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# THE DETERMINANTS OF NEW FIRMS' EXPORT PERFORMANCE<sup>\*</sup>

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#### **I** INTRODUCTION

Export activity is a key element of the operation of small and new firms, enabling them to create value, grow and have access to new knowledge and technologies (Yeoh 2004). The creation of new export-oriented firms has become a crucial matter of entrepreneurship that has attracted the interest of the academic community and policy makers in Greece, given its relevance for the productive restructuring and competitiveness of the Greek economy and economic growth in general. Besides, it has become clear that Greece's "new growth model" must translate into a higher share of exports in national output.

More generally, in an era of growing globalisation and ever-increasing international competition, new firms need to follow internationalisation and export enhancement strategies in order to successfully cope, ensure their long-term viability and exploit opportunities for market penetration beyond national borders (Porter 1986, 1990).

Especially in recent years, rapid technological advances, wide diffusion of Information and Communication Technologies (ICT) and digital development have enabled the emergence of new export-oriented firms (Oviatt and McDougall 1994). In other words, the widespread use of the Internet and the rapid development of e-commerce appear to open up major opportunities for new firms to penetrate, and establish themselves in foreign markets, as they provide unique, efficient and alternative channels for reaching customers at a global level.

Against this background, McDougall et al. (1994) and Oviatt and McDougall (2005) formulated a theoretical framework, under which international new ventures are capable of identifying opportunities across national borders, are alert to the possibilities of combining resources from different national markets and are also able to utilise at an international level competencies related to knowledge absorption and networking. As pointed out by Hessels and van Stel (2011), new export-oriented firms in the process of their internationalisation tend to develop specialised human capital and innovative skills. Therefore, the importance of new firms with export activity can largely be attributed to the catalytic role they can play in the diffusion of new knowledge and the absorption of technology, which in turn are expected to contribute to the introduction of new innovative solutions, improved productivity and thus economic growth.

The purpose of this empirical analysis is to investigate the factors behind the decision of

This empirical research forms part of a more extensive study entitled "Characteristics of New Firms in Greece", prepared by the Foundation for Economic and Industrial Research (IOBE) with the support of the Bank of Greece.



new firms in Greece to internationalise. Besides providing insights into a crucial aspect of the Greek economy, the empirical findings and conclusions of this research ultimately aim to provide policy recommendations on ways to strengthen businesses' export performance and the competitiveness of the domestic entrepreneurial system.

The article is structured as follows: Section 2 presents the basic theoretical and empirical background and provides a brief overview of the empirical literature on business export performance. Section 3 describes the data and the methodology employed, while Section 4 reports the empirical findings. Finally, Section 5 summarises the results of the research, along with some indicative and tentative policy recommendations for strengthening the export performance of new firms.

#### 2 A BRIEF REVIEW OF THE LITERATURE ON THE FACTORS AFFECTING THE EXPORT PERFORMANCE OF NEW FIRMS

The variables incorporated in the econometric model have been selected on the basis of data availability and the research questions examined, in combination with the theoretical and empirical background which has been developed by international literature in order to investigate the determinants that affect the export performance and the internationalisation of firms and which is briefly described below. Such determinants can be broadly divided into firm-specific factors and those associated with the overall environment in which a firm operates, including industry-specific and spatial characteristics.

#### 2.1 FIRM-SPECIFIC FACTORS

A key variable associated with the export performance of an enterprise is its age. Younger firms are generally thought to be more vulnerable and to need time to learn from their presence in the market, thus improving their management's attitudes and production methods. Zahra et al. (1997) and Calof (1994) find a positive relationship between age and export performance.

A second key variable examined in international literature as a possible factor affecting firms' export performance refers to size. A large body of empirical research finds a positive correlation between firm size and export performance (e.g. Kaynak and Kuan 1993, Moini 1995, Zahra et al. 1997). More generally, there is empirical evidence that larger firms are the most active abroad, irrespective of whether size is defined on the basis of turnover, total assets or staff numbers.

Furthermore, international literature investigating firms' decision to export argues that the high initial cost they face when planning to enter foreign markets may be an inhibiting factor. This cost is closely linked to the collection of information regarding the environment in foreign markets, the upgrading and adjustment of product quality, and distribution channels (Bernard and Jensen 2004, Roberts and Tybout 1997). In the same vein, Greenaway et al. (2007) investigate the role played by firms' financing constraints in their decision to internationalise. Their empirical findings suggest that highly liquid and low-leveraged firms tend to be export-oriented, while firms facing liquidity and indebtedness constraints tend to refrain from export activity.

#### 2.2 INDUSTRY-SPECIFIC FACTORS

According to Hensler et al. (1997), although firms operating in the same industry are not necessarily identical with one another, they tend to face the same survival probabilities and growth prospects and apply similar production methods. Consequently, the sectoral dimension should be given serious consideration when examining determinants of firm performance, such as export activity.

The sectoral dimensions considered in this empirical investigation refer to the industry's (i) ICT intensity and (ii) knowledge intensity. Given a lack of available data on the adoption of ICT and knowledge intensity at the firm level, an industry-level aggregation can lead to interesting findings. If the environment in which firms operate is characterised as highly ICT- or knowledge-intensive, then there is more room for firms also to adopt ICT or absorb knowledge in comparison with firms operating in an environment with low ICT and knowledge intensity (Giotopoulos and Fotopoulos 2010, Giotopoulos 2014).

Regarding the role of ICT in foreign market penetration by new firms, the relevant literature has pointed out about two decades ago – when information and communication technologies were at an early stage of development, before their current rapid growth and diffusion – that ICT and digital development greatly facilitate the emergence and strong presence of new export-oriented firms (Oviatt and McDougall 1994), mainly because the Internet offers efficient alternative channels for finding new customers in international markets.

With regard to knowledge-intensive firms, their activities according to Coviello (1994) are characterised by the high value added of scientific knowledge, which is in turn incorporated both in the provision of services and the processes for their outflow. According to Miles et al. (1995), firms active in the industry of knowledge-intensive business services (KIBS) rely heavily on professional knowledge and supply products that are sources of information and knowledge for their users, or use their knowledge to produce services which are intermediate inputs to their clients' production processes. Furthermore, KIBS firms represent an important supplier industry and, through the long-term bonds they establish with the manufacturing sector (B2B relationships), play a major role in the introduction of innovation, acting as "innovation bridges", as Czarnitzki and Spielkamp (2003) put it. Given its structural characteristics as described above, the KIBS industry is expected to create a favourable environment for firms' decision to export, by its potential to provide a critical mass of suppliers, and possible innovation facilitators for business clients across the borders.

#### **2.3 SPATIAL FACTORS**

Finally, when examining firm performance, the spatial dimension is also taken into account. In our analysis, one of the research questions posed is whether and how the export performance of new firms is influenced by the degree of urbanisation in the area where their headquarters and primary place of business are located.

According to international literature, the concentration of high-quality human resources, inter-firm networks and intra-regional knowledge spillovers enable firms located in metropolitan regions to exploit spatial externalities, known as "agglomeration economies" (see e.g. Jaffe et al. 1993, Krugman 1998). In the context of his new economic geography theory, Krugman (1998) argues that these externalities exist in highly urbanised regions which benefit from a large pool of high-quality labour, skills and expertise. Namely, in these areas there is a pool of specialised labour, with know-how and skills, which results in lower searching costs for firms. Moreover, when an economic activity is concentrated in a geographical area, it is highly likely that the suppliers of the sector concentrate in the specific geographical zone, thus providing the firms of the sector with the possibility to find specialised resources, raw materials and equipment at more competitive prices.

In this direction, Freeman et al. (2012) argue that large metropolitan centres present an advantage, as firms can more easily access export-related networks, infrastructures and consultancy structures or services and thus they are expected to achieve higher export performance in comparison with firms operating in less urbanised areas.



#### **3 DATA AND METHODOLOGY**

#### 3.1 DATA

The dependent variable of the model is the ratio of a firm's sales in international markets to its total turnover. Available data refer to the period 2010-2012 and make up a total sample of 8,764 observations for firms established in the period 2000-2004. These data have been derived from ICAP's Greek Financial Directory for the years 2012, 2013 and 2014. For the independent variables, as described right below, the source is the Infobank Hellastat database, which provides business financial data from published balance sheets and income statements. In addition, this database provides information on a firm's year of establishment, branch of economic activity and location.

#### **3.2 VARIABLES**

On the basis of the theoretical and empirical background discussed in Section 2, the model variables were constructed, as described in Tables 1-3.

Subsequently, Charts 1-3 plot the average export percentages by period of establishment, activity sector and size group, respectively.

It can be observed that export performance changes with the year of establishment, i.e. firm age (see Chart 1), as younger firms appear to have appreciably lower export percentages.

The analysis focuses on new firms established between 2000 and 2004, illustrating their average export percentages by sector of activity based on STAKOD 2003 classification.

ladie i Model variables		
Variable name	Variable measurement method	
Exports	Sales in foreign markets as a percentage of total turnover.	
Age	A natural logarithm of the age of a firm, which has been calculated as the difference of the year for which information has been retrieved from the corresponding balance sheet minus the year of the firm's establishment.	
Size group	Categorisation of firms based on the average turnover for the reviewed period, following the definition of the European Commission. Specifically, firms are divided into: a) very small (micro), with a turnover of up to $\notin 2$ million, b) small, with a turnover of $\notin 2-10$ million, c) medium-sized, with a turnover of $\notin 10-50$ million, and d) large, with a turnover higher than $\notin 50$ million. Categorical variable taking on the value 1 for very small firms, the value 2 for small firms, the value 3 for medium-sized firms and the value 4 for large firms.	
Liquidity	Current assets to short-term liabilities ratio.	
Indebtedness	Firm's total assets to total liabilities ratio.	
ICT-intensive manufacturing industries (ict-manuf dummy)	A dummy variable that takes on the value 1 when the firm belongs to an ICT-intensive manufacturing indus- try and 0 otherwise. According to the OECD, the industries which are defined as ict-manuf are those man- ufacturing "office, accounting and computing machinery", "insulated wire and cable", "electronic valves and tubes and other electronic components", "television and radio transmitters and receivers and record- ing apparatus" and "measuring, checking, testing instruments and appliances".	
ICT-intensive services industries (ict-serv dummy)	A dummy variable that takes on the value 1 when the firm belongs to an ICT-intensive services industry and 0 otherwise. According to the OECD, the industries which are defined as ict-serv are those practising "wholesaling of electrical house appliances", "telecommunications", "renting of office machinery and equipment" and "computer and related activities".	
Knowledge-intensive business services industries (kibs dummy)	A dummy variable that takes on the value 1 when firms operate in kibs sectors and the value 0 otherwise. According to Eurostat, the industries which are defined as kibs are those of "information technology", "Research & Development", "legal activities", "architectural and engineering activities", "consultancy serv- ices", "technical tests and analyses services" and "advertising services".	
Business location (location dummy)	A dummy variable that takes on the value 1 for the prefectures of Attica and Thessaloniki, namely the two largest urban centres, and the value 0 for the remaining prefectures.	

Source: Authors' calculations.



#### Table 2 Descriptive statistics of continuous variables, firms established in 2000-2004

Variable name	Number of observations	Mean value	Standard deviation
Exports	8,848	0.064	0.18
Age	135,980	5.68	3.26
Mean size*	96,076	3.29	35.1
Liquidity	84,526	0.62	0.32
Indebtedness	82,743	0.75	42.4

Source: Authors' calculations.

\* Average turnover per firm for the reviewed period (2010-2012) in EUR millions.

#### Table 3 Descriptive statistics of discrete variables, firms established in 2000-2004

Variable name	Number of observations	D <sub>k</sub> =1	$D_k = 0$
ICT-intensive manufacturing industries (ict-manuf dummy)	136,321	99.7%	0.3%
ICT-intensive services industries (ict-serv dummy)	136,321	97%	3%
Business knowledge-intensive services industries (kibs dummy)	136,321	91%	9%
Business location (location dummy)	136,321	36%	64%

Source: Authors' calculations.



## Chart 2 Average export percentage of new firms established in 2000-2004, by sector of activity

(%)







In this regard, certain sectors appear to be highly export-oriented relative to others. Specifically, the sectors of Agriculture and Livestock Breeding (Category A in STAKOD 2003), Fishing (Category B), Mines and Quarries (Category C) and finally Manufacturing (Category D) have considerably higher export percentages relative to the other sectors (see Chart 2).

Turning to firm size (see Chart 3), smaller firms (with a turnover of up to  $\notin 2$  million) have the lowest average export percentage. Generally, the average export percentage increases with size; however, larger firms (with a turnover of more than  $\notin 50$  million) have a lower export percentage in comparison with medium-sized firms (with a turnover of  $\notin 10$ million to  $\notin 15$  million).

