons. The Great Depression of the 1930s was the predominant area of focus. Nevertheless, neither economic theory nor economic history aim to formulate generalised lessons that could easily and safely be applied; this is so because the lessons of history are typically time- and state-contingent, in the form of findings or conclusions applying only to the specific period of a given event and to the particular circumstances of its occurrence. In other words, they cannot be universally applied, since no event repeats itself identically. Therefore, an automated, mechanic and generalised application of a lesson may lead to unsound policy implications if taken out of context. The point is thus not to anxiously glean lessons from the past and apply them to the present, but to make the best possible effort to conduct in-depth and extensive historical research in order to generate new

5 Mainly with regard to the evolution of on-balance-sheet activities.
6 In contrast with a note-issuing bank that also operated as a commercial bank.
7 See Fabozzi et al. (2010) and Tobin (1958). For an empirical analysis of the relationship between monetary policy, securitisation and excessive risk-taking, see Jimenez et al. (2012).

knowledge. This knowledge will become a safe roadmap towards a more accurate understanding of the present and appropriate policy-making to shape the future. Therefore, every crisis affirms the need for more and better research into economic history.

To attain this goal, two conditions must be met. First, emphasis should be placed on better understanding and utilising country-specific experience and characteristics at different periods of the past and comparing them with the experience of other countries in a regional or global context. This would build a sample of observations from similar historical episodes, constantly enriched with new ones, which would provide invaluable information about the method and size of responses to a global crisis and their results, since there is no single policy to address a crisis and, even if there were, it would have to be adjusted to the specific temporal and geographical circumstances in order to be effective. The current literature and debate among academics and policy makers mainly focus on the monetary experience of major developed countries in Western Europe and of the United States, which are at the core of the global economic system and have historically played a leading role. At the same time, the monetary and economic history of the weak periphery countries remains inadequately researched. Consequently, policy decisions are largely made on the basis of the experience of a few strong economies. However, their generalised application is not always safe.

The second condition refers to the availability of reliable quantitative data as a necessary tool to study historical experience. Underpinning economic history by long-run macroeconomic time series helps to substantiate and empirically verify historical narratives, provide valid evidence of the nature of determinants of the phenomena and enrich our knowledge of historical events and country experiences.[8] Although history by definition does not teach us about the present, it passes on knowledge that is instrumental to policy-making.[9]

3 ECONOMIC HISTORY AND POLICY. WHY DOES ECONOMICS NEED HISTORY?

Currently, economics and history are largely separate disciplines. Economists and historians rarely cross paths, and, if at all, only exceptionally. Looking at academic terminology, it is hard to find a commonly accepted definition of economic history. According to Douglas North (1981), economic history should explain the structure and performance of economies over time.[10] The term "performance", in its original and main sense, denotes the evolution of macroeconomic fundamentals over time ("the typical concerns of economists", aggregate macro history[11]), such as production, industrialisation, consumption and investment, inflation and unemployment, optimal allocation of inputs to achieve the highest possible economic growth rate, uneven distribution of income and its effects on growth. In this case, economic history and the statistical processing of quantitative data are the key analytical tools. The term "structure" includes those characteristics of a society which are considered as determinants of its performance, i.e. political and economic institutions, technology, demographics. The word "explain" means "explicit theorising and the potential of refutability", while the phrase "through time" refers to "temporal changes in structure and performance".

Others argue that economic history deals with the behaviour demonstrated in the past by spe-

8 The need for economic history and historical statistics to assist the study of economic phenomena was underlined by Paul Samuelson. In one of his last interviews a few months before his death, he expressed the view that economists must "... have a very healthy respect for the study of economic history, because that's the raw material out of which any of your conjectures or testing will come... But history does not tell its own story. You've got to bring to it all the statistical testings that are possible...". ("An interview with Paul Samuelson", Part Two, Connor Clarke, June 2009, *The Atlantic*).

9 Apart from the Bank of Greece's initiative in the context of the SEEMHN research project, the first outcome of which is the compilation of the historical database for SEE countries, it is worth mentioning two other similar activities: that of the Institute for New Economic Thinking, studying the experience of emerging market economies, and that of University College London, with its CORE (curriculum open access resources in economics) project, involving the interactive (ebook-based) teaching of economics with an emphasis on historical quantitative documentation.

10 "I take it as the task of economic history to explain the structure and performance of economies through time" (Chapter 1, *The Issues*).

11 Adelman (2014).

cific economic agents such as enterprises and entrepreneurs, consumers and employees, savers and investors, interest groups, economic policy-makers and administrative bodies (disaggregated history). In this case, it borrows analytical tools from social sciences, such as social anthropology. Once again, quantitative data processing is the main analytical tool for studying how the effects of an event are spread across various economic and social agents, which is the key question that economic history is called upon to answer.

According to all definitions, the subject matter of economic history is the evolution of economic institutions and economic behaviour across time. Economic history does not only study past economic activity, but also sheds light on topical questions of relevance to policy-makers. In this sense, it bridges the past with the present. To do this, it needs to blend economic theory and quantitative data with methods from other disciplines such as demography, statistics and sociology.

A good definition is given by the New Palgrave Dictionary of Economics: "economic history focuses on the historical study of economic development and growth...". From a professional and academic point of view, economic history was distinguished from economics with the emergence of scientific societies in Great Britain in 1926 and then in the United States in 1941. As economics increasingly shifted away from history to the use of mathematical models in the 1960s, the "new economic history" advocated the application of economic theory to history ("but its emphasis on data analysis retained a bridge to other traditions", see Field 2008).

Against this background, the compilation of long-run time series, using information from historical archives, should not be neglected. By allowing for the quantitative analysis of historical events, these data fill the "knowledge gap" and even bring unknown events to light. In turn, this new knowledge changes the existing historiography and takes us further along the path towards the objective truth.[12]

In Greece, the split between economics and history is clear. Economic history is limited to a simple narrative of events as they unfolded. The importance of a holistic study and teaching of economic theory in the context of a thorough examination of historical episodes is systematically underplayed. Economic historians are misleadingly stereotyped as "economists that use historical statistics in their analysis" or "historians dealing with economics". There also prevails a wrong view of economic historians as "academics who are only interested in what happened in the past and do not deal with the present and current matters".

In turn, economics overlooks the value of historical research. To describe and study the behaviour of economic agents, it mostly uses mathematical models, the robustness of which is conditional on the validity of a number of underlying assumptions that provide a simplified picture of a complex economic reality. The solution of these models is based on deduction (hypothetical deductive models): economists propose a general theory and try to test its validity by examining it in specific cases (top-down approach). If the theory is verified, they then draw generalised conclusions, which however are only valid if the initial conditions were correct. However, they do not know the exact functioning of the economy in the real world. Their knowledge is limited to the study of abstract models that are often based on wrong assumptions, since economics, unlike the so-called "hard" sciences, is subject to strong data limitations. Moreover, the experimental method cannot be applied to the collection of observations, since an economy cannot be subjected to experimental conditions.

In other words, while hard sciences construct models to explain actual data collected by observation or experiment, an economist uses a model to describe how the world might work. Theory is empirically verified either by interpreting econometric results or by identifying

12 See e.g. Deane and Cole (1967), Feinstein (1972), Lindert (2004) and Crafts and Fearon (2013).

stylised facts. However, both processes rely on the use of a limited sample of observations under "normal conditions"; as a result, the absence of a broader, long-term perspective can lead to wrong conclusions as to the robustness of the economic model.