#### **3.3 METHODOLOGY**

In order to investigate the determinants of export performance of new firms, we employed an unbalanced panel data, tested for heterogeneity (Arellano and Bover 1995, Baltagi



2008). The function estimated has the following general form:

exports = f {size group, age, liquidity, indebtedness, ict-manuf dummy, ict-serv dummy, kibs dummy, location dummy}

The model was estimated using the fixed effects approach, in which the constant term changes per panel unit (in our analysis, per firm), as well as the random effects assumption, in which the constant term is common to all panel entities and panel differences are considered to change randomly, incorporated in the residues of the regression.

In both cases, a sectoral clustering is applied to account for any within-panel correlation, enabling a better estimation of standard errors. The selection between the two models is given by the Hausman test. The result of the test is  $\chi^2(3)=3.81$  and  $Prob>\chi^2=0.28$ , showing that the random effects model is more appropriate for interpreting the relationship between exports and other variables. Besides, the random effects method requires the estimation of fewer parameters and thus affords higher degrees of freedom and lower variance.

Before proceeding to the interpretation of the results, we note that the Wald statistical test rejects the hypothesis that the results are jointly statistically insignificant.

#### **4 EMPIRICAL RESULTS**

Looking at the empirical results from the random effects method for the entire sample (see second column in Table 4), we can reach the following conclusions. We can observe that the location variable has a negative sign and is statistically significant at the 1% level. This means that firms located in regional Greece, namely outside the prefectures of Attica and Thessaloniki, demonstrate higher penetration of foreign markets. A possible interpretation of this empirical finding could be the fact that the export activity of Greek firms focuses mainly on agricultural products, metal ores, processed food and certain other manufacturing products, while the sectoral structure of exports from urban areas is dominated by services.

At the other end of the spectrum, the coefficient of age has, unsurprisingly, a positive sign at a significance level of 1%. This finding is in line with the international literature. Specifically, Calof (1994) puts forward theoretical arguments suggesting that firms' export performance tends to strengthen as their life cycle progresses. As firms grow in age and establish themselves in the market, export orientation increasingly becomes a sustainable strategic option.

Similarly, the coefficient of firm size (by size group) is positive and statistically significant at the 1% level. This result is explained by the fact that smaller firms do not have the dynamism required in order to turn to foreign markets. By contrast, the larger a firm is, the more its resources and the less its scope for exploiting growth opportunities in the domestic context (Calof 1994). Furthermore, as a firm grows, the higher its ability is to successfully overcome potential barriers to internationalisation (Zahra et al. 1997).

Regarding ICT-related characteristics, in firms in both the Manufacturing and the Services sectors, ICT intensity is positively linked to export orientation, testing for effects of the other explanatory variables (especially firm size) in the model. Specifically, if a manufacturing firm shifts from *non-ict manuf* to *ictmanuf* activities, its degree of export orientation is expected to increase by 0.43 unit (or 43 percentage points). Lesser, but equally statistically significant (at the 1% level), is the effect of the *ict-serv* variable on the degree of export orientation.

The above result may be explained by the fact that technology is a very important source of competitive advantage in international markets (Miller 1994). According to Ito and Pucik (1993), technological specialisation is expected

## Table 4 Determinants of export performance– Random effects model for firms establishedin 2000-2004

Dependent variable: exports	Total sample	Manufacturing
location	-0.032*** (0.006)	-0.045*** (0.020)
age	0.030*** (0.007)	0.082*** (0.023)
size group	0.033*** (0.004)	0.075*** (0.015)
ict-manuf	0.434*** (0.072)	0.343*** (0.112)
ict-serv	0.042*** (0.017)	-
kibs	-0.028*** (0.011)	-
indebtedness	-0.007* (0.003)	-0.027* (0.015)
liquidity	0.013** (0.0078)	-0.040 (0.032)
constant term	-0.041*** (0.017)	-0.079 (0.061)
Number of observations	8764	1863
Period	2010-2012	2010-2012
Wald test (P-value)	163.93 (0.00)	56.00 (0.00)
Hausman test (P-value)	3.81 (0.28)	2.82 (0.42)
LM Test (P-value)	6467.06 (0.00)	1308.48 (0.00)
Mean VIF	4.46	6.56

Notes: \*, \*\*, \*\*\* denote statistical significance at a level of 10%, 5% and 1% level, respectively. The standard error is shown in parentheses, unless otherwise indicated. Source: Authors' calculations.

to be positively linked with the export performance of new firms, as the new firms which specialise in the output of ICT-intensive goods and services are expected to have more possibilities to export in comparison with firms specialising in low ICT-intensity products (Samiee and Walters 1990). A considerable body of empirical literature supports the existence of this relationship (e.g. Cavusgil 1084, Moini 1995, Samiee and Walters 1990, Zahra et al. 1997).

Knowledge-intensity characteristics (kibs: Knowledge Intensive Business Services)



appear to be statistically significant at a level of 1%, but with a negative sign. This suggests that knowledge-intensive industries are less export-oriented, as expected by their nature, given that most industries in the services sector are largely characterised as non-tradeable.

Firm indebtedness is found to be negatively correlated with export performance at a significance level of 10%. In other words, when a firm has high debt obligations relative to its own funds, this poses difficulties to export activity. Finally, as expected, liquidity is a statistically significant determinant of export performance, lending support to the view that export-oriented businesses base their export activity on the existence of liquidity.

The interesting results presented above can be interpreted in the light of the international literature exploring the impact of financial constraints on export performance. Specifically, Melitz (2003) points out the role of sunk cost as an obstacle to the internationalisation of young firms at the early stages of their life cycle. Moreover, the existence of information asymmetries in capital markets highlights the crucial importance of financial factors as determinants of export behaviour (e.g. Chaney 2005, Manova 2006). In this context, a number of empirical studies confirm that financially sound firms are more likely to export. Accordingly, financial constraints act as a barrier to foreign market penetration, while better access to external financing can considerably increase the probability that a firm starts to export and also shortens the time before a firm decides to do so (Bellone et al. 2010).

In order to identify any multicollinearity problems and ensure consistency of estimators, we observe the test values *1/VIF* (VIF: Variance Inflation Factor) and come to the conclusion that the econometric model we have estimated is free of multicollinearity problems.

Alternatively to the random effects model and once the fixed effects model has been rejected

through the Hausman test, we perform a Breusch-Pagan test with a Lagrange multiplier (or LM test) to check the appropriateness of the model versus a simple OLS model. The result of the test rejects the null hypothesis that there is no statistically significant difference across firms (no panel effect), consequently the selection of the random effects model is deemed to be appropriate.

In order to test the robustness of our results, we perform additional estimations using alternative approaches enabling to detect any heterogeneity and/or heteroskedasticity problems. As a first step, we re-estimate our random effects model by selecting grouping per sector of activity. The results of this process, however, revealed fewer statistically significant factors and a shorter confidence interval, indicating heterogeneity across sectors of activity. This is so because, among the sectors examined, there are some with stronger export activity, such as the manufacturing sector.

Then, by the same procedure as the one we applied to the total sample (2000-2004), we focus on manufacturing firms only and perform estimations using the random and fixed effects methods. The remaining sectors do not provide a representative sample that would allow us to draw reliable conclusions.

The sample consists of 1,863 observations. On the basis of the Hausman test results, the random effects model was also selected in this analysis as the most appropriate one.

In the case of the manufacturing sample, with the exceptions of the liquidity variable which was not found to be statistically significant and of the indebtedness variable which is statistically significant at a level of 10%, all the remaining variables are shown to be statistically significant at a level of 1%, just as in the total sample (see third column in Table 4).

Closing the section of empirical results, it is worth noting that the results for the subsample of young firms (2000-2004) were confirmed



with the same significance and the same signs for the total sample of firms (2000-2012).

#### **5** CONCLUSIONS

The export performance of a firm, as shown by the model analysed, depends to a large extent on the sector of its activity. Greater export orientation typically characterises those firms in the Primary Sector or Manufacturing, which, although obviously not providing knowledge-intensive business services, possess Information and Communications Technology.

The size of a firm is also a determinant of export orientation, with larger firms appearing to be more export-oriented. Similar conclusions are drawn also for firm age. The firms that are already well-established in the market tend to be more successful in penetrating markets abroad. A necessary factor behind increased export activity is liquidity, as well as low indebtedness.

Against this background, the analysis could also highlight the importance of the activation and development of effective advisory structures for new firms with a view to enhancing their export performance. A policy in this direction should include effective provision of supportive services, in terms of: (a) facilitating the transfer of information and knowledge regarding foreign markets and technology demand; (b) helping firms to develop strategic action plans with respect to international activities; (c) providing tools for networking with potential strategic business partners already operating in foreign markets; (d) establishing a practical business guide for businesses aspiring to expand their activities to other countries inside and outside the European Union; (e) removing potential legal obstacles; and (f) raising awareness of finance options for prospective exporters.



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### THE TRANSITION TO THE NEW METHODOLOGY FOR THE COMPILATION OF BALANCE OF PAYMENTS STATISTICS - BPM6

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#### **I** INTRODUCTION

As from 2015, the Bank of Greece (BoG) started publishing the balance of payments and international investment position statistics using the new methodology that was developed by the International Monetary Fund (IMF) and described in the sixth edition of the Fund's Balance of Payments and International Investment Position Manual (BPM6). This manual establishes international standards for the compilation of statistics on the balance of payments (b.o.p.) and the international investment position (i.i.p.).

The IMF released the sixth edition of that manual (BPM6) in 2009, replacing the fifth edition which dated back to 1993. The overall structure of the balance of payments, comprising the current account, the capital account and the financial account, remained unchanged in the latest edition. However, the existing statistical framework for recording and capturing international economic relations was modified to take into account both technical and economic changes. New sub-categories and classifications, more exhaustive analyses, as well as the inclusion of new types of transactions which were previously not recorded, enable the provision of more detailed statistical data. Besides, given that the BPM6 methodology was designed to harmonise b.o.p. and i.i.p. statistics with national accounts, the concepts, nomenclature and data coding structures are now fully consistent across the two statistical approaches.

The new rules are legally binding on the Member States of the European Union (EU) under the relevant Regulation of the European Parliament and of the Council, as amended by the European Commission.<sup>1</sup> Furthermore, the statistical reporting obligations of the Eurosystem's central banks to the European Central Bank (ECB) are specified in the relevant ECB Guidelines.<sup>2</sup> All EU countries gradually adopted the sixth edition of the manual during 2014, while the ECB and Eurostat first published the balance of payments for the euro area and the EU in line with the new rules at end-2014.

The balance of payments methodology was purposely revised in parallel with the introduction of the new methodology for national accounts, in order to achieve greater consistency in terms of terminology and recording of economic aggregates. It should be noted that the European Commission, the International Monetary Fund (IMF), the Organisation for Economic Co-operation and Development (OECD), the United Nations (UN) and the World Bank had jointly revised and published the new System of National Accounts in 2008 (SNA 2008).<sup>3</sup> For EU Member States in particular, accounting rules are determined with greater accuracy and detail relative to ESA 2010,<sup>4</sup> and the transition to ESA 2010 occurred during 2014, in tandem with the changeover to the new BPM6 methodology.

<sup>4</sup> Regulation (EU) No 549/2013 of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union.



<sup>1</sup> Regulation (EC) No 184/2005 of the European Parliament and of the Council of 12 January 2005 on Community statistics concerning balance of payments, international trade in services and foreign direct investment, and Commission Regulation (EU) No 555/2012 of 22 June 2012 amending Regulation (EC) No 184/2005 of the European Parliament and of the Council on Community statistics concerning balance of payments, international trade in services and foreign direct investment, as regards the update of data requirements and definitions.

<sup>2</sup> Guideline ECB/2011/23 of 9 December 2011 on the statistical reporting requirements of the European Central Bank in the field of external statistics, and Guideline ECB/2013/25 of 30 July 2013 amending Guideline ECB/2011/23.

<sup>3</sup> European Commission, IMF, OECD, UN, World Bank (2009), System of National Accounts 2008 (2008 SNA).

In the case of Greece, the changeover to the new BPM6 methodology was also accompanied by another major change, which is mainly associated with the need to bring b.o.p. statistics into closer alignment with national accounts. More specifically, settlements data, which were formerly used by the BoG for the compilation of the balance of goods, were replaced by external trade data from the Hellenic Statistical Authority (ELSTAT), while at the same time ELSTAT estimates of illicit trade in goods (based on National Accounts) were included in imports of goods. As a result of these changes, the current account was revised, along with the current account-to-GDP ratio, which is monitored by the European Commission under the Macroeconomic Imbalance Procedure (MIP).<sup>5</sup> However, an analysis of the revised time series since 2002 shows that significant economic adjustment has been gradually achieved in Greece towards a close-tobalance current account equilibrium.

The objectives of this study are to present the changes introduced by the adoption of the new BPM6 manual (Section 2), to describe how ELSTAT data were incorporated into the balance of goods (Section 3) and to compare the outcomes of such changes with the old series of b.o.p. statistics (Section 4).

#### 2 KEY CHANGES INTRODUCED BY THE BPM6

The latest edition of the IMF's manual takes into account important developments in the global economy since the release of the fifth edition in the early 1990s (BPM5 1993).

The key factors that influenced the revision are associated with globalisation, which is marked by the increased use of cross-border production processes, complex international corporate structures and international labour mobility.

In the context of globalised economies, the focus is shifting towards balance sheet data, i.e. data on outstanding assets and liabilities, as a tool for assessing global economic developments, the degree of an economy's openness, the risk level and the duration of an economic event. These data are reflected in the international investment position and therefore the BPM6 provides a much more extensive coverage of the international investment position relative to the previous manual.

Furthermore, the emergence of increasingly complex financial instruments due to technological advances and financial innovation called for an update to the statistical recording of such instruments, with a view to better monitoring them.

#### 2.1 KEY CHANGES IN THE GOODS AND SERVICES ACCOUNT

The BPM6 redefines the concepts of goods and services (see Table 1). The balance of goods records flows related to transactions transferring the ownership of goods between residents and non-residents (change of ownership principle). As a result, merchanting transactions,<sup>6</sup> as well as goods for processing or repair are reclassified.

Under the old methodology, merchanting had the form of a resale service, in which goods were purchased and then resold without any change in their condition, and such transactions were included in the balance of services. By contrast, the new methodology places emphasis on the change of ownership of goods and therefore merchanting is classified as a separate sub-category under the balance of goods. Goods acquired under merchanting are negative exports (rather than imports), since they are purchased for the sole purpose of being resold (positive exports).<sup>7</sup> This change



<sup>5</sup> Regulation (EU) No 1176/2011 of the European Parliament and of the Council of 16 November 2011 on the prevention and correction of macroeconomic imbalances. See also "Scoreboard for the Surveillance of Macroeconomic Imbalances", European Economy, Occasional Papers, 92, February 2012.

<sup>6</sup> Merchanting is defined as the purchase of goods by a resident (of the compiling economy) from a non-resident, combined with the subsequent resale of the same goods to another non-resident without the goods being present in the compiling economy.

<sup>7</sup> Net exports of goods under merchanting, i.e. sales minus purchases of goods, may be negative in some cases, as a result of losses or changes in inventories.

#### Table I Key changes associated with the transition to the BPM6

	BPM5		BPM6
CURRENT ACCOUN			
Goods	General merchandise	Goods	General merchandise of which goods procured in ports by carriers
	Goods procured in ports		Merchanting
	Repairs	7	
	Processing		
Services		Services	Maintenance and repair services
			Manufacturing
	Transport		Transport of which postal/courier services
	Travel services	/	Travel services
	Construction		Construction
	Insurance and pension services		Insurance and pension services
	Financial services	1	Financial services of which FISIM
	Charges for the use of intellectual property (royalties)		Charges for the use of intellectual property (royalties)
	Computer and information services		Telecommunications, computer, and informa- tion services
	Communication of which postal/courier services of which telecommunications		
	Other business services / of which merchanting		Other business services
	Personal, cultural, and recreational services		Personal, cultural, and recreational services
	General government goods and services		General government goods and services
Income	Labour income	Primary income	Compensation of employees
	Investment income / including FISIM		Investment income excluding FISIM
		*	Other primary income of which part of former current transfers to general government of which rent
Current transfers	Current transfers to general government	Secondary income	Part of former current transfers to general government
	Emigrants' remittances		Emigrants' remittances
	Other		Other
FINANCIAL ACCOUNT			
Direct investment	By residents abroad	Direct investment	Assets
	By non-residents in Greece		Liabilities
Portfolio investment	Assets	Portfolio investment	Assets
	Liabilities		Liabilities
Financial derivatives		Financial derivative	S
Other investment	Assets	Other investment	Assets of which euro banknotes
	Liabilities		Liabilities of which euro banknotes of which special drawing rights (SDRs)
Change in reserve	assets	Change in reserve as	ssets



does not affect the current account. In the case of Greece in particular, the balance of goods has also remained unaffected, as the bulk of merchanting transactions was already recorded under goods in the Greek balance of payments.

Under the new methodology, net exports of goods for processing or repair are reclassified from goods to services. According to the old methodology, goods for processing, which changes the condition of the goods but not their ownership, would be recorded in the services account, as the value of the service rendered was included in the value of the merchandise. Under the BPM6, goods for processing are recorded in services under "manufacturing services on physical inputs owned by others". Since there is no change of ownership, there is no need to record them in international transactions. The same principle also applies for cross-border repairs of goods.

In general, the application of the change of ownership principle in the balance of payments led to increased theoretical differences between b.o.p. and external trade statistics. Such differences can be identified in cross-border transactions in goods (a key item in external trade statistics) without any change of ownership between residents and non-residents. For a smooth transition from external trade data to the balance of goods, international organisations have suggested a number of statistical adjustments, which will be further discussed in the second part of this paper, describing the implications arising from the inclusion of ELSTAT external trade statistics in the balance of goods.

The changeover to the new methodology also requires a number of reclassifications in the services account. More specifically, "communication" is abolished, while on the one hand postal/courier services are moved to "transport" and on the other hand telecommunications are moved to "telecommunications, computer, and information services". As regards financial services, in addition to those charged for by explicit charges (e.g. commission fees), the concept of financial intermediation services indirectly measured (FISIM) is also introduced. Financial institutions provide certain financial services for which they are indirectly paid through the interest rate margin. In more detail, actual interest can be seen as including two elements: an income element (pure interest) and a charge for a service (FISIM). In other words, banks offer lower deposit rates than lending rates; the resulting interest margins are partly used by banks to defray their expenses and to generate an operating surplus.

Under the old methodology, FISIM were not shown separately from actual interest and thus were included in the income account rather than in financial services. Under the BPM6, FISIM are calculated on the basis of loans from and deposits with financial institutions, and are recorded under the services account. Pure interest as part of actual interest (excluding FISIM) continues to be included in the primary income account (income account in the BPM5).

FISIM are estimated by ELSTAT in the context of national accounts, using a model under which the differential between the actual interest rate and the reference rate (which does not include FISIM) is multiplied by the value of a deposit or loan. It should be noted that FISIM are not yet included in the balance of payments, as ELSTAT works together with the Bank of Greece on jointly revised estimates.

#### 2.2 THE CONCEPTS OF PRIMARY AND SECONDARY INCOME ACCOUNTS

Another important change associated with the classification and presentation of b.o.p. data concerns the introduction of two new components, namely the *primary income account* and the *secondary income account*, replacing the older ones, i.e. the income account and the current transfers account, respectively, so as to achieve greater consistency with national accounts.



The primary income account comprises flows that are related to income receivable by resident institutional units for their contribution to the production process (labour income) or for the provision of financial assets (investment income) or for renting natural resources to other institutional units (rent).

It consists of compensation of employees (wages, salaries), investment income (interest, dividends, profits) and other primary income, comprising flows which were previously classified under current transfers. The "other primary income" sub-category mainly refers to taxes and subsidies on products and production, as well as income receivable for renting natural resources (e.g. subsoil assets).

The secondary income account is conceptually closer to the previously used current transfers account. Nevertheless, this account will be presenting from now on fewer receipts, due to the fact that transfers from some EU funds (most notably the European Agricultural Guidance and Guarantee Fund – FEOGA) have been reclassified to other primary income.

#### 2.3 KEY CHANGES IN THE FINANCIAL ACCOUNT

#### 2.3.1 Change in the use of signs

The new BPM6 methodology places great emphasis on the relationship between financial account flows and outstanding assets and liabilities, as shown in the i.i.p. More specifically, changes in assets and liabilities over a given period can arise from transactions in the financial account or from revaluations and/or other statistical adjustments. In this vein, the use of signs in the financial account has changed to reflect increases/decreases in the i.i.p. (see Table 2). Net capital outflows increase net foreign assets and are now shown with a positive sign, as opposed to the previous practice. Thus, a negative sign in assets will no longer imply an increase in assets (outflow) and a positive sign in assets will no longer imply a decrease in assets (inflow). Conversely, a positive sign will denote an increase in assets, and a negative sign a decrease. Accordingly, a positive sign in liabilities will indicate their increase, whereas a negative sign will indicate their decrease.

The use of signs to denote increases/decreases in reserve assets is likewise changed. An increase in reserve assets is now shown with a positive sign, while a decrease in reserve assets is shown with a negative sign.

#### 2.3.2 Changes in foreign direct investment

Another relevant change in the presentation of data is the shift of foreign direct investment (FDI) statistics from the "directional principle" to the "assets/liability principle". More specifically, the main characteristic of the directional principle was the recording of data in net terms, i.e. the initial capital invested by the direct investor was recorded net of all reverse investment (from the direct investment enterprise to the direct investor).

According to the asset/liability principle that applies under the BPM6, the presentation of

## Table 2 Changes in the use of signs in the financial account as a result of the transition to the $\ensuremath{\mathsf{BPM6}}$

BPM5	BPM6
Financial account	Financial account
An increase in assets is shown with a negative sign ( - )	An increase in assets is shown with a positive sign ( + )
An increase in reserve assets is shown with a negative sign ( - )	An increase in reserve assets is shown with a positive sign ( $+$ )
An increase in liabilities is shown with a positive sign ( + )	An increase in liabilities is shown with a positive sign ( + )
An increase in net assets is shown with a negative sign ( - )	An increase in net assets is shown with a positive sign ( $+$ )



direct investment data depends on whether these constitute an asset or a liability of the reporting country. Against this backdrop, in the case of Greece for example, all residents' investment abroad is recorded under assets and all non-residents' investment in Greece is recorded under liabilities.

This presentation is most importantly useful because it is consistent with the overall presentation of the financial account and the i.i.p. Moreover, it is in line with the presentation of a company's balance sheet, which facilitates data comparability. It is pointed out that the new method does not affect the net balance of direct investment, but increases both assets and liabilities. However, it should be noted that the b.o.p. data for Greece are not significantly influenced by the application of this new principle.

#### 2.3.3 Changes in the statistical reporting of banknote issuance

Along with the transition to the BPM6 methodology, a number of additional changes are also introduced in the items of the financial account – specifically, in other investment – which are linked with recent ECB/Eurostat decisions on euro area countries' statistical reporting of banknote issuance.

The treatment of euro banknotes in the b.o.p. and the i.i.p. has so far relied on the assumption that the amount of euro banknotes actually put into circulation by each national central bank (NCB) and the amount held by residents of each country are equal to the legal issuance based on the NCB's key for subscription to the ECB's capital (Capital Share Mechanism). However, this recording did not take into account cross-border flows of banknotes after their issuance. At the same time, the counterpart transactions of the cross-border flows of banknotes (e.g. purchases of goods and services by tourists) were formerly recorded in the b.o.p. This situation led to an unbalanced recording, to the extent that crossborder flows of banknotes did not mirror the counterpart transactions.

To correct this and achieve consistency with the adjusted data of national Financial Accounts, the ECB and Eurostat jointly decided that the issues of banknotes above or below the key for subscription to the ECB's capital constitute liabilities (or assets) of member countries vis-à-vis the Eurosystem. Furthermore, the amount of euro banknotes held by residents of each member country, which are above or below the legal issuance on the basis of the Capital Share Mechanism, will constitute external assets or liabilities, respectively, of member countries.

The net effect of those two items corresponds to imports or exports of euro banknotes after their issuance, which should theoretically reflect an outward or inward transaction (paid for in banknotes and recorded in the b.o.p.).

So far, in Greece the b.o.p. and i.i.p. data did not include any adjustment related to banknotes, in line with the applicable practice. The change in the recording of such transactions under the BPM6 significantly affects gross flows and external positions, but has limited or no impact on net aggregates.

#### 2.3.4 Liabilities in special drawing rights (SDRs)

The allocation of SDRs to IMF members is now shown as a liability of the recipient under SDRs in other investment, with a corresponding entry under SDRs in reserve assets.

#### 3 INCORPORATION OF ELSTAT TRADE STATIS-TICS INTO THE COMPILATION OF THE BALANCE OF PAYMENTS

As part of the revision of the methodology for compiling the balance of payments, the Bank of Greece has incorporated ELSTAT trade statistics into the compilation of the balance of goods (which is a common practice in EU Member States), instead of the settlements data used until June 2015. This new practice brought about significant changes in the balance of goods, hence in the current account,



while changes in the services account were negligible.

As a result of this change, the same primary sources of data are now used in the compilation of both b.o.p. statistics and data on transactions with the rest of the world in national accounts. In more detail, data sources for goods, services and other services are ELSTAT trade statistics, the Border Survey on travel services conducted by the BoG, and the BoG's settlements data, respectively. It should be noted that any discrepancies between national accounts and the balance of payments stemmed from divergent methodological approaches and differences in the collection of data on transactions related to goods. At the same time, this change has greatly contributed to the harmonisation of methodologies for compiling balance of payments and national accounts.

The monthly data on the value of exports and imports published by ELSTAT are the main source of information about transactions that are related to merchandise and account for the bulk (over 90%) of export receipts and the import bill in the balance of goods.<sup>8</sup> However, a number of discrepancies from the monthly data released by ELSTAT may arise during the compilation of b.o.p. statistics.