Against this backdrop, it is clear that economists argue on the basis of theory, while historians on the basis of facts. Economic historians have to do both, namely combine theory with facts. Their analytical tools are empirical or historical inductive models.[13] They are not confined, as historians are, to collecting and studying a sample of events, or, as economists are, to making assumptions and verifying *a posteriori* a general theory. On the contrary, the first step in their analysis is to collect the highest possible number of observations for an actual event. High incidence of these observations ensures the success of the second step, which involves the identification of a recurrent pattern and the construction of a behaviour model that would allow, as a third step, to investigate the causes that generated a phenomenon and make alternative assumptions about its occurrence. The final step is to draw general conclusions or formulate theories. We could describe the methodology by the following scheme:

quantitative data → pattern → assumptions → theory

For an economist, the steps of the technique would be employed in the reverse order.

Therefore, the compilation of reliable statistics that capture, in a condensed manner, the incidence of an event and its specific features (magnitude, duration, intensity) is the groundwork for an economic historian's research. By extension, the condensation of historical experience and the use of quantitative data to support it provide a deeper insight into the mechanism generating an event and the causes for its repetition. This knowledge is vital to drawing useful conclusions that will help in economic policy-making.

4 THE NEW GREEK HISTORICAL STATISTICAL DATABASE, 1833-1949

4.1 OUTLINE

The monetary history of the modern Greek State has not been adequately researched to date. Although there is an extensive body of literature, it largely consists of anniversary publications, chronicles, albums and biographies, exhibition catalogues or, at best, reprints of past monographs and papers. These mainly focus on a simple chronological narration of monetary events, without attempting to identify and interpret the underlying mechanisms, or on empirical verifications of some theory or assumption using available long-run data series. However, both approaches are far from a comprehensive and systematic study of monetary phenomena in Greece.

An important obstacle has been the absence of a comprehensive and reliable statistical historical database on the Greek economy. The statistical series available so far are incomplete, insufficient, fragmented and unofficial, and largely unknown to the broader research community; as a result, efforts to utilise such data have only been sporadic, and the case of Greece only randomly features in the international literature.

By making the new statistical database available to the international research community, the groundwork is laid for more systematic research into the economic, monetary and banking history of modern Greece, with a view to building on existing knowledge and adding new knowledge that would contribute to informed policy-making. In greater detail, the use of this database as a tool for the quantitative documentation of the historical narrative is expected to help identify any parallels between the past and the present and draw appropriate policy implications, which is the ultimate goal of the endeavour. In this respect, the database should help to answer topical questions such as:

13 Known as bottom-up approach.

1. What are the specific characteristics that classify an economy in the periphery of the global monetary and economic system?

2. Which factors can explain the economic backwardness of a country?

3. Why does a country often experience an elusive stability?

4. What are the factors behind the persistent trust deficit, which is understood as the lack of credible fiscal and monetary institutions, causing a country to suffer repeated confidence crises?

5. What were the benefits and risks of Greece's effort to borrow policy credibility by joining an economic or monetary club of strong economies and pegging to a monetary anchor?

6. What were the specific problems faced by Greece whenever an international crisis occurred? and

7. What did the day after look like?

The answers to all these questions will provide an in-depth understanding of the architecture of the international monetary system which prevailed in each historical period and was joined by Greece; it will also help us identify the reasons why the country failed to reap the benefits of membership of successive monetary systems.

The Greek statistical database (Greek Macro History Database) is part of the large historical statistical database of SEE countries (SEE Macro History Database), included in the joint publication entitled *South-Eastern European Monetary and Economic Statistics from the Nineteenth Century to World War II* (SEEMEHN 2014, Chapter 3). It is accessible on the Bank of Greece website, http://www.bankofgreece.gr/Pages/el/Publications/Studies/SeemhnDataVolTables.aspx). It covers the period between 1833 and 1949 and comprises a total of 98 time series of annual and monthly data, grouped in six categories. For the period 1833-1939, there is a complete set of annual and monthly time series for the following broad categories of macroeconomic data:

(1) monetary variables;
(2) interest rates;
(3) exchange rates;
(4) government finances;
(5) prices, production and labour; and
(6) national accounts and population.

For the period 1940-1949, there is a complete set of data on an annual and monthly basis for three variables:

(1) monetary base;
(2) exchange rates; and
(3) the cost-of-living index.

The database is divided into three parts. The first part provides a brief but comprehensive account of the most important monetary events in the country and an accurate analysis of the institutional framework of monetary policy in each reviewed period. This was deemed necessary because collecting, recording, processing and verifying data and compiling indicators for such long and distant periods require in-depth knowledge of the domestic and international institutional environment of economic and monetary policy. This knowledge helps us to more strictly define the variables published.

The second part sets out definitions of variables and provides detailed explanation of each time series separately, in each of the six categories. It also details the method for compiling new variables; for instance, money supply, long-term government borrowing costs and a proxy for public debt are given each two definitions.

The third part presents in detail all the sources of information. There is a focus on an accurate description and discussion of primary sources, such as regular or occasional publications of

statistical bulletins, statistical yearbooks, banks' balance sheets and annual reports, government budgets and ex-post reports. Secondary sources are also discussed, mainly including published original research, which is mostly used to cross-check quantitative data found in primary sources or to address gaps and breaks in the relevant time series.

To facilitate users, an index table at the beginning of the Greek statistical database summarises all useful information, i.e. the definition of the group of key variables and their components, time span, data frequency, unit of account and series code. Finally, the database is accompanied by charts plotting the evolution and interactions of selected variables over time.

4.2 METHODOLOGY

To ensure reliability, accuracy and comparability of quantitative data, all central banks participating in the project agreed[14] on a common methodology as regards a number of fundamental matters, such as selection and definition of variables, methods for the collection of information, techniques for compiling new indices and missing data handling.

In more detail, *first*, the statistical database comprises information about a minimum but adequate set of variables, common to all countries. Emphasis was placed on monetary variables, in an aim to utilise the comparative advantage offered by the archives of national central banks.

Second, the time series were compiled on the basis of commonly used definitions, as the best way of achieving maximum conceptual accuracy and harmonisation across countries and across time (historical vs. current series) for the same variable, thereby ensuring consistency and continuity.

Third, each variable is described in detail, enabling to identify variations in the recording method across countries and across time within the same country. These variations typically reflect different monetary policy regimes.

Fourth, data were collected only from primary sources.

Fifth, the method of presentation was the same across countries, with both aggregated and disaggregated data series. The time span of each series is the longest possible, the unit of account is the legal tender of each country, the frequency is annual and monthly, while the method of linear interpolation was used in the case of missing data.

Sixth, the compilation of new indicators mainly relates to GDP, government borrowing costs, money supply and a proxy for public debt.

5 GREEK HISTORICAL TIME SERIES AND ECONOMIC POLICY: EXAMPLES

The analysis of simple policy examples using specific historical time series demonstrates their importance for policy assessment. This section focuses on four groups of variables.

5.1 MONETARY AGGREGATES

Monetary aggregates are divided into two categories of variables: (i) the country's reserves; and (ii) measures of domestic money supply. For the purposes of quantitative presentation, the first category is defined as the sum of: total reserves in precious metal (gold and silver) in the form of barren metal or minted coins held in the vaults of all note-issuing banks until 1927 and of the Bank of Greece since 1928); gold-based foreign exchange (usually French francs and pounds sterling) in the form of

14 The successful completion of the project is primarily due to the strong team spirit among participants. Regular meetings (13 in 7 years) and daily online communications ensured that any problem was promptly and effectively addressed. The roundtable format of regular meetings provided an opportunity for a fruitful exchange of progress reports, knowledge and information. Moreover, the setting up of sub-groups contributed to a quick, sound and useful process of peer review and editing. At the same time, the early utilisation of time series to study specific monetary phenomena has been a first test of their accuracy.

interest-bearing deposits with foreign central or correspondent banks, used to settle the country's international payments and back the convertibility of banknotes; and gilt-edged bonds held as part of the central bank's assets.