External trade statistics include data on goods procured in ports and airports by carriers - mainly procurement of fuels by foreign shipping companies and airliners, which are recorded under exports – as well as data on goods for processing. Goods procured abroad by Greek carriers are not recorded by ELSTAT under imports, since data are not collected in the Greek customs. Therefore, for the compilation of the balance of payments, goods procured in ports by carriers on the basis of data collected by the BoG are classified under imports of goods. Data concerning goods for processing are excluded from the compilation of the balance of goods, although BoG data on processing and repair services are included in the services account, as mentioned above. In addition, the compilation of the balance of payments is based on data collected by the BoG concerning purchases and sales of ships (excluding data collected by ELSTAT) as well as merchanting transactions.

Moreover, with respect to imports, the compilation of the balance of payments requires a conversion of the value of exports reported by ELSTAT in CIF (cost, insurance, freight) terms into FOB (free on board) terms.<sup>9</sup> Finally, imports also include ELSTAT estimates of the value of undeclared imports, which relate mainly to illegal activities (illicit trade of alcoholic beverages, tobacco, narcotic drugs and other products, e.g. clothing).

#### 4 THE IMPLICATIONS OF THE CHANGEOVER TO THE NEW METHODOLOGY FOR B.O.P. STATISTICS IN 2002-2015

The most important changes in the revised b.o.p. data are due to the incorporation of ELSTAT data into the balance of goods as well as from the inclusion of ELSTAT estimates of transactions related to illicit trade in goods. In comparison with the formerly published data, the revised statistics point to a widening of the current account deficit (as well as of the deficit in the goods and services account, which constitutes its largest component) (see Charts 1

<sup>9</sup> This is achieved by applying a fixed 5% CIF/FOB conversion coefficient (i.e. FOB = (1-0.05)\*CIF). The resulting difference is allocated to transportation and insurance services and is recorded under the services account.



<sup>8</sup> Intra-EU trade statistics are based on data collected through a special document submitted by enterprises (Intrastat document) if the value of transactions is above the yearly statistical reporting threshold, as determined by ELSTAT. Transactions of a lower threshold value, which are not subject to an Intrastat document submission requirement, are estimated in accordance with EU Regulations, on the basis of the recapitulative statements of intra-Community supplies/deliveries and acquisitions that enterprises are required to submit to the Ministry of Finance. Statistics on imports and exports from and to non-EU countries (Extrastat) are based on data collected from customs authorities through the Single Administrative Document. Such statistics also include data from "incomplete customs declarations", which are supplemented and finalised and mostly concern oil products. Nevertheless, it should be noted that data on "oil products", as published by ELSTAT on a monthly basis, do not comprise codes not corresponding to oil products (such as anthracite and lignite) and electricity, but which are taken into account in the compilation of the balance of payments.

#### Chart I Current account and balance of goods and services







#### Chart 3 Exports and imports of goods



and 2). Yet, the trend has remained broadly unchanged, especially the positive trend observed over the 2009-2015 period, which saw the current account deficit as a percentage of GDP narrow by 15 percentage points and the deficit in the balance of goods by 8.5 percentage points. More specifically, exports of goods and services came to 30% of GDP in 2015, against 19% in 2009.

The revised data show an increase in both net exports and imports over the adjustment period, in the wake of the collapse of world trade in 2009 (see Chart 3). Relative to the profile of previous time series, the upward path of exports appears to have moderated since 2012 and imports have been declining at a slower pace, thereby resulting in a higher deficit in the balance of goods. In any event, the upward trend of exports after 2009 is also sustained by the inclusion of new data in the balance of payments and remains one of the key drivers of the improvement in the current account.

#### **5** CONCLUSIONS

The new methodology for compiling the balance of payments, as specified in the sixth edition of the Balance of Payments and International Investment Position Manual (BPM6), offers a comprehensive method for the recording and monitoring of changes in international transactions, which is of paramount importance for the detection of macroeconomic imbalances. Furthermore, it helps to achieve greater consistency between b.o.p. statistics and other macroeconomic statistics, most importantly national accounts.

The incorporation of ELSTAT external trade statistics into the balance of goods compiled by the Bank of Greece, which was concurrent with the transition to the BPM6, constitutes a major change in the methodology for the compilation of the balance of payments and the main factor behind the revision of aggregates in the balance of goods, hence in the current account.



The adoption of the new methodology resulted in the widening of the current account deficit. However, the analysis of the series that were compiled using the new methodology and which cover the 2002-2015 period reveals that considerable positive adjustment has been achieved in the Greek economy since 2009, leading the country to a close-to-balance current account equilibrium. Lastly, it should be noted that the transition to the new methodology (BPM6) is not yet finalised; it is rather part of an ongoing process, aimed at ensuring a more accurate recording of external trade data and at bringing them into closer alignment with national accounts. This should further enhance the information that is provided by the balance of payments and which is useful in assessing developments and policy making.



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# THE GREEK BRAIN DRAIN: THE NEW PATTERN OF GREEK EMIGRATION DURING THE RECENT CRISIS

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#### I INTRODUCTION

The role of human capital and knowledge in economic growth is a key element in the theory of "endogenous growth", as formulated by Romer (1986, 1989), Lucas (1988), Azariadis and Drazen (1990) and Becker (1993).<sup>1</sup> The main argument is that an economy that accumulates high-quality human capital and deploys it in the production process reaps the fruits of technological advancement, improves its productivity and competitiveness, and achieves high and sustainable growth rates. It is not by chance that the term "knowledge-driven or knowledge-based economy" (OECD 1996) has prevailed since mid-1990s, thereby confirming a link between market economy and knowledge. Knowledge, in the sense used here, contributes to the creation of new products and services, to a more efficient combination of labour and physical capital, and to innovation. The main carrier of knowledge is human capital. One of the State's top priorities is to create, maintain and safeguard the country's human capital.

2007 was the last year when the Greek economy posted a positive GDP growth rate. Ever since, the country has been experiencing a protracted recession, which is due not only to the impacts of the global financial crisis of 2008, but also to its serious and long-standing endogenous weaknesses. Following a shortlived recovery in 2014, the Greek economy fell back into recession in 2015 and, as suggested by the latest available forecasts, is expected to remain on a recessionary path through 2016.<sup>2</sup> The factors behind the recession relapse were the political instability over the past year, the protracted negotiations with the country's creditors in the first half of 2015 which led to the imposition of capital controls, as well as the new economic adjustment measures that were adopted in the context of the third financial assistance programme for Greece, to help the country achieve the revised fiscal targets.<sup>3</sup> Besides, the long delays in the completion of the review of the programme and in the signing of a new agreement blocked the disbursement of financial assistance over a prolonged period, increased investor uncertainty and exacerbated the economic downturn.

A direct implication of the prolonged international and domestic adverse macroeconomic environment is soaring unemployment, especially among the youth, at unprecedented levels. Mass unemployment has inevitably led to a loss of human capital, which manifests itself in two different forms: first, as skills atrophy, either as a result of a long period of inactivity and idleness or because of brain waste, and, second, as brain drain, i.e. a mass exodus of the healthiest and most productive part of Greece's workforce from the country.

Human capital is defined as all the knowledge, abilities, skills and training obtained through education and work experience. It can be quantified as the current value of expected returns throughout one's work life. It is known both in

- 1 The "new theory of economic growth" is opposed to the neoclassical theory, which overstates the role of physical capital as a key driver of growth. See also Mankiw et al. (1992) and Jones (2002). Its modern formulation is based on earlier studies by Arrow (1965), Uzawa (1965), Nelson and Phelps (1966) and Welch (1970).
- 2 In 2014, annual GDP growth turned slightly positive (0.7%) for the first time since 2007. In the second half of 2015, the economy sank once again into recession (-1.9%), and the annual rate of decline in real GDP stood at -0.2%. A mild recession of around -0.3% is projected for 2016. See European Commission, Spring 2016 Economic Forecast, 3 May.
- 3 On the basis of developments in stock and flow variables, the level of economic prosperity in Greece has worsened visibly. Between 2008 and 2014, net national disposable income shrank by 27%, household final consumption decreased by 19%, national saving as a percentage of GDP turned even more negative, dropping further from -6% to -9.5%, and households lost one third of their net total wealth (property values, financial assets, liquid assets). See ELSTAT, Eurostat, OECD, as well as Credit Suisse (2015).



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theory and in practice that when labour demand declines, i.e. when the labour demand curve shifts downwards and to the left for a given level of labour supply, the labour market clears at a lower point which combines lower average wages and lower employment, thus resulting in higher unemployment. In conditions of weakening labour demand, the issue of unemployment intensifies in terms of both magnitude and persistence. This leads to economic migration, which entails a mass shift of high-skilled unemployed persons towards the economies that are characterised by strong labour demand and better expected returns/earnings. As a rule, emigration concerns that part of the workforce which has obtained high-quality educational qualifications in the country of origin, prior to the start of the migration flow, and is highly specialised. In other words, it concerns the most competent and productive part of the domestic workforce.

Nowadays, in the context of our globalised economy and society which is marked by an unrestricted and free movement of goods, services and capital, human capital flows across countries have picked up, although their size and direction continue to be largely determined by factors that are directly linked with the international and/or local culture and macroeconomic conjuncture, as well as by the migration policies that are pursued in host countries (quotas, special labour arrangements) and in origin countries (incentives for stay or repatriation, taxation of incomes acquired abroad).<sup>4</sup>

In crisis-ridden Greece, the phenomenon of human capital flight, commonly known as "brain drain", has grown to large proportions. Between 2008 and 2013, almost 223 thousand Greek residents aged 25-39 left the country permanently for more advanced economies, in search of employment, better pay and better social and economic prospects. This is the generation that was hit the hardest by the crisis, also known as "generation E" (expats) or "generation G" (young, talented and Greek) or "generation We". The escalating Greek brain

drain has received frequent, almost daily, coverage by international and domestic media. Over the last two years, several sample surveys have been conducted, attempting to investigate the phenomenon and its qualitative characteristics (see EUI 2013, ICAP Group 2015 and 2016, Endeavor Greece 2014, Labrianidis and Vogiatzis 2013, Damanakis et al. 2014, Labrianidis and Pratsinakis 2016). A common finding of this research is that the new wave of migration concerns young, single and highskilled persons. The most important underlying factors have been found to include high unemployment, the current difficult economic situation and a lack of policy focus on promoting excellence and providing opportunities for advancement.

The intensity and strong dynamics of the phenomenon point to an urgent need, first, to delineate its various aspects and patterns and map its characteristics; second, to explore the reasons why the Greek brain drain has emerged at the current juncture; and, third, to identify its impacts on the domestic economy. This paper attempts to answer these questions and derive a minimum set of six policy implications that could help contain the phenomenon.

#### 2 MODERN GREEK EMIGANTS

Emigration and poverty are unquestionably the two most pernicious social by-products of a protracted economic crisis. According to the latest available statistics, in 2013 the number of Greek emigrants aged 15-64 almost tripled relative to 2008, exceeding 100 thousand. On a cumulative basis, during the 2008-2013 crisis, 427 thousand Greek residents left the country



<sup>4</sup> Between 1990 and 2013, the number of migrants worldwide increased by 50%, reaching 232 million (see United Nations 2013 and OECD 2015), with six out of ten living and working in advanced economies and three out of ten in Europe. In OECD countries, the number of migrants aged 15 and above exceeded 100 million, with three out of ten being tertiary education graduates. This latter group accounts for 11% of the population of host countries. More specifically, in 2010-2011, more than one third of those migrants originated from European countries, representing the third highest percentage of tertiary educated migrants after Africans and Latin Americans (5.3%, against 10.8% and 7.4%, respectively. See Arslan et al. 2014).

permanently.<sup>5</sup> In addition, between 2010 and 2013, nearly 209 thousand emigrants were Greek citizens and almost 187 thousand emigrants were non-Greek citizens but permanent and legal residents of Greece. In 2014, the estimated total outflow was 106.8 thousand people (ELSTAT).

In more detail, according to web traffic data on the UK job site CV-library, the number of Greek visitors looking for jobs in the UK doubled in July 2015, year-on-year, recording an average weekly increase of 26%, whereas historical data typically point to a normal decline over the summer months across countries.6 On the basis of statistical data from the European Centre for the Development of Vocational Training (CEDEFOP), in 2014 the number of visits from Greece associated with Europass website activity remained elevated (310.5 thousand), close to the 2013 level (327.4 thousand), while in the first seven months of 2015 it fell to 190.5 thousand, but still remained almost double compared with 2008 as a whole. Besides, the results of a survey conducted by Endeavor Greece (2014) show that 46% of young respondents aged 18-34 consider relocating abroad and 33% are ready to relocate within the next year. Against this backdrop, it becomes apparent that the Greek economy and society is once again faced by a new wave of mass emigration.

Historically and traditionally, Greece is among the countries with a rich experience from emigration. As illustrated in Chart 1, over the past 100 years, Greece has experienced three major phases of mass emigration. Of course, the third phase is still underway, but the two previous phases reveal three salient features of the phenomenon: (a) its long duration (persistence);<sup>7</sup> (b) its intensity, as measured by the size of the outflow; and (c) a time lag of over two years, on average, after a soaring unemployment rate has been recorded.