In selecting the items under the quantitative definition of the reserves variable, we addressed two issues: conceptual content and method of valuation. Specifically, in metallic monetary regimes, reserves were meant to ensure banknote convertibility. Nowadays, reserves data are built on two different concepts (see IMF 2013, Balance of Payments and International Investment Position Manual): "international reserves" or "official reserve assets", and "foreign currency liquidity". According to the first concept, international reserves are used for the country's international transactions and for foreign exchange market interventions aimed to influence the international price of the currency. They are recorded on the assets side of the central bank's balance sheet. The second concept is broader and refers to both on- and off-balance-sheet items, not only of the central bank, but also of the government, which are aimed to meet demand for foreign exchange.

To avoid an overestimation of reserves, we adopted the first definition, which narrows the concept of the variable. Similarly, to avoid an underestimation, we took into account the total level of reserves, not just the statutory lower limit[15] as defined in the founding law and the statute of the note-issuing/central bank. The latter would perhaps be relevant if the objective of monetary policy was only to ensure the statutory lower limit of reserves and the upper limit of currency in circulation. However, since the country's reserves were used to fulfil foreign payment obligations arising from international borrowing and a net liability position, the concept of "official reserves" or "international reserves" is more relevant.

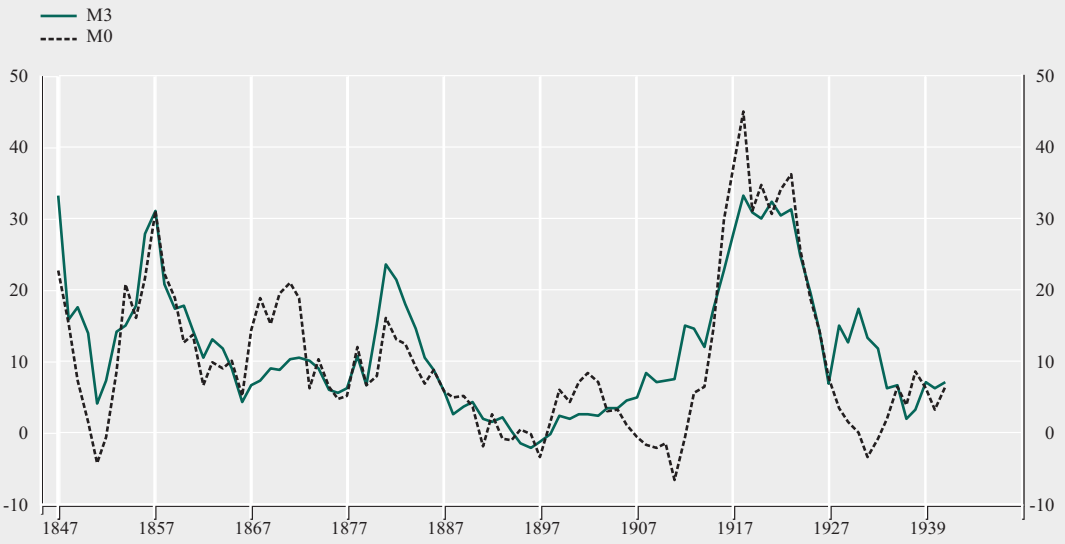
A second issue refers to the method of valuation. Note-issuing banks used to report their metallic and foreign exchange reserves not at the market exchange rate, but at the parity rate of the domestic currency vis-à-vis gold or gold-based foreign exchange. However, due to strong and constant depreciation pressures on the domestic currency, the note-issuing/central bank, under its respective founding act, reported all balance sheet items (assets and liabilities) expressed in the domestic currency on the basis of the market exchange rate as at the balance sheet date.

The second category of monetary variables relates to measures of money supply. On the first page of their classic book, Friedman and Schwartz (1970) note that "... measuring money is an activity that dates back to the beginning of the republic". This is so because knowing exactly how much money there is in the economy at any given time enables the conduct of monetary policy that can support growth in an environment of monetary and foreign exchange stability. This was very important in metallic monetary regimes, since the scarcity of precious metal forced the authorities to establish a minimum ratio of reserves to banknotes in circulation, as excess uncovered note issue would undermine confidence in the banknote and strengthen inflationary and depreciation pressures, thereby jeopardising the monetary regime.

In Greece, although a national monetary system was introduced right after independence, with the circulation of silver coins and paper notes (uncovered money), the systematic recording of banknotes in circulation on an annual and monthly basis only started in 1841, with the establishment of the National Bank of Greece as a note-issuing bank. However, the concepts of narrow or broad money used today are nowhere to be found in those records. This was so because, according to the Currency School of the 19th century, banknotes were the only substitute for physical money. Other types of what we now see as money, such as bank deposits, were not included in the calculation

15 25% of currency in circulation for the National Bank of Greece and 40% of the monetary base for the Bank of Greece.

Chart 1 Monetary aggregates (1847-1939)



Sources: SEEMHN (2014) and Bank of Greece.
Note: Annual percentage changes in averages. Own calculations, based on a 5-year rolling time span.

of money supply. Therefore, although metallic and foreign reserves were endogenously determined, the statutory reserve-to-banknote ratio was determined exogenously, necessitating the precise knowledge of the stock of banknotes in circulation. However, with the emergence of a bourgeois class in the last quarter of the 19th century, the domestic economy gradually shifted from barter to a money economy, and the banking system grew. This implied a broadening of the concept of money, at least as a medium of exchange. Until then, the time series of currency in circulation underestimated domestic money supply. Therefore, the formulation of two alternative definitions of money, one narrow as medium of exchange and one broader as two measures of liquidity, helps to make safer estimates of the variable.

In this context, and given the quantitative data limitations, we compiled two monetary aggregates: M3 (broad money), including less close substitutes for money, such as bank deposits of any type and bank bonds, and M0 (narrow money), also known as "monetary base".[16] We used the monetary approach, according to which an optimal measure should meet three criteria: (i) high correlation with national output; (ii) inclusion of several items treated as money; and (iii) the highest correlation with either current or lagged values of real GDP.

The importance of monitoring the evolution of these aggregates for the purposes of policy-making is illustrated by two examples of policy pursued in the 1910s and 1930s. In particular, Chart 1 shows that, in the first decade of the 20th century, M0 and M3 moved in opposite directions. M0, tracking banknote circulation, which was at the time fully controlled by monetary authorities, follows a downward path, as a result of the very tight monetary policy under a strict stabilisation programme agreed with foreign creditors in 1898. Through a sterilisation policy, any increase in the country's foreign reserve assets, mainly as a result of higher foreign trade, was fully offset by a larger decrease in banknote circulation. This policy was aimed to restore monetary and exchange rate stability, but did not yield the

16 Two other indicators were also compiled: the reserve-to-banknote ratio and the M3 multiplier.

expected results: excess demand for money intensified upward pressures on the exchange rate, causing deflation and keeping lending rates at high levels. The rising path of M3 during the same period, solely driven by increases in private deposits and cash transactions because of higher foreign trade, although implying satisfactory liquidity, failed to finance growth. Growth remained weak after the recession of the 1890s, since it was forbidden by law to exceed a maximum, but narrow, limit of uncovered circulation.

The policy implemented in the context of the new monetary regime after 1910, with the delayed decision to link the drachma to the French franc at par, in an effort to counter deflation and the rapid appreciation of the currency, did not help at all to restore monetary stability. This time, as shown in the chart, M0 and M3 moved in the same direction. Their co-movement is explained by the fact that the increased inflow of foreign exchange led, in the context of full and free convertibility, to continuous and equal increases in the monetary base and therefore in liquidity, which fuelled domestic inflation. The adverse effects of this policy on the real exchange rate and the reserve asset position of the country became visible after 1914, when Greece insisted, after the collapse of the international gold standard, to maintain a *de jure* regime of stable exchange rates.[17]

A second example is the monetary policy of the interwar period. In 1925, the Greek authorities began a monetary tightening to counter the post-war very high inflation and marked depreciation of the currency. As shown in Chart 1, although the monetary base also declined after 1925, the liquidity index in the pre-crisis years followed a steep upward path, driven by high bank deposits accumulated during the strong monetary expansion of the war period. Most of these deposits were very short-term (sight deposits) because of low public confidence in the currency. On the other hand, banks were very liquid but were extremely reluctant to extend long-term loans, thereby maintaining very high lending rates. The central bank, taking into account the size of the monetary base, assessed (perhaps erroneously) that monetary conditions were tight and, right after its establishment, cut its discount rate.

The monetary policy implemented since mid-1931 proved to be equally ineffective. The banking crisis, as manifested by the mass deposit withdrawals and bank defaults, squeezed liquidity in the economy, as shown by the steep downward path of M3. At the same time, however, the Bank of Greece further tightened its monetary policy stance by successively raising its policy rate, which pushed further upwards market lending rates, thereby causing a credit squeeze that deepened the recession. Meanwhile, the requirement on commercial banks to hold reserves with the central bank, a measure aiming at improving bank supervision in the wake of the banking crisis, implied an additional monetary policy tightening, reflected in the upward path of M0, as opposed to the downward path of M3.

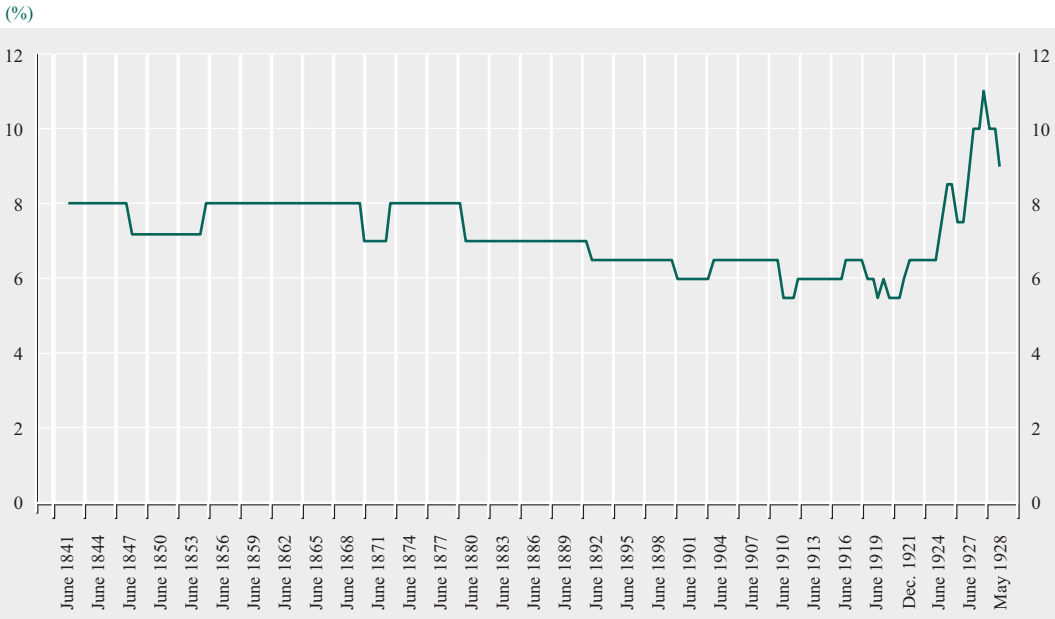
5.2 INTEREST RATES AND BORROWING COSTS

5.2.1 Discount rate

In metallic monetary regimes, money supply was controlled through changes in the interest rate[18] at which the note-issuing or the central bank usually refinanced the domestic economy by discount and credit facilities to commercial banks. In the case of Greece, in the absence of a central bank until April 1928, the National Bank of Greece, being both a note-issuing and a commercial bank, controlled liquidity in the economy through the interest rate at which it discounted three-month commercial bills and notes. It applied the same rate on lending to merchants, other commercial banks, as well as the government.[19] Chart 2 shows the evolution of the dis-

17 For a detailed discussion of monetary policy implementation in Greece during the period of the gold standard, see Lazaretou (1995) and SEEMHN (2014, Chapter 3).
18 Also known as "bank rate" or "Lombard rate".
19 Until 1880, when Greece regained access to international capital markets, the National Bank of Greece was the almost exclusive holder of public debt.

Chart 2 The discount rate of the National Bank of Greece (1841-1928)



Sources: SEEMHN (2014) and Bank of Greece.
Note: Based on the dates of change, in percentages per annum, end-of-month data.

count rate over time. The series was constructed on the basis of the available dates of interest rate changes, as derived from the minutes of general meetings of shareholders and annual reports of the National Bank of Greece.

A simple look at the chart shows that the National Bank of Greece never considered its discount rate as a monetary policy tool. Its changes were rather infrequent. In 80 years, it changed this rate only 27 times. Decisions to change the interest rates were dictated by its commercial banking activities, competition with other, smaller commercial banks, to which it was usually reluctant to provide the required liquidity, and its concerns about public confidence in its banknote, rather than by macroeconomic considerations. For instance, although at the start of its operations in March 1841 it set its rate at 8%, much lower than the non-banking lending rate (20%), it kept it virtually unchanged until the early 1890s. Only at the turn of the century was there a small and slow decline in the discount rate, at a time when the Greek economy started developing fast and there was a great need for cheap loans. The reluctance to change the interest rate policy stance, as shown in the chart, does not seem to have significantly helped to finance the growth efforts of this period. It was only after 1923 that the bank began to take the macroeconomy into account, given the high post-war inflation and strong depreciation pressures.

The interest rate policy of the Bank of Greece was equally ineffective, as seen in Chart 3, which shows the discount rate and the short-term market lending rate. Both series were constructed on the basis of the dates of interest rate changes. We note that the central bank's effort to reduce market lending costs by cutting its rate from 10% to 9% in November 1928 and keeping it at this low level until September 1931 ended up in failure since, because of the excess liquidity then available to commercial banks, they did not need to resort to

Chart 3 The discount rate of the Bank of Greece and the market lending rate (May 1928-November 1941)

Sources: SEEMHN (2014) and Bank of Greece.
Note: Based on the dates of change; 3-month market lending rate: simple annual average of the 4 largest commercial banks, in percentages per annum, end-of-month data.

central bank money for their refinancing.[20] At the onset of the Great Depression, the Bank responded by successive increases in its rate,[21] pushing further upwards the market rate and causing a credit squeeze at a time when monetary policy relaxation was needed to promptly counter the negative impact of the recession.