For the purposes of the present analysis, an *emigration phase* starts in the year which sees an abrupt and sharp year-on-year increase of at

least 50% in the flow of emigrants, following at least two consecutive years of low and stable outflows. The phase ends in the year when the flow of emigrants falls by at least 50% year-onyear, followed by two consecutive years in which the size of the outflow remains unchanged at the new low level. On the basis of this criterion,8 it is easy to identify three major phases of emigration, as shown in Chart 1: 1903-1917, 1960-1972 and 2010-2013. The factors underlying each wave of Greek emigration were several and different, but economic factors were predominant.9 It is no coincidence that all three phases occurred after a serious recessionary disruption which widened the country's prosperity gap vis-à-vis the more advanced countries and triggered a mass exodus of, mainly young, people seeking new career and advancement opportunities. It is worth drawing a comparison between the earlier two emigration waves and the current migration outflow in terms of their qualitative characteristics. During the first wave, the main destination countries were the so-called "transoceanic countries" (US, Australia, Canada, Brazil and South Africa). Seven out of 10 emigrants were aged 15-44, less than 2 in 10 were women and the vast majority were unskilled workers and farmers, of a low educational level, who mainly worked in host countries as domestic servants and industrial workers. For a thorough analysis of the qualitative characteristics of the first emigration wave, see Tastsoglou and Stubos (1992). The second phase of emigration mainly concerned young people, aged 20-34 (7 out of 10), 5 in 10 reported to be manual workers, while 4 in 10 had no work experience or professional qualifications. Six out of 10 moved to Germany and Belgium, finding jobs as industrial workers. By contrast, the current outflow concerns young

**<sup>9</sup>** The second wave of emigration, in 1969-1971, was partly due to political reasons (imposition of the military junta in 1967).



<sup>5</sup> Data (based on census statistics in the countries of origin and residence) refer to the estimated migration outflow of Greek residents.
6 See CV-library press release, 21 July 2015.

<sup>7</sup> In each phase, the migration outflow continued to rise for an average period of 10 years.

<sup>8</sup> The criterion, albeit ad hoc, describes adequately both historical emigration waves in 1903-1917 and 1960-1972. Any isolated peaks in the migration outflow, which however do not last for more than one or two years in a row, are probably associated with major political and national developments, such as in 1920-1921 and 1955-1956.

#### Chart I Emigration phases



Sources: Calculations based on data from ELSTAT, Statistical Yearbook (digital library); Eurostat, Emigration Statistics; OECD; Kostelenos et al. (2007); SEEMHN SEE Macro History Database (2014); NBER Historical Database; and Maddison (2003). Notes: Emigrants: Greek residents, all age groups. Referring to legal or permanent residents who left the country and stayed abroad for over a year. Seamen, visitors-tourists and commercial representatives are not taken into account. For the period 1932-1938, both new emigrants and remigrants (i.e. those who returned for a limited period of time and left again) are included. Until 1924 only the transoceanic countries are included, for the period 1932-1938 all "migration countries" (transoceanic, European and Mediterranean countries), for the period 1946-1954 all non-European and non-Mediterranean countries, and from 1955 onwards all countries. In 1977 the collection of data was discontinued. Prosperity gap in terms of GDP per capita in US dollars, PP for the years 1990 and 2008. 1903-1917 and 1963-1972: % of G4=100 (US, UK, France and Germany), 2010-2013: % of OECD=100 (34 countries).

educated people having at least two years of work experience in Greece, who are mainly headed for Germany, the UK and the United Arab Emirates.<sup>10</sup>

#### Flows

Migration is typically driven by a nexus of economic, social and political factors existing in the country of origin (push factors) and/or in the country of destination (pull factors). High unemployment, political instability, deprivation of fundamental human rights, armed conflict, lack of physical safety, socio-economic backwardness, and lack of opportunities for advancement and prosperity constitute push factors usually from a developing country to a developed one. Pull factors include academic and career opportunities, better pay, better prospects for research and business activity, good working conditions, and political and economic stability. Traditionally, the Atlantic economy (i.e. the US and Europe) has attracted the bulk of migrants. Nevertheless, the relative economic prosperity and a developed welfare state, along with prospective strong labour demand on account of ageing population, make the EU economy the most attractive destination.

In 2013, almost 3.4 million people migrated to an EU Member State.<sup>11</sup> At the same time, at least 2.8 million emigrants moved from one EU country to another or outside the EU. Although most EU countries saw their migration inflows increase after a modest drop during the recession, Greece (as well as Bulgaria, Ireland, Spain, Cyprus, Croatia, Poland, Por-



<sup>10</sup> Triandafyllidou and Gropas (2014), ICAP Group (2015) and Labrianidis and Pratsinakis (2016).

<sup>11</sup> Eurostat. Of these people, 1.4 million originated from non-EU countries and 1.2 million from another EU Member State.

#### Chart 2 Emigrants by origin country (2013)

(total, flow, % of labour force)



Source: Calculations based on data from ELSTAT and Eurostat, Emigration Statistics. Notes: Long-term emigrants who left their origin country permanently and resided in another country for a period of 12 months or more. Labour force refers to the economically active population (employed and unemployed).



tugal, Romania, Estonia, Latvia and Lithuania) had net outflows.

As shown in Charts 2 and 3, among the 12 EU Member States with net migration outflows,



#### Chart 4 Migration of European tertiary education graduates (2010-2011)





Source: Calculations based on data from OECD-UNDESA (2015), OECD (2015), DIOC 2010/11, and Barro and Lee (1993). Notes: Long-term emigrants (who stayed abroad for a period of 12 months or more), tertiary education=levels 5-8, ISCED 2011, shortcycle tertiary education, Bachelor's, Master's and Doctoral or equivalent level, stock, by country of birth. Labour force refers to the economically active population (employed and unemployed).

Greece in 2013<sup>12</sup> had the fourth largest outflow of residents as a percentage of its worforce, after Cyprus, Ireland and Lithuania, and the third largest share of young emigrants, after Cyprus and Spain. Specifically, emigrants aged 15-64 corresponded to more than 2% of the country's workforce, while the share of young people at the most productive age of 25-39 exceeded 50% of total emigrants.

#### Stock

According to the 2010-11 census, the percentage of Greek tertiary education graduates who are currently residing in another OECD country was much lower than the respective average for a sample of 15 European countries and

12 The last year for which comparative data are available.




### Chart 5 Migration of European tertiary education female graduates (2010-2011)

Chart 6 Migration, unemployment and recession (2008-2014)



Source: Calculations based on data from ELSTAT and Eurostat, Emigration Statistics. Note: The number of emigrants in 2013 and the recession rate in 2014 are expressed on a cumulative basis.

almost half the French and UK percentages (see Chart 4). Besides, the respective percentage of female tertiary education graduates was the lowest among the 34 OECD countries (see Chart 5). This suggests that, on the basis of the latest census data that capture the stock variable, the mobility of highly educated Greek residents until 2010 was rather low. Satisfactory wages, the one-digit unemployment rate of tertiary education graduates, high public sector employment and the beneficial effects of the welfare state in Greece were inhibiting factors for the mobility of Greeks, compared with other advanced economies during the precrisis period.13 However, this picture changed dramatically after 2010.

Chart 6 plots the evolution of unemployment and GDP contraction (rate of recession) against the course of migration outflows dur-

<sup>13</sup> See European Commission (2010). According to Eurostat data, the unemployment rate of tertiary education graduates as a percentage of total active population (aged 15-64), in average annual terms, was 8.5% and 7.9% in 2007 and 2008, respectively, while for the age group of 25-39 it stood at 9.9% and 9.7%, respectively.



ing the crisis. Two points are readily apparent from the chart: first, although the number of observations is rather small, all three variables appear to co-move. In other words, it seems that the Greek economy and society "invested" in emigration to cope with soaring unemployment and a deep plunge into recession and poverty. A stable outflow of roughly 38 thousand people in 2008 and 2009 more than doubled in only two years (2010-2011) and exceeded 104 thousand in 201314, implying a cumulative outflow of almost 427 thousand overall between 2008 and 2014. Second, both emigration and unemployment, as social phenomena, lag behind GDP developments and are persistent. Although the Greek recession started in 2008, when GDP first contracted, and escalated in 2009 when the unemployment rate rose by two percentage points relative to 2008, the migration outflow remained virtually unchanged. With a lag of more than one year relative to the peak of unemployment, the migration outflow embarked on a steep upward path from 2010 onwards and persisted in the following years in spite of a gradual easing of the recession after 2012.

### 3 THE CURRENT PHENOMENON OF "BRAIN DRAIN" IN GREECE

### **3.1 DEFINITION**

Perhaps the oldest and most common debate in economic science is why some economies are rich and others are poor, and which policies a poor country should pursue to develop out of poverty. Economic theory explains that the educational level and quality of the workforce determine the economic development and prosperity gaps across countries. Thus, it suggests that poor countries which lag behind in terms of economic development should channel resources into upgrading education at all levels, as better education can raise the per capita income of those countries. However, it is not uncommon that talented and well-educated citizens of poor countries, after graduating from a university

in their home country, choose to work in a rich, advanced economy.

The term "brain drain" or "human capital flight/exodus" was popularised in the 1960s in the UK, when it was widely used to describe the influx of Indian scientists, notably doctors and engineers (see Cohen 1977), as well as in the 1990s in the US, to depict the mass inflow of healthcare professionals from Africa and Latin America. Ever since, the term "brain drain" has increasingly appeared in interational literature and can be defined as "a situation in which large numbers of educated and very skilled people leave their own country to live and work in another one where pay and conditions are better" (see Cambridge Advanced Learner's Dictionary and Thesaurus, Cambridge University Press).

Apart from the exodus of people, the term is also used to denote the social and economic losses entailed for those countries of origin that channel, on average, large amounts of public funds into education and skills. A direct effect of this phenomenon is that investment in education fails to deliver faster growth rates if a critical part of the country's high-skilled workforce moves afield. Furthermore, any efforts to address the emerging skill shortages through improved education are pointless, unless they are accompanied by strong disincentives to emigration (see Alpha Bank 2015, 2016, and Trachana 2013).

The losses sustained by the national economy can become clear using a static equilibrium model, as illustrated in Figure 1. It is widely accepted that skills and talents are not evenly distributed across a population; as a result, it is the specific skills of an individual that ultimately determine the expected return to education, whereas the cost remains unchanged. If migration is not possible or if there are no migration incentives, the expected return to education is determined by domestic wages:



<sup>14</sup> In 2013, 4 in 10 people were women and more than 1 in 2 were young, aged 25-39.

Expected return =  $W_D$ 

Otherwise, it is determined by wages in the destination country, i.e.

### Expected return = $p W_F + (1-p) W_D$

where p is the probability of skilled migration  $(0 \le p \le 1)$ , measured by the share of migrants in total domestic skilled labour force and determined endogenously, as it is conditional upon the immigration policy of the host country, e.g. numerical quotas restricting entry. Probability p is assumed to be equal across the more able and the less able groups; in other words, skilled migrants are randomly selected among the skilled population.

If p=0, then expected return =  $W_D$  and determines a level of quality  $Q^* < Qmax$  (see Figure 1) with an average level of quality  $(Q^* < Qmax)/2$ , where Qmax is the maximal level of labour force quality.

If  $0 \le p \le 1$ , i.e. during the period in which the migration of more educated and able people occurred, the expected benefit of education is the weighted average of wages in the origin and host countries:

Expected return =  $p W_F + (1-p) W_D$ 

determining a level of quality of the remaining domestic skilled labour force  $Q^*(Q^{**} < Q^* < Qmax)$  by an average level  $(Q^{**} < Qmax)/2$ , which is lower than in the case of no migration, since  $(Q^{**} < Q^*)$ . Therefore, any change in terms of quality  $(Q^{**} - Q^*)/2$  is negative and the final outcome is a lower stock of human capital.

The investigation of the brain drain dynamics reveals that during the first period of migration the expected gain is substantial, thus leading to increased demand for education and to a rise in the number of educated people in the following period (equilibrium  $A^*$ ). Yet, these increases are short-lived: as migration takes on mass proportions, the probability of migration

### Figure 1 Static equilibrium of an economy with migration and education



decreases as a result of stricter numerical quotas and less-than-expected wages on the back of increased supply of skilled people in the host country. This in turn leads to lower demand for education along with a decline in the quality of the labour force (equilibrium  $A^{**}$ ). In the long run, the economy is in equilibrium at a smaller size and worse quality of human capital (equilibrium to the left of  $A^{**}$ ).<sup>15</sup>

It is worth noting that after the second phase of Greek emigration in the 1960s and 1970s, which mainly concerned unskilled workers and farmers amid excess supply of cheap labour,<sup>16</sup> the phenomenon of brain drain was unknown to post-1974 Greece, as the young people who left the country for tertiary-education studies in the 1980s and 1990s tended to repatriate, lured by the positive growth rates that were recorded from mid-1990s onwards, as well as by the favourable working conditions which were comparable to those in advanced European countries. In this case, the economic benefits to the home country are straightforward, as the repatriated young sci-

**<sup>16</sup>** As a result of the generation of the so-called Baby boomers, as well as the low average educational level.