5.2.2 Government borrowing costs

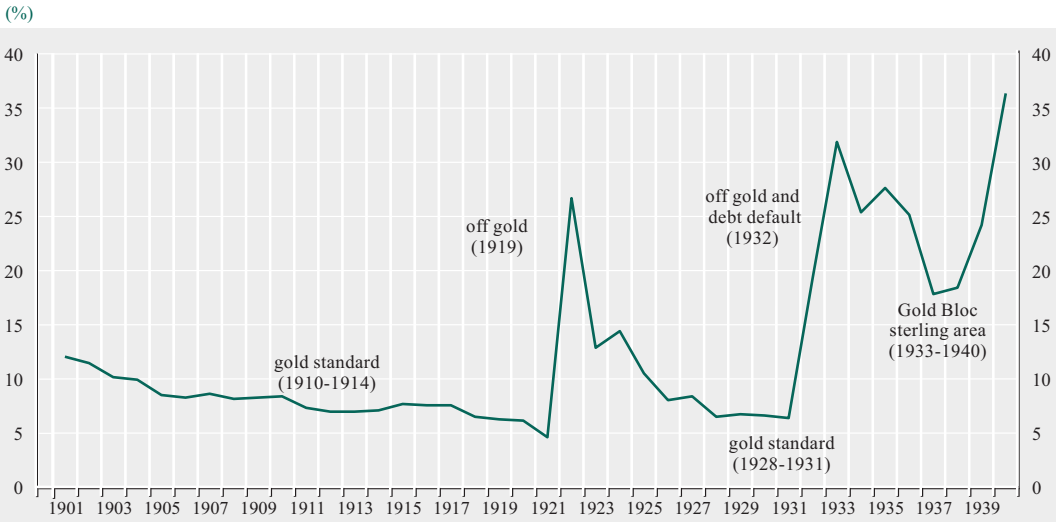
A country's creditworthiness is reflected in long-term government bond yields. The market prices (annual since 1901 and monthly since 1928) of the bonds of ten major foreign loans in gold allow us to calculate the current yield as the product of the face value and the coupon rate divided by the market price. Both in theory and in practice, it is now a well-known fact that the less developed economies at the periphery of the system suffered from the "original sin", i.e. they were unable to issue international debt in their own currency (Eichengreen and Hausmann 1999, Eichengreen et al. 2003, Catão and Milesi-Ferretti 2014). To prevent the risk of debt monetisation and loss of their investment, foreign creditors were not willing to buy government bonds unless these were denominated in an international hard currency. In the years of the gold standard, the issuance of debt by a developing country included a "gold clause" or "currency clause", i.e. a promise to repay the debt either in gold or in "gold-based foreign currency". The high share of debt liabilities increased the country's foreign dependence, since they were serviced through fixed payments in hard currency, which were not linked to the current economic situation.

As seen in Chart 4, which shows the average annual unweighted current yield of ten gov-

20 In the years before the crisis, to raise liquidity, commercial banks used to have recourse to the National Bank, where they kept their deposits. Despite the decrease in the Bank of Greece's rate, the National Bank raised its own rate from 9% to 11%-13%; as a result, the three-month market lending rate increased sharply.

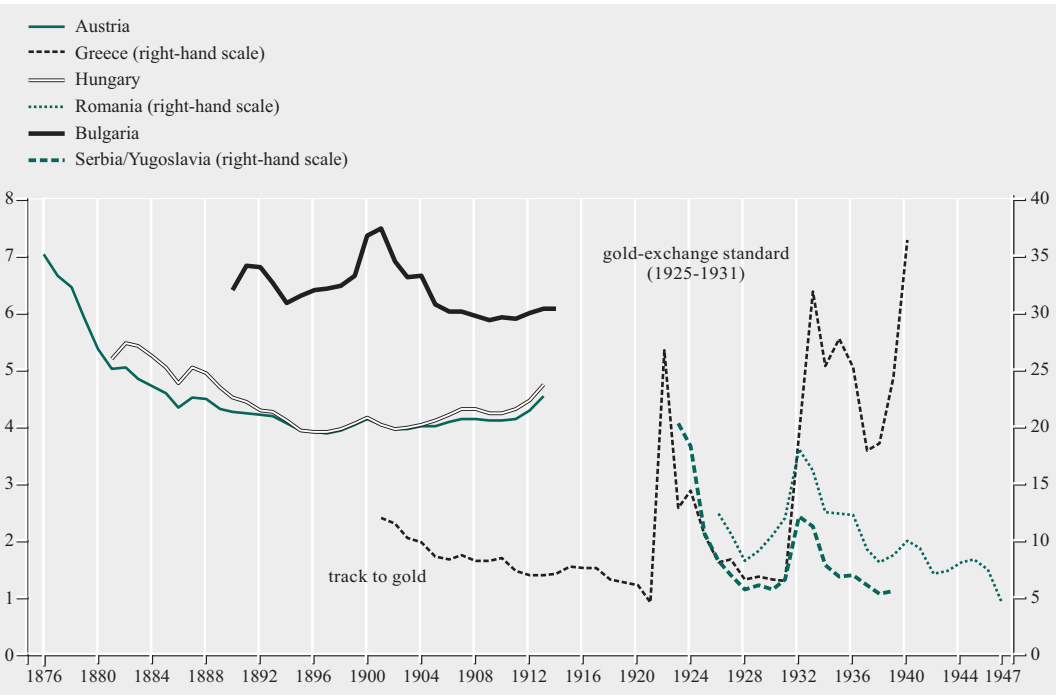
21 In 1931, the Greek economy was already in recession and a credit crunch (economic downturn and a drop in employment, bank runs, bank defaults and cash hoarding). The policy response was haphazard and intensified uncertainty. Finally, opting to support a stable relationship with gold, the Bank of Greece increased its rate from 9% to 12% in end-September 1931. One month later, it lowered it to 11% and raised it again to 12% in mid-January 1932. One month later, it cut it again to 11%. The slow but gradual decline in borrowing costs began in the second half of 1932.

Chart 4 Government bond yields (1901-1940)



Sources: SEEMHN (2014) and Bank of Greece.
Note: Current yield, simple annual average of the current yield of 10 long-term foreign fixed-rate government bonds in gold. Own calculations based on released market bond prices.

Chart 5 Current yield on fixed-rate government bonds in gold of SEE countries (1876-1947)



Sources: SEEMHN (2014) and Bank of Greece.
Note: Current yield, simple annual averages of long-term foreign loans in gold.

ernment bonds in the period 1901-1940, whenever the country made credible efforts to join the international monetary system, its borrowing costs decreased substantially.[22] By contrast, periods outside the international monetary system were associated with very high borrowing costs or even inability to borrow. For example, after the country left in 1932 the – by then collapsing – gold-exchange standard, and also unilaterally defaulted on its public debt, borrowing costs increased steeply within one year, up to three times compared with the preceding year. What is particularly interesting is that, despite the eagerness to find a compromise solution and re-peg the currency to a monetary anchor in the context of the Gold Bloc in 1933 and, after its collapse, the sterling area in 1936, borrowing costs never returned to reasonable single-digit levels, such as those prevailing in the gold-exchange standard period (1928-1931). The global shortage of liquidity in a climate of international mistrust after the 1929 crisis, as well as the past experience of unilateral debt default, prejudiced the country's creditworthiness and drove yields more than four to five times higher, as shown in the chart.

It is worth noting that the pattern of borrowing costs was common to all SEE countries (see Chart 5). Joining and staying on the gold standard, and even the effort and prospects of joining, increased the credibility of economic policy and improved the access of the periphery to international capital markets.

5.3 FISCAL INDICATORS

The recent compilation and publication of statistics of key fiscal aggregates, such as revenue and expenditure, as well as a proxy for public debt allow us to study the fiscal policy implemented from 1833 to 1939. A simple look at Charts 6 and 7 reveals four salient features of fiscal policy in this period:

(i) It is clear that the fiscal authorities failed to increase tax revenue. Between the start and the end of the sample period, the tax-to-GDP ratio remained at the same low level of about 18%, whereas primary expenditure in times of peace was three to four times higher than taxes. This failure was due to the small tax base, high tax collection costs and the unclear and segmented tax framework.

(ii) Data on Greece empirically confirm the procyclical effect of fiscal policy, which is a common characteristic of poor countries (see Kaminsky et al. 2004, Alesina et al. 2008, Woo 2010).[23] In good times, fiscal policy responded by increasing expenditure, thereby widening the imbalance and amplifying the adverse effects in bad times.