<sup>15</sup> For empirical evidence of the negative impact of mass migration on education and the growth rate, see Beine et al. (2003) and Lucas (2005).

entists made a major contribution to the economy, by increasing the domestic stock of scientific knowledge and expertise and serving as a vehicle for the transfer of technology and managerial know-how.

It was only after 2012 that the domestic version of the phenomenon started to attract the attention of international and domestic media.<sup>17</sup>

### **3.2 QUANTITATIVE DOCUMENTATION**

A quantitative documentation of the phenomenon requires comparable statistical data, which will enable not only to capture the phenomenon and monitor its evolution over time, but most notably to grasp its underlying factors. This is the only way to ensure appropriate policy design and implementation for effectively containing or even reversing the brain drain. For the purposes of the present analysis, we use the statistical databases of ELSTAT, Eurostat and OECD recording migration flows in the home and host country, respectively. Data on the qualitative characteristics of emigrants is derived from three surveys conducted by the University of Macedonia (Regional Development and Policy Unit, June 2015), the European University Institute in the context of the EUI Global Governance Programme (2013) and the University Research Institute EPI (2015, HO Survey), respectively.

Assuming that the value of human capital can be quantified using as a proxy the present value of workers' expected future earnings during their economically active lives, the declining path of per capita disposable income (see Matsaganis 2013) can be considered a strong motive for emigration. As shown in Chart 7, the two variables move in the opposite direction. The annual flow of Greek emigrants aged 25-39 increased from 20 thousand in 2008 to 53 thousand in 2013, while on a cumulative basis almost 223 thousand people of the same age group left the country permanently.<sup>18</sup> Over the same period, the gross disposable per capita income of Greek households declined from

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(2008 - 2013)

household gross disposable income per capita ----- (euro area-19=100, right-hand scale)

Chart 7 Youth migration and disposable income

Emigration Statistics, and OECD. Note: Disposable income in US dollars in terms of PPP, relative to the EA-19 average.

93.8% of the euro area-19 average in 2008 to just 68.8% in 2013, confirming the divergent path of the Greek economy vis-à-vis the euro area economy.

Another strong motive for emigration is protracted high unemployment. As shown in Chart 8, which plots the unemployment rate of young tertiary education graduates in the EU-28 for 2013 against the emigration rate of the same age and education group, the correlation between the two variables is positive and statistically significant. In Greece, almost 4 in 10 were unemployed, among whom 7 in 10 were



<sup>17</sup> The size and intensity of the outflow is evidenced by the fact that the term "Greek brain drain" is extensively used in international media reports. See Euronews, 24.4.2014; Der Spiegel, 10.4.2013, BBC News, 29.5.2013; The Economist, 10.7.2015.

<sup>18</sup> For a better understanding of the outflow size and its future implications for the domestic economy, it suffices to note that, on the basis of data from ELSTAT, the number of those who obtained a university degree, a master's degree or a PhD at the end of the academic year 2012-2013 stood at 42,852, while the number of active enrolments across all tertiary levels of education was 224,715.

### Chart 8 Unemployment and migration (EU-28, 2013)



long-term unemployed. Nearly 4 in 10 unemployed persons were tertiary education graduates, while more than 7 in 10 unemployed tertiary education graduates were aged 25-44. Although statistical data on the educational level are scarce, 88% of those who left the country permanently were Greek university graduates, 60% had a master's degree acquired abroad or in Greece, and 11% had a PhD acquired mostly abroad (see Triandafyllidou and Isaakyan 2014). The bulk of those who chose a European country as their destination headed for the UK, Germany and the Netherlands.

### 4 EDUCATION, HUMAN CAPITAL AND BRAIN DRAIN

The level of public spending on education is often seen as the key determinant of a country's educational level and hence of human capital formation, which constitutes a critical explanatory factor of economic growth rates. The view that has prevailed in the new economic growth theory suggests that poor devel-

oping countries can accelerate their growth rates by investing in human capital. Besides, people in these countries are highly motivated to study, as a higher educational achievement is typically associated with higher earnings. As shown in Chart 9, in Greece tertiary education graduates in 2013 were the best-paid among all educational attainment groups. The average earnings of a graduate across all tertiary levels of education and across age groups, albeit lower than the respective OECD average, was 1.4 times higher than the average earnings of an upper secondary or post-secondary non-tertiary education and almost double the earnings of lower secondary (compulsory) education graduates.19

Nevertheless, one should not overlook the importance of the quality of education offered, hence of the human capital generated. The link between education and production, the timely recognition of ongoing changes in the global labour market, the incentives provided to young graduates for entering and remaining in the domestic labour market and the adaptability of this market, as well as the willingness to implement business-friendly policies, all determine the qualitative characteristics of the existing stock of human capital. Although it is generally accepted that the unprecedented surge in youth unemployment is a symptom of the crisis and is due to a broad-based lack of demand for labour, the examination of the qualitative characteristics of unemployment and the education system is necessary for an indepth understanding of the factors behind the current migration phase.

Until 2008, when the lowest unemployment rate was recorded both in Greece and in the EU, higher education attainment was largely associated with lower unemployment for tertiary education graduates. As shown in Chart 10, in 2008 the unemployment rate of tertiary education graduates in Greece was the lowest

<sup>19</sup> For the role of the level of earnings as an incentive for participation in tertiary education in Greece, see Papapetrou (2007), Mitrakos, Tsakloglou and Cholezas (2010) and Livanos and Pouliakas (2011).



## Chart 9 Wages and educational level (2013)



Source: OECD, *Education at a glance 2015, OECD Indicators: Greece*, Table A61a.

Notes: The average wages of the respective group in 34 OECD countries for the same year are given in brackets, on the basis of the 2011 International Standard Classification of Education (ISCED): compulsory education 0-2, upper secondary and post-secondary non-tertiary education 3-4, tertiary education (Bachelor's, Master's, Doctoral or equivalent levels) 5-8. There are no detailed data on postgraduate degree and PhD degree holders (levels 7-8).

across educational levels, albeit higher by more than 2 percentage points than the respective EU and euro area averages for the same year.

However, as depicted in Chart 11, education does not appear to have greatly helped bring down the unemployment rates of educated young people over the pre-crisis period. In 2008, in Greece the unemployment rate of educated young people aged 25-39 was by 2 percentage points higher (9.7%) than the overall rate of unemployment (7.7%) and more than double the EU average for the same age group and educational level (4.3%). Yet, what is indicative of the quality of education offered is the fact that, unlike what was the case in Greece, the unemployment of educated young people in the EU and in the euro area both prior to the crisis (in 2008) and after the crisis (in 2014) was more than 2 percentage points lower than the overall rate of unemployment for total population and across educational levels. In quantitative terms, the stock of human capital, as measured by the present value of expected earnings in Greece, tended to converge with the



Source: Eurostat, Unemployment Statistics.

Notes: Unemployment rate by educational level, aged 25-64. Primary 0-2, secondary 3-4, tertiary 5-8, 2011 ISCED.





## Chart II Youth unemployment and educational attainment (2008 and 2014) $% \left( \left( \left( 1-\frac{1}{2}\right) \right) \right) \right) =\left( 1-\frac{1}{2}\right) \left( \left( 1-\frac{1}{2}\right) \right) \right) =\left( 1-\frac{1}{2}\right) \left( 1-\frac{1}{$

EU average, but diverged in terms of quality. Comparative statistics are provided in Table 1. Three conclusions can be reached. First, although the share of tertiary education graduates in total active population grew considerably between 2010 (25%) and 2014 (28%), approaching the OECD average (34%), it continues to fall short of that average. Besides, a breakdown of graduates by field of study (see Chart 12) shows that social, political and economic studies, and science and technology account for the majority (6 in 10), a proportion that is significantly above the OECD average. Against this backdrop, the main reason for young people's propensity to migrate should be sought in the inherent inability of the domestic productive mechanism to absorb young graduates. Second, data focusing on the size of the human capital stock alone should be treated with extreme caution, as its qualitative features also need to be examined thoroughly. According to data from Table 1, it is evident that in Greece in 2014 the bulk of tertiary education graduates (accounting for 28% of people aged 25-64) concerns bachelor's degree holders (23%), against 16% in OECD countries, of whom only one in 10 has a master's degree (3% of people aged 25-64). The respective proportion in OECD countries is overwhelmingly higher, i.e. one in 2. This implies that the orientation of the domestic economic model towards the services sector and, most notably, towards the public sector was the key determinant of mass absorption of bachelor's degree holders prior to the crisis. A statistical mapping of employment for university graduates corroborates this finding. In 2014, more than 7 in 10 university graduates aged 25-64 were employees and, among them, 2 in 10 worked for the public sector,<sup>20</sup> while 3 in 10 civil ser-

20 In 2010 the ratio was 3 in 10.



#### Chart 12 Breakdown of graduates by field of study in Greece (2014)



Source: OECD.

Notes: All levels of tertiary education 5-8, % of total graduates. In 2014, the share of tertiary education graduates in total active population aged 25-64 was 28%. The respective averages of 34 OECD countries are given in brackets. vants were university graduates.<sup>21</sup> Furthermore, the very small share of master's degree holders reflects an inherent failure of the domestic production mechanism to generate new products and develop research and technology, which suggests that the Greek economy under the current production model can compete in world trade only through lower prices rather than through better quality of its output.

Third, assuming that the quality of human capital is a positive function of expenditure on research and innovation, Greece ranks in the 5th lowest place among EU countries on the basis of this criterion. Even though this expenditure increased as a percentage of GDP between 2010 and 2014, it continues to fall short of the EU average, being 2.5 times lower. The number of those who either completed university studies in science and technology or are employed in the S&T sector is

21 Eurostat and Greek Civil Servant Census.

Table I The human capital in Greece in numbers		
(2010 and 2014)		
Indicators	2010	2014
A. Tertiary education graduates (% of people aged 25-64)	25 (30)	28 (34)
– Bachelor's		23 (16)
– Master's		3 (12)
B. Tertiary education graduates (% of people aged 25-34)	31 (37)	39 (41)
C. R&D spending (% of GDP) <sup>1</sup>	0.6 (1.93) (1.99)	0.83 (2.03) (2.11)
D. Human capital in science and technology sectors (% of people aged $25-64$ ) <sup>2</sup>	32.5 (40.5)	35.4 (44.4)
E. Number of patent applications (per million residents, 2012) <sup>3</sup>	7.28 (112.6) (139.4)	

Note: In cases A and B, the respective values for OECD (34) are given in brackets. In cases C, D and E, the respective values for EU-28 and EA-19 are given in brackets.

Sources: OECD (2015), Eurostat and World Bank.

1 Total (public and private) spending by all stakeholders (public and private bodies, corporations, non-profit organisations, universities). Covering spending on basic and applied research and experimental development.

2 Who either have completed university studies or are currently employed in the S&T sector. 3 Number of applications to the European Patent Office (EPO), irrespective of the outcome.







also significantly lower,<sup>22</sup> representing 35.4% of total active population (aged 25-64) in 2014, compared with 44.4% in the EU. Lastly, the number of patent applications is also small: 19 times lower than the EU average and the 7th lowest among euro area countries.

This points to the country's failure to attract, deploy and retain talent, which would enable it to gradual reverse the brain drain. Table 2 provides relevant data. On the basis of the Global Talent Index for 2015, Greece scores a mere 45.7 points on a 100-scale and ranks 33rd among a total of 60 countries, i.e. 10 places down from its previous ranking in 2011.<sup>23</sup> This low ranking can be explained by a number of factors, including a lack of incentives for excellence in pre-tertiary education, the declining quality of Greek universities and technological institutes by international standards, barriers to labour market entry, weak expectations of

improving personal prosperity among young people, lack of economic openness, and the limited opportunities for developing talent.

Although the country is ranked among the top 10 OECD countries with the highest teacher/student ratio and has the highest gross enrolment ratio for all educational levels, the worsening of its overall talent index score is mainly due to the drastic cuts in research and technology spending, the stagnant quality of the labour force and the reduced openness of the domestic economy (see Table 2).

The poor performance in terms of the quality of the human capital stock is mirrored in the downward path of the country's high-technology export activity. Chart 13 depicts the evolution of Greek exports of goods with high R&D intensity, relative to OECD countries, the EU and the euro area. Between 2000 and 2013, these exports as a percentage of manufactured exports followed a downward course and declined by 6 percentage points, coming to a level more than two times lower than the EU, euro area and OECD averages.

### 5 BRAIN DRAIN: A COST-BENEFIT ANALYSIS

In the "brain drain" literature, it has been argued that the origin country may reap substantial benefits from the migration outflows of labour force: (a) the expected return to education increases, as it is the educated people who typically have better prospects of advancement in host countries; as a result, (b) demand for education as well as education spending increase, which leads to (c) a rise in the origin country's wealth and prosperity (see Beine et al. 2003, Stark 2004, Carrington and

<sup>23</sup> Among the countries with the best scores, five are European countries. In 2015, Greece, dropping by 10 places, is ranked after Russia and before Argentina in the global ranking and, along with Bulgaria and Azerbaijan, is among the three countries that suffered the heaviest losses.