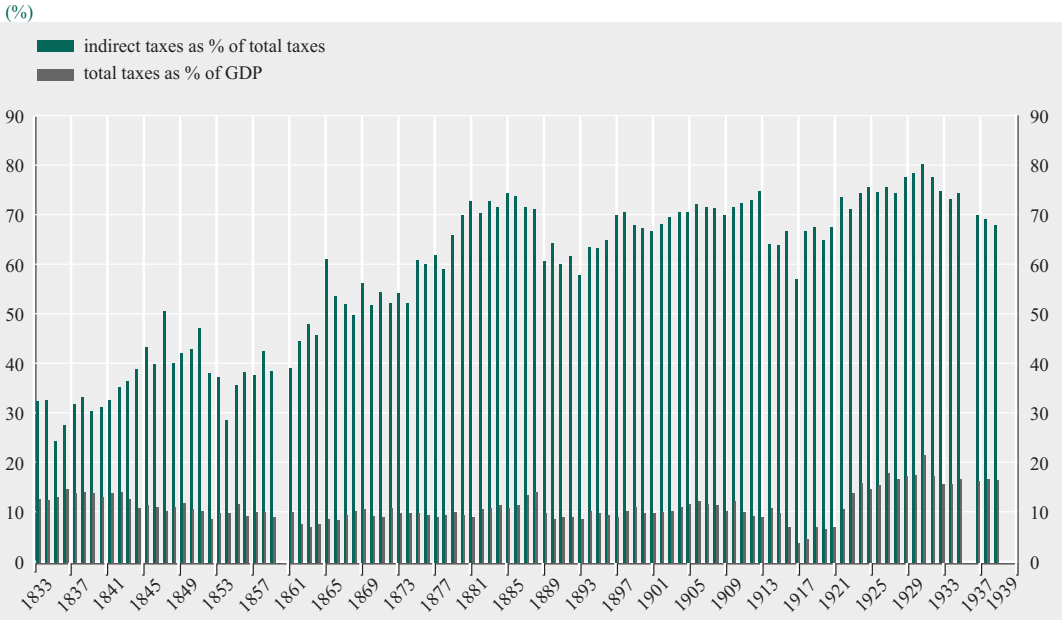
(iii) Any increase in tax revenues stemmed from a significant rise in indirect taxation, which accounted for over 70% of total tax revenue. Although indirect taxation immediately increased public revenues, it also caused strong social discontent, as it fell heavily on consumer staples and mainly affected weaker income brackets. This caused prolonged political instability, e.g. in the late 1880s and the first half of the 1930s, leading to adverse economic effects as well as to major changes in the form of government.

(iv) The government's systematic recourse to borrowing to finance its expenditure increased its liabilities vis-à-vis the note-issuing/central bank, which was its main domestic creditor. As shown in Chart 8, since early 1880, the ratio of government debt to the central bank's total assets, with only a few exceptions, rose to over 40%. The tight entanglement of the monetary authority with the fiscal authority caused an immobilisation of a substantial part of its assets and limited its scope for action to safeguard monetary and financial stability.

22 The yield differential between Greek and British bonds in the years of the gold standard never exceeded 380 basis points. In addition, when the country joined the gold-exchange standard in 1928, the government's borrowing costs less than halved, from 14.3% to 6.7% in 1923.

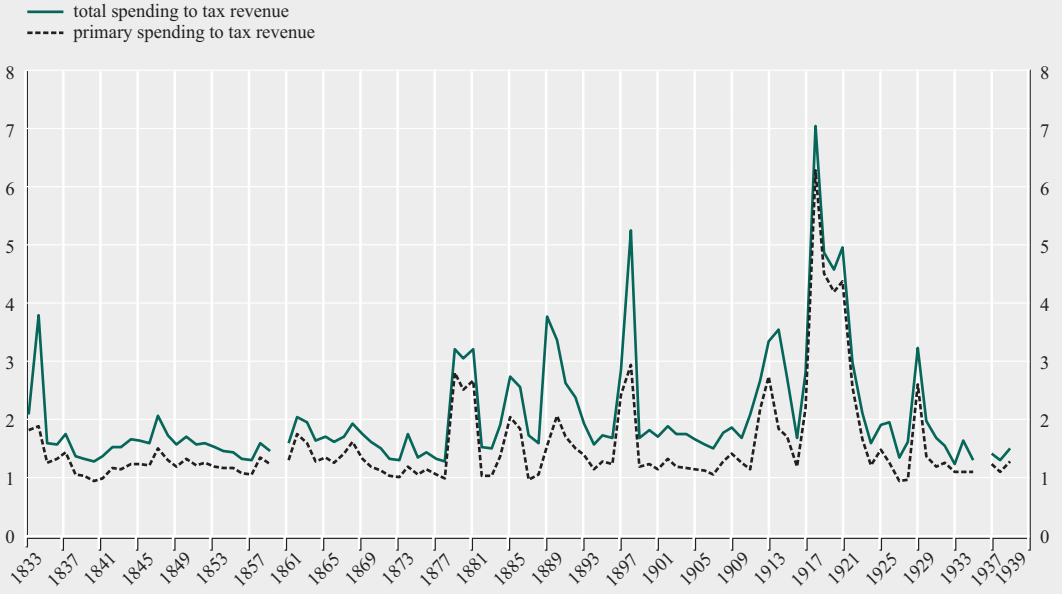
23 The regression coefficient of the cyclical component of real output in the estimates of bivariate regressive schemes of public expenditure at constant prices and/or the fiscal deficit on the basis of historical time series is positive and highly statistically significant. The cyclical component has been estimated as the deviations from a logarithmic time trend.

Chart 6 Public revenue and indirect taxes (1833-1939)



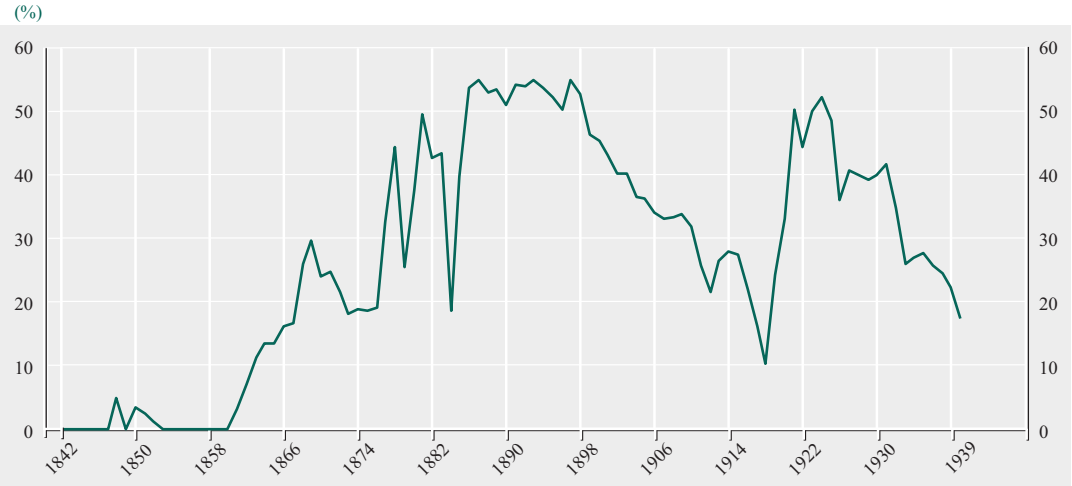
Sources: SEEMHN (2014) and Bank of Greece.
Note: Received tax revenues on the basis of the ex-post Budget Report.