<sup>22</sup> They have either successfully completed tertiary education studies (HRSTE, ISCED 2011 levels 5-8) or work in those sectors without having attained a higher education level but are specialised as technicians or professionals (HRSTO, ISCO-08, major groups 2 and 3).

Table 2 Global Talent Index		
(Greece, 2011 and 2015, on a 0-100 scale where 100=best)		
Indicators	2011	2015
Ability to develop talent	42.7	34.0
Quality of the labour force	49.3	49.0
Researchers in R&D	27.6	27.4
Technicians in R&D	50.0	50.0
Language skills	50.0	50.0
Adult literacy rate	95.6	96.9
Quality of university education	54.1	48.9
Gross enrolment ratio	92.4	85.5
Total expenditure (% of GDP)	60.8	53.8
Universities ranked in world's top 500	4.6	2.9
Quality of compulsory education	75.3	70.7
Spending per pupil (% of GDP per capita)	52.3	24.2
Enrolment ratio	97.4	97.1
Pupil/teacher ratio (compulsory - lower secondary)	98.0	95.1
Pupil/teacher ratio (upper secondary)	98.6	96.8
Openness	34.3	33.9
Talent environment	50.0	62.5
Personal disposable income per capita	57.3	53.4
Employment	23.3	8.1

Source: Economist Intelligence Unit, The Global Talent Index Report, The Outlook to 2015 (January 2015).

1 Openness is the composite index of of three sub-indices: foreign direct investment (% of GDP), openness of trade (% of GDP), hiring of foreign nationals.

Detragiache 1998, Docquier and Marfouk 2004). To those benefits one should add the growth of trade with destination countries, the inflow of workers' remittances, the transfer of know-how and expertise, and increased foreign productive investment flows to the origin country (Lucas 2005, Javorcik, Saggi and Spatareanu 2004).

Although it is too early to determine the measurable impact of brain drain on macroeconomic aggregates, there are strong arguments that the net effect is ultimately negative (Schiff 2006). This is so because, *first*, the brain drain affects countries with negative demographic trends and mainly concerns single young people, both men and women.<sup>24</sup> This not only has an adverse effect on the already weak birth rates, but also increases the burden on the social security system, by depleting the country's employable human resources.

Second, higher education and specialisation in Greece is exclusively provided by the government through public universities, which are mainly financed by taxpayers' money. Average government spending on education remains relatively high (4.5% of GDP, compared with 5% of GDP for the EU-28 in 2013).<sup>25</sup> To this we should add the expenditure of the average family, which continues to finance higher-level studies in Greece and abroad.<sup>26</sup> Thus, taking into account the high total national expendi-



**<sup>24</sup>** 40% are women.

<sup>25</sup> Source: ELSTAT.

<sup>26</sup> In 2006, private spending on education accounted for 0.3% of GDP. On the basis of overall (public and private) education expenditure per student (USD 4,479) in PPP terms, Greece ranks 16th in the EU-28 (USD 5,930). See Eurostat, *Education Statistics*.

ture on education, both the flight of scientific human resources that were trained in Greece and their stay abroad after the completion of their studies constitute a heavy loss.

*Third*, human capital flight concerns mainly the most competitive, able and ambitious part of a country's labour force. Its productive utilisation by a foreign country causes a permanent damage to the origin country, as the average quality of the remaining human capital stock deteriorates. This leads to understaffing for lack of skilled workforce, which is necessary to underpin the growth process.

Fourth, people with lower skills and educational attainment also emigrate, which limits the benefit from the expected higher return to education, since a shortage of labour supply relative to demand creates expectations of higher earnings in the source country, and weakens any incentives for education and improvement of the quality of the labour force.

*Fifth*, the high expected return to education is surrounded by high uncertainty, given that it is conditional upon unpredictable factors such as the possibility to migrate, employment opportunities in the destination country, changes in the destination country's immigration policy (stricter numerical quotas) and unfavourable developments in the host country's economic environment which affect the level of expected wages.

*Sixth*, migrants are usually overqualified and underpaid. As a result, the brain waste and income loss pose an extra burden on the source country.<sup>27</sup>

Seventh, increased education spending deprives public funds from other sectors, such as public infrastructure and healthcare, which also have a positive multiplying effect on economic growth. If increased education spending is financed through taxation, the resulting decline in disposable income will weaken demand for education, thereby leading to a negative net final outcome. Besides, cuts in other investment expenditures, e.g. in infrastructure or in healthcare, also have first-round adverse effects on the growth process as well as on the quality of the labour force. The latter has multiplying negative second-round effects, as returns to physical capital decrease, if a given stock of physical capital has to be combined with lower-quality labour inputs in the production process.<sup>28</sup>

*Eighth*, human capital loss also implies sizeable fiscal losses in terms of tax revenue, since, as a rule, highly skilled workers demand, and succeed in obtaining, higher wages and pay more taxes due to their higher taxpaying capacity.

*Ninth*, the exodus of the most talented and educated people, when manifesting itself with such magnitude and duration, brings about a feeling of resignation and pessimism among large parts of the population, which translates into mistrust in the country's future outlook.

### **6 SYNOPSIS AND POLICY IMPLICATIONS**

The main findings of our research are four. First, the phenomenon of brain drain, as a symptom of the recent crisis, has developed strong dynamics in terms of size, intensity and duration. Second, according to the information available so far on its qualitative characteristics, the emigration flow concerns that part of the domestic workforce which is young, healthy, well-educated and skilled, highly mobile and employable. Third, although the deep and prolonged recession has triggered the manifestation of the phenomenon, its root causes should be sought not only in the recent negative macroeconomic environment, but also in the long-standing weaknesses of the domestic production paradigm. Fourth, as additional explaining factors, one should not overlook the lagging behind of the domestic education system in terms of generating high-quality human

<sup>28</sup> For a theoretical general equilibrium analysis of the entailed welfare loss, see Schiff (2006).



<sup>27</sup> According to the results of the survey of the ICAP Group (2015), 60.8% of respondents (Greek migrants) had non-managerial jobs in the destination country, while more than half of them were relatively low-paid (annual gross earnings of up to €40,000).

capital and the inability of the domestic economy to attract and retain talent.

The flight of domestic workforce deserves to become the subject of a constructive dialogue. The starting point for any efforts to provide better education and more career opportunities should be mutual understanding and cooperation among all stakeholders: the government, educational institutions and businesses. In the following, we conclude with six policy recommendations, as a minimum set of actions which should be implemented without delay.

First, a shift in the growth model of the Greek economy towards more productive sectors and a link between education and production. Coordinated efforts should be made to support those sectors in which the domestic economy has and can maintain and expand, or can obtain, a comparative advantage in the global division of labour and wealth. To this end, it is necessary to identify the types and forms of scientific and vocational skills available and needed, with a view to reducing the current demand-supply mismatches. Linking tertiary education to the labour market is instrumental in this respect.<sup>29</sup>

Second, development of a skills database, which would support the compilation of statistics and the quantitative and qualitative study of the brain drain phenomenon and, at the same time, serve as a platform connecting domestic businesses to skilled and experienced expatriate staff, with the potential of ultimately leading to their repatriation.<sup>30</sup>

Third, *initiatives to support entrepreneurship*. This could take the form of meeting points liaising creative and ambitious young people with the business community.<sup>31</sup> The observed shift of employment away from the public sector towards the private sector, as well as the appealing image of entrepreneurship among educated young people are encouraging steps in this direction. 61% of educated young people who participated in the Endeavor Group 2014 survey wish to work in the private sector,

even with the same earnings as in the public sector, while 52% would like to start their own business.

Fourth, strengthening excellence, transparency and meritocracy. Although the economic crisis has reinforced the great exodus of young graduates, it has not been the only factor behind mass migration. In relevant surveys, current or prospective/potential migrants cite as the major push factors: (a) lack of meritocracy and of transparency in recruitment processes; (b) mediocracy, corruption and nepotism; (c) inefficient and ineffective public administration; (d) lack of career and professional development opportunities; (e) lack of incentives to entrepreneurship; and (e) the economic crisis and the prevailing uncertainty about the country's future.32 Among pull factors, respondents cite meritocracy, availability of promising career opportunities at managerial positions, more flexibe labour markets with less barriers to entry, as well as the desire to live in more progressive societies. The policy implication is that, in order to halt the outflows

- **29** In a survey conducted among young people (Endeavor Greece 2014), 82% of respondents expressed the view that the education system in Greece does not provide students with the necessary skills to match market needs.
- 30 Along these lines, the web-based initiative BrainGain is designed to bring together skilled Greek expatriates and, through concrete actions, pave the way for their return home (see www.braingain.gr).
- 31 2015 saw several such initiatives launched by the Greek business sector in collaboration with non-profit and voluntary organisations without however any involvement of the State. Such initiatives included: (i) the 2015 Startup Safary Athens, which through 90 events offered young people the opportunity to obtain useful information, meet in person, talk with and be inspired by entrepreneurs; (ii) the Mindspace initiative (December 2015) focusing on technology entrepreneurship; (iii) the Entrepreneurship School that was launched in Athens for the first time (30 November-4 Decem ber 2015) by the non-profit organisation Think Young and enabled students to be taught directly by entrepreneurs rather than professors; and (iv) Impact Hub Athens, funded by Greek firms and part of the global network Social Impact Awards, which supports youth entrepreneurship. Mention should also be made to the "ReGeneration" programme, designed by the Global Shapers Athens Hub in the context of the World Economic Forum. This paid internship programme enables ambitious and talented persons to benefit from professional development opportunies and businesses to build capacities. In the same vein, the Google Launch-Pad, a 4-day boot camp for startups, was organised in Athens for the first time (7-10 October 2015), bringing together 80 software programmers and entrepreneurs. Lastly, the SFEE Innovation Project implemented jointly by the Hellenic Association of Pharmaceutical Companies and Industrydisruptors.org as part of the Disrupt Startup ScaleUP event is another case in point.
- 32 This is a common finding of almost all the surveys and studies conducted so far (see EUI 2013; ICAP Group 2015, 2016; Endeavor Greece 2014; Theodoropoulos et al. 2014; Triandafyllidou and Gropas 2014; Labrianidis and Pratsinakis 2016).

and even more so to reverse them, it is important to ensure transparency in recruitment processes and career development, reward excellence and promote equal opportunities for talent to flourish. The regular holding of competitions, with the support of both professional associations and the government, with awards in the form of prizes and/or subsidies for prospective employers, as a reward for innovative ideas and as an incentive for participation, would provide tangible proof that excellence is valued and nurtured and meritocracy is safeguarded. Besides, the institution of competitions is an optimal practice that is successfully implemented by all advanced countries for several years.

Fifth, an expansion of apprenticeship and traineeship opportunities would help to keep at home talented young professionals or graduates with little or no work experience. In the current circumstances of low demand and downsized production, Greek firms are able to cope with short-term skill shortages; in the longer term however, once the economy enters an upward phase of the business cycle, they are likely to face serious problems associated with low productivity and lack of innovation.<sup>33</sup>

Sixth, a business-friendly environment. Based on the World Economic Forum competitiveness indices for 2015 and 2016, Greece holds one of the top places in terms of availability of scientists and engineers. It ranks 36th in a total of 144 countries worldwide in technological readiness and 43rd in the quality of higher education and training. However, its overall Global Competitiveness Index score brings it to the 81st place, with a stagnant trend, due to its weak performance in other domains (pillars), such as macroeconomic environment, institutions, labour market efficiency, financial market development, innovation and business sophistication.34 This score is the lowest among euro area countries. Furthermore, although 90% of the population has internet access, the country holds one of the bottom places (26th out of the 28 Member States of the EU) in terms of digital literacy. Doing business in Greece would therefore greatly benefit from an institutional environment that includes, as essential ingredients, less red tape, a businessfriendly attitude on the part of the State, as well as lower social security contribution and tax rates for startups until they become profitable.<sup>35</sup> Significant gains are also expected from flexible forms of bank financing, as well as from the utilisation of the European Investment Bank's special financial instruments.