Chart 7 Expenditure to tax revenue (1833-1939)



Sources: SEEMHN (2014) and Bank of Greece.
Note: Realised expenditure and received taxes on the basis of the ex-post Budget Report.

Chart 8 Public debt as a percentage of the note-issuing/central bank's total assets (1842-1939)



Sources: SEEMHN (2014) and Bank of Greece.
Note: Debt liabilities (stock) of the central government to the National Bank of Greece and the Bank of Greece, as a percentage of their total assets. Own calculations based on the data from the National Bank of Greece's balance sheet (1842-1927) and the Bank of Greece's balance sheet (1928-1939). This series can be considered a proxy for public debt stock since, for its construction, due to lack of data, all information on the bank's claims on the government has been retrieved from its balance sheet. They refer to total liabilities of the Greek central government, including loans in banknotes, foreign exchange and gold, as well as Treasury bills and government bonds, that were issued under national jurisdiction, regardless of the nationality of the creditor and/or the debt denomination currency. See Reinhart and Rogoff's (2010) debt glossary.

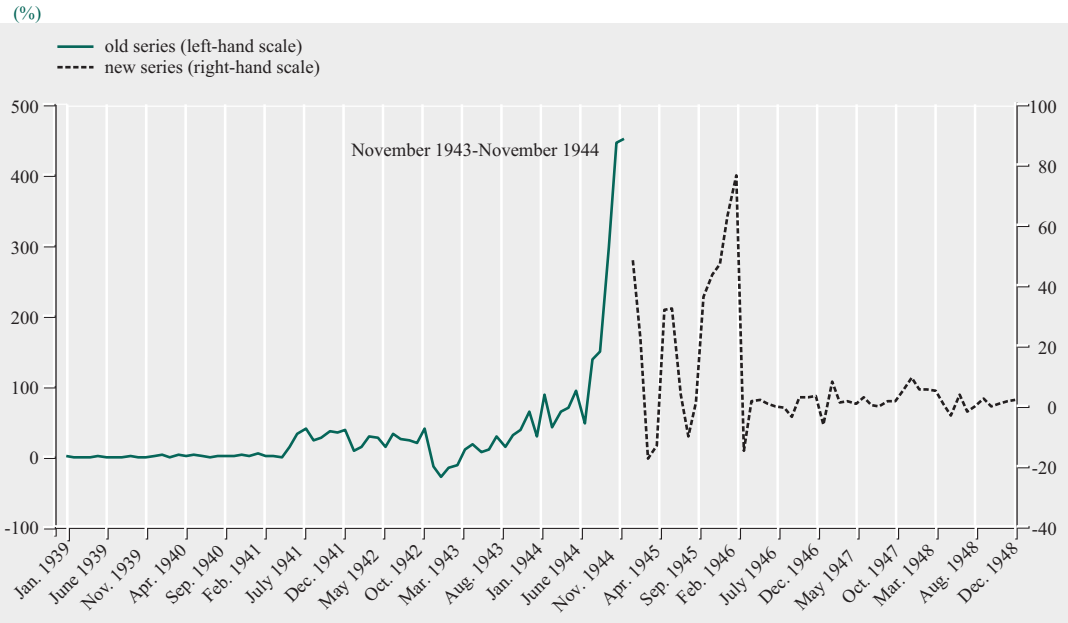
5.4 THE GREEK HYPERINFLATION

Hyperinflation in Greece, according to Cagan's definition[24] (1956), began in November 1943 and ended in November 1944 (see Chart 9), although strong inflationary pressures re-emerged, but were short-lived, in the last four months of 1945. It was one of the 56 hyperinflation episodes in human history and one of the eight worst in terms of the daily rate of increase in the price index (see Hanke and Krus 2012). Two reasons accounted for this. First, the complete lack of goods on the Greek market, since almost the entire production had been confiscated by the occupation forces, and second, the continuous issuance of new (uncovered) money to finance, through inflation, the maintenance costs of occupation troops and military operations in the eastern Mediterranean. Runaway inflation triggered a flight from the drachma to the only safe haven, gold, thereby leading to the so-called *chrysophilia* (love of gold), which plagued the Greek economy until the mid-1960s.

The availability of monthly observations on the monetary base and a cost-of-living index allow us to calculate inflation tax revenue (seigniorage). Its evolution between January 1939 and December 1948 is shown in Chart 10. We note that, despite continuous issuance of new money, inflation tax revenue declined dramatically month after month, eventually leading to a steep rise in inflation, which approached three-digit figures. Mounting distrust in the national currency, since no one wanted to hold paper drachmas because of the extremely high and rapid loss of their value, and the increasing circulation of gold sovereigns reduced demand for liquid assets in drachmas. Consequently, the inflation tax base

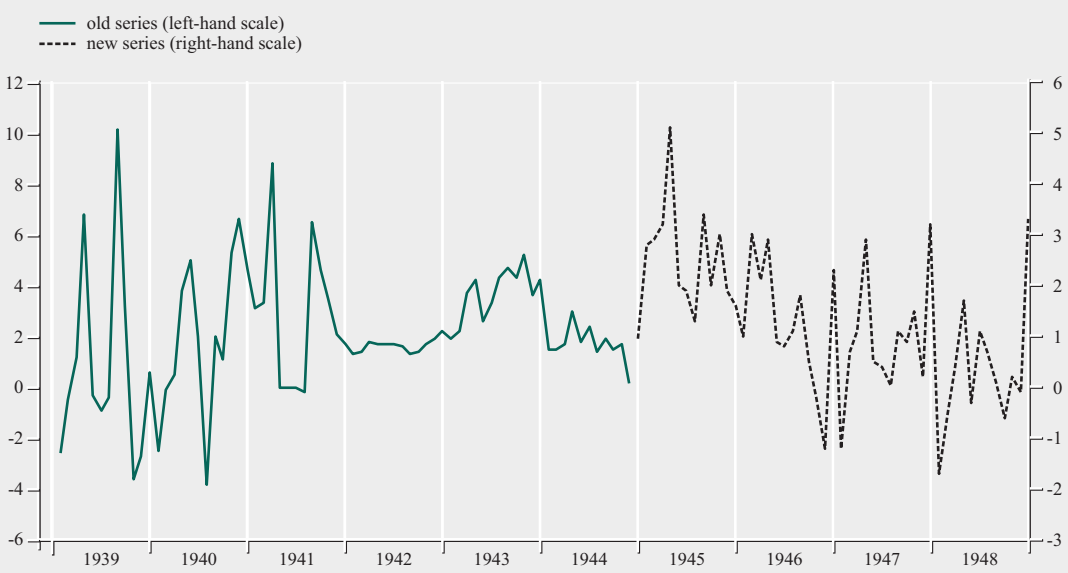
24 Hyperinflation is defined to begin in the month when the rise in prices exceeds 50%, month on month, and end in the month before the monthly price increase drops below such percentage and remains below 50% for at least one year. Although this is an ad hoc definition, it adequately captures all hyperinflation episodes to date.

Chart 9 The Greek hyperinflation episode (1943-1944)



Sources: SEEMHN (2014) and Bank of Greece.
Note: Monthly percentage changes (first differences of the natural logarithms) of the cost-of-living index in Athens. Old series: up to 10 November 1944; new series: from 11 November 1944 onwards.

Chart 10 Seigniorage revenue (1939-1948)



Sources: SEEMHN (2014) and Bank of Greece.
Note: Own calculations; index 1938.09-1939.08=1. Seigniorage is measured as the product of the monthly rate of change in the monetary base in period t and real money balances in period t-1, deflated by the cost-of-living index in Athens.