Finally, a worrisome issue which is not directly related with the phenomenon of brain drain but negatively affects the quality of the domestic workforce is the very high percentage of young people not in education, employment or training (NEET); at more than 19% of population aged 15-24 in 2014, this rate is the third highest in the EU. Young people who are NEET often feel abandoned by the State and socially and economically sidelined.<sup>36</sup> This issue needs to be addressed by a holistic and cohesive strategy, building on best practices successfully followed in advanced economies which, despite the global crisis and recession, have experienced only small rises in youth unemployment.<sup>37</sup> Such practices are based on

- 33 For an overview of on-the-job-training, see Nicolitsas (2011).
- 34 Switzerland, Singapore, the United States and Germany have the highest scores.
- 35 According to the results of a recent survey on 2,222 students from 30 Greek universities, 81% of the respondents have a favourable view of entrepreneurship, 53% consider that internship and startups are the most effective tools for fostering entrepreneurship, 63% cite red tape as an inhibiting or even prohibiting factor, 45% believe that the Greek State is business-unfriendly and 48% call for an improvement of the institutional framework. See the survey Entrepreneurship through young eyes. Something is changing, conducted by the Athens University of Economics and Business, Endeavor Greece, EY and the American-Hellenic Chamber of Commerce, December 2015.
- 36 According to the latest PwC survey (2015), Greece ranks last among 34 OECD countries in developing the economic potential of young people in 2014. More specifically, on the basis of the PwC Young Workers Index, which is a weighted average of 8 indicators (unemployment, employment, part-time employment, long-term unemployment, educational enrolment rates, school drop-out rates, relative unemployment ratio (youth/adult, 15-24/25-54), NEET rates) and reflects the participation of youth under 25 in the labour market, education and training, the country's performance is judged as disappointing, which implies that young people in Greece not only represent an unlocked potential but also face social exclusion.
- 37 In Germany, the second best performer in the global ranking, youth unemployment rates have fallen since 2006 and now stand at below 8%, compared with 50% in Greece. Besides, the German NEET rate was 6.4%, i.e. three times lower than the respective Greek rate. These top performances of the German economy are due to the successful implementation of the programme "EU Youth Strategy", aimed at addressing multi-faceted issues for young workers such as education, health and social inclusion.



a set of initiatives developed by the government, in conjunction with businesses and educational institutions of all levels and forms, and are aimed at increasing apprenticeships and internships, vocational training and specialisation programmes, so as to support the transition of young people from school to the world of work, bolster the institution of second chance schools and provide incentives to prevent drop outs.<sup>38</sup>

38 A few examples are the UK programme "Employer Ownership of Skills", which aspires to create 3 million new apprenticeships by 2030, the German programme promoting long-term company internships for young people, as well as the programme "School Drop Out – A second chance", which aims to reintegrate students who are at risk of not completing qualifications due to high levels of truancy.



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### BANK RECAPITALISATION: A NECESSARY BUT NOT SUFFICIENT CONDITION FOR RESUMING LENDING

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### I INTRODUCTORY REMARKS

A common feature in all banking crises is the depletion of bank capital, which in most cases calls for government intervention. The intervention takes the form of rescue packages, aimed at restoring the crucial functions of financial intermediation and supporting macroeconomic policy objectives. Before the crisis of 2007-08 and the European debt crisis, authorities had intervened to rescue banks, but on an ad hoc basis. The crisis clearly demonstrated banks' relevance for economic growth and therefore the necessity of governmentsponsored recapitalisation schemes. In the case of major disturbance, such schemes, in conjunction with conventional or unconventional monetary policy measures, aimed to limit diffusion to the real sector of the economy. Big banks were rescued, mainly through their recapitalisation, given that they would not have survived market strains otherwise. Recapitalisation of distressed banks has been an unpopular policy, as it entails fiscal costs, encourages further risk-taking and is commonly perceived as giving amnesty to banks for their past unproductive investments. However, there are ample theoretical and empirical arguments in favour of bank bailouts. The collapse of one or more banks implies loss in social welfare, as well as negative externalities due to the disruption of banking services and to systemic risk. In addition, if left undercapitalised, banks tend to cut back lending to the economy, and viable firms with healthy investment projects often fail to be financed. If somehow banks are forced to expand lending to the economy, they may do so by increasing risk-taking and by financing non-viable firms. In this light, bank resolution is a key policy option that can be implemented in two ways: (i) through open bank resolution or (ii) through closed bank resolution. In the former case, there are several alternative resolution tools, mainly deposit guarantees, guarantees of bank bonds, capital injection and direct management of troubled assets. The first two cover banks' liquidity needs, while the other two meet capital needs. In the academic literature, there is no consensus on the optimal solution. Stiglitz (2008) proposes the injection of funds, Bernanke (2009) the provision of guarantees for troubled portfolios and Diamond et al. (2008) capital injection and purchase of the troubled portfolio.<sup>1</sup> Governments have used a combination of all the above, but the ultimate policy is the recapitalisation of banks, on which this study will focus.

The impact of capital injection on resuming lending to the economy can be analysed from three perspectives:

(a) Examining banks' behaviour after previous needs for recapitalisation. These needs can be the result of business expansion or the changing requirements of market participants or, finally, a change in the regulatory framework. These three reasons are not independent of each other, and this analysis focuses on how the transition from the current level of capital to the new level affects banks' lending behaviour. All the parameters of such behaviour are discussed in Section 2.

(b) Examining the ex-ante incentives to finance the economy generated from recapitalisation programmes as part of government-sponsored rescue packages. These involve a channeling of funds (usually public) to support the ex-ante incentives for lending and to reverse the socially undesirable reduction in loans to the

<sup>1</sup> Stiglitz, J. (2008), "We Are not Done Yet: Comments on the Banking Financial Crisis and Bailout", The Economists' Voice, 5(5). Bernanke, B. (2009), "Financial Reform to Address Systemic Risk", Speech at the Council on Foreign Relations. Diamond, D., S. Kaplan, A. Kashyap, R. Rajan, and R. Thaler (2008), "Fixing the Paulson Plan", Wall Street Journal.



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economy during a crisis. All contributions to the topic, by academics and practitioners alike, highlight the importance of the implementation details for the success or failure of the project in achieving the overall objectives. Thus, by analysing the modalities of a recapitalisation programme, it is possible to investigate the incentives for financing the economy. The key features that such programmes must meet are presented in Section 3.

(c) Examining the ex-post impact of previous recapitalisation programmes. To quantify the effects of a programme and derive policy recommendations, academic studies compare the behaviour of banks participating in the programme with the behaviour of those that did not participate. Alternatively, it is possible to consider the loans granted by both groups of banks to common borrowers or the evolution of loans granted by banks that have been recapitalised under the programme. Thus, Section 4 examines three recapitalisation programmes implemented in recent years, namely those of Japan, the United States and Greece. All three countries experienced major banking crises, forcing governments to develop remediation programmes. The aim of this study is not to provide a detailed historical narrative, but to focus on the essential characteristics of these programmes, in order to enable a comparison with the Greek case, i.e. the latest recapitalisation programme of November 2015.

The main conclusion reached by the study is that Greek banks were recapitalised largely with funds covering current regulatory requirements and market requirements, which is a necessary condition for resuming lending. A sufficient condition for this to happen is to address a number of uncertainties that hamper a stabilisation of the capital base, including uncertainties about the future regulatory requirements, effective non-performing loan management and the organisational and operational restructuring of banks. Positive synergies in this direction can also be expected from the restoration of banks' funding sources. The sooner the above conditions are fulfilled, the sooner lending to the economy should resume.

### **2 CAPITAL ADEQUACY AND LENDING**

### 2.1 BANK RESPONSES TO CHANGES IN REQUIRED CAPITAL

The management of its capital base is a crucial policy within a bank's business strategy, given that capital adequacy is a key determinant of its funding and growth.<sup>2</sup> Each bank enjoys a current level of capital adequacy, but must meet a target capital ratio as well. The capital target ratio can be seen as the combined outcome of the requirements of all those who have a direct interest in the financial soundness of the bank, i.e. supervisors and market participants.

For supervisors, banks' capital adequacy has been the main tool for exercising prudential supervision since the late '80s, when the Basel Committee on Banking Supervision (BCBS)<sup>3</sup> adopted the Basel Capital Accord (Basel I, July 1988), which set the minimum level of capital that every bank should have in relation to the respective risk. Since then, the Capital Adequacy Ratio (CAR) has been used as a key prudential tool, aimed to create a capital stock that can absorb losses in the event of a shock. Over time, the characteristics of financial instruments that may be included in the capital base and the minimum amount of capital have been revised repeatedly, and we are now in the third revision of the framework (Basel III), while further changes are under way.



<sup>2</sup> Capital adequacy is defined as the ratio of a bank's capital to its total risk exposure, and this ratio must be higher than 8%. In managing its capital adequacy, a bank may influence the level of available capital, i.e. the numerator of the ratio, or the amount of its risk-weighted assets, i.e. the denominator.

<sup>3</sup> Basel Committee on Banking Supervision (BCBS) is a body without legal personality that operates under the auspices of the Bank for International Settlements (BIS). It is neither an international intergovernmental organisation nor a supervisory authority, as it has no direct supervisory powers over the banks of its member countries. Its recommendations are not legally binding, but rather aim to provide general supervisory standards, guidelines and best practices.

In addition to regulatory capital requirements, banks need to satisfy market participants (shareholders, investors, bondholders, rating agencies, etc.), which, although they cannot be considered as a homogeneous group with common objectives and interests, affect a bank's capital structure decisions. Market participants determine their requirements according to a bank's business plan, the level of anticipated risk, the degree of risk aversion, as well as to the extent of regulatory arbitrage. This of course implies that market participants are able to impose discipline on a bank's decisions,4 i.e. they are able to determine the actual financial condition of banks (monitoring ability) and to influence banks' decisions (influencing ability). If these two aspects are weak, then regulatory capital requirements take the lead. But even when market discipline is strong, regulatory requirements still play an important role, by providing a statutory minimum that has to be complied with.

Therefore, each bank has to cover its target capital ratio, which, as mentioned above, is the combined outcome of regulatory requirements and market participants' requirements. What matters here is how the transition from the current level of capital to the target capital ratio affects banks' lending behaviour.

In the academic literature, the transition is modelled using a partial adjustment model, where the capital gap, i.e. the shortfall of existing own funds against the target, is assumed to be covered gradually over a certain time horizon rather than immediately. Thus, each year the gap is covered partially. The target capital is a function of the existing capital stock and idiosyncratic factors such as the desired capital level, anticipated regulatory requirements, profitability, asset size, corporate governance and other bank-specific variables (see Francis and Osborne 2012 and Appendix 1 of the present article). The advantage of this approach is that it takes into account banks' preferences and enables the analysis of how the loan portfolio has to be adjusted in order to meet the target capital ratio. The disadvantage of the approach is that the model is prone to misspecification error, which explains why many researchers favour the use of regulatory capital. De Jonghe and Öztekin (2015), using the partial adjustment model for a multi-country sample of banks, estimated that in normal times banks annually cover about one third of the gap between the existing capital and the target capital. In other words, the gap is fully covered in three years. The sample also includes Greek banks, for which the adjustment was estimated slightly longer, at about four years.

Therefore, banks must adjust their capital base to meet their respective target capital ratios; to do so, they have three options:

### (a) to increase equity capital; or

## (b) to implement a dynamic asset management policy; or

#### (c) a combination of both.

Essentially, the extreme cases (a) and (b) result in a reduction of lending, in the former case directly and in the latter case indirectly, through a shift to safer assets (flight to quality). In option (a), the capital increase can be pursued through direct access to capital markets or through a reduction in dividends and an increase in retained earnings. Although each policy option entails different costs, the average funding cost increases in all three options, and the pass-through to lending rates is expected to reduce demand for borrowing. In option (b), a dynamic asset management policy involves changing the structure of the bank's assets by reducing the size of the loan portfolio and/or changing the riskiness of assets (deleveraging).

<sup>4</sup> Market discipline refers to the measures that market participants may jointly adopt in order to "punish" a bank that does not exhibit the appropriate risk-taking behaviour. The "punishment" may manifest itself in three forms: the price effect, where investors require higher returns on bank securities; the quantity effect, where depositors withdraw their funds; and the valuation effect, where stock market participants drive down the bank value.



Which of the available policies is followed in practice and its impact remain to be confirmed by empirical research. A recent ECB study among EU countries (see Gross et al. 2016), using a GVAR model, confirms that alternative policies have different effects on economic activity. It is estimated that an increase in equity - option (a) - results in an expansion of economic activity, at least in some countries, while deleveraging -option(b) - leads to a contraction of economic activity, while the combination of the two -option(c) - hadmilder effects. Certainly, the model includes multiple transmission channels, but the lending channel is the strongest. These results provide evidence regarding the optimal response of banks to anticipated increases in capital requirements and the desired policy direction on the part of regulators. There is also empirical evidence that, before the crisis, banks used to meet the requirements for additional capital mainly by adjusting the risk of their assets (i.e. investing in safer assets) rather than by adjusting the size of their assets (i.e. reducing their loan portfolio). Wherever the capital increase option was adopted, this was made through Tier 2 capital, which is cheaper but with less loss-absorbing capacity (see Francis and Osborne 2012). De Jonghe and Öztekin (2015) differentiate banks' behaviour depending on the actual capital adequacy and, in a sample of banks from 64 countries for the period 1994-2010, show that overcapitalised banks opt for active asset management, thus increasing their lending, while undercapitalised banks adjust their capital base mainly with external funds.

Clearly, the picture is mixed as to how banks adjust to changing capital requirements. Therefore, the investigation of the relationship between the manner in which banks adjust to new capital requirements and the level of lending can provide useful policy recommendations.

However, it should be clarified that such investigation