(i.e. liquid assets in drachmas) decreased to a minimum; as a result, tax revenue was non-existent despite the very high inflation rates.[25]

In other words, the occupation period was an extreme example of the limitations of monetisation of public deficits: while a sudden (unexpected) increase in money supply to cover the deficit may yield important revenue, an expected – even accelerating – increase causes, from a certain point on, such a large decrease in the demand for money and in the tax base that revenue falls. If the government insists on such a policy, the accelerating increase in money supply leads to the substitution of legal tender with other commodities that fulfil the functions of money, driving government revenue down to zero.

6 CONCLUDING REMARKS

As regards European monetary developments, 2015 started with two pieces of good news: the euro area entry of Lithuania, an emerging market and peripheral economy of New Europe, and the ECB's announcement of the launch of its quantitative easing programme. Both events in themselves send a hopeful message about the monetary future of Europe, at a time when the core economies, after six years of crisis, are facing the challenge of stagnation or weak growth and deflation, while the economies in the periphery continue to suffer from high debt, extremely low employment rates, mass and long-term unemployment, and recession.

The recent adoption of the single currency by an emerging market peripheral economy attests to the intention of small and weaker European economies to keep pace with European monetary developments and become members of the European economic family. The publication, for the first time, of a complete and comparable statistical database of economic and monetary variables for the SEE countries spanning more than 100 years reveals that this has been a constant pursuit of economic policy-makers in these countries.

The purpose of this article was to introduce the Greek statistical database and demonstrate its importance for the empirical documentation of the specific features of the Greek economy over time and the assessment of the policies implemented. It discusses certain policy examples using quantitative data such as monetary indicators, borrowing costs and fiscal aggregates. The examples show that the same thread runs through the monetary history of Greece and the SEE countries: an agonising - and not always successful - effort to join an economic and monetary club of strong economies. The benefits were readily measurable, reflected in low borrowing costs and access to cheap financing necessary to support growth in a context of low national saving levels. The country's intention to import policy credibility by participating in the international monetary system and adopting a monetary anchor (i.e. by establishing a minimum level for the reserve-to-banknote ratio and adhering to an irrevocable currency peg) was dictated by the need to encourage its external trade and attract foreign capital, as well as by the effort to put an end to periods of serious economic and political instability.

The statistical series show that, although there has been a measurable benefit in terms of borrowing costs, there have also been visible risks, especially when the country's entry was not always accompanied by sound and credible fiscal and monetary institutions. Often, also in view of negative international conjunctures, the gap between will and skill has led to collapse and failure.

25 The Greek confidence crisis, which peaked in July 2015 and took the form, at least initially, of a liquidity crisis and a bank run, leading to the imposition of a bank holiday and capital controls, presents all the typical features of economic agents' reaction to economic panic and hyperinflation: distrust of money (plastic or electronic) as a medium of exchange, an abrupt fall in demand for transaction balances, hoarding of the "good" currency, i.e. the euro, increased electronic money velocity, growing demand for consumer durables and luxury goods. However, keeping the euro as legal tender in the Greek economy prevented hyperinflation, which would have emerged under a national or parallel currency scenario.

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WORKING PAPERS (JANUARY 2015 – JULY 2015)

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What are the international channels through which a US policy shock is transmitted to the world economies? Evidence from a time varying FAVAR

Working Paper No. 190
Anastasios Evgenidis and Costas Siriopoulos

The study examines the international transmission of US monetary policy shocks across euro area and Asian countries by using a time-varying Factor Augmented VAR (FAVAR) model.

We first examine all the possible channels through which a policy shock is transmitted in each country. In general the transmission of the shock hides considerable heterogeneity across countries. We find that trade balance is not a convincing channel in describing the pass through of policy shocks in East Asia countries. Further investigation of the transmission in this region suggests that the wealth effects along with the world interest rate channel do explain the negative propagation of the US shock in the GDP of Hong Kong, Philippines and Singapore. On the other hand, the exchange rate channel is suitable for explaining the GDP positive spillover effects in Korea and Japan. What is more, the central banks of these two countries strongly respond to GDP increases -as a result of the US contractionary policy- by also increasing their short term rates. As concerns the euro area, the wealth effect through the exchange rate channel seems adequate to describe the transmission of the shock in European countries. For Germany and Italy the decline in lending and spending reveal the importance of the balance sheet channel in the shock transmission.

Second, we investigate the extent to which the transmission mechanism has changed through the years. We focus on two important worldwide phenomena, the effect of the globalization and the recent US financial crisis. We find that the impact of the shock in all economic variables in most countries other than the USA has fallen under global integration. For the 2007 financial crisis, our results indicate that the majority of countries witness an increase in the size of the shock to real activity, inflation and credit variables in the post-crisis period.

Profitability in the Greek banking system: a dual investigation of net interest and non-interest income

Working Paper No. 191
Dimitrios P. Louzis and Angelos T. Vouldis

The study examines in parallel the determinants of interest and non-interest income in the Greek banking system with the aim of understanding the primary drivers of overall profitability for Greek banks. Using dynamic panel data techniques and a unique data set, including supervisory data, covering the whole Greek commercial banking system from 2004 to 2011, we find that net interest income is primarily affected by the banks' market power, their operating costs and their strategic choice to diversify their income sources by enhancing non-interest income. On the other hand, non-interest income is more persistent than net interest income, with the more efficient banks, possessing a strong deposit base, having greater leverage in boosting their non-interest income. Aggregate demand conditions and inflation can also affect both income components. Moreover, interest and non-interest income are found to be substitutes rather than complements, with non-interest income used as an indirect competition instrument by efficient banks, instead of competing directly with their peers through prices in loans and deposits.

EMU 2.0
Drawing lessons from the crisis – a new framework for stability and growth

Working Paper No. 192
Theodoros S. Papaspyrou

This paper, drawing on the lessons from the sovereign debt crisis, tries to give answers to some key questions: Was the strategy and specific actions to cope with the crisis appropriate? Was the priority given to preserving financial stability justified? Are stability and growth objectives possible in EMU? What is the scope for national economic policy in the new policy framework? It emerges that, after some initial weaknesses in policy action, decisive initiatives by EU authorities, supported by significant progress to strengthen further economic and financial governance and reduce macroeconomic imbalances succeeded in preserving the stability and integrity of the euro area. While the priority given by the EU policy action to financial stability was fully justified, it is also clear that robust economic growth is essential for durable financial stability and overall welfare. Policies enhancing both stability and growth are possible in EMU and some of them have started being implemented while others are at an advanced stage of development. There is ample scope for national economic policies which, if well-designed and properly implemented, will enhance the growth potential of member countries. However, legacy problems such as the excessive government debt burden in some countries must be resolved.

Corruption and tax evasion: reflections on Greek tragedy

Working Paper No. 193
Anastasia Litina and Theodore Palyvos

We provide empirical support and a theoretical explanation for the vicious circle of political corruption and tax evasion which countries often fall into. We view Greece as a typical example of a situation like this that led to the modern tragedy. We address this issue in the context of a model with two distinct groups of agents: citizens and politicians. Citizens decide the fraction of their income on which they evade taxes. Politicians, on the other hand, decide the fraction of the public budget that they peculate. We show that multiple self-fulfilling equilibria with different levels of corruption can emerge, based on the existence of strategic complementarities. Accordingly, whenever one group decides to steal more, the other group finds it to its best interest to steal more as well. This indicates that corruption may corrupt and explains why corruption often spreads over to different groups of the society. Our empirical results confirm the interaction between attitudes towards political corruption and tax evasion, an interaction that, as we show, is not driven by unobservables or reverse causality. Furthermore, we find that standard deterrence policies, e.g. fines, cannot eliminate the multiplicity of equilibria. Instead, policies that impose a strong moral cost on tax evaders and corrupt politicians can lead to a unique equilibrium.

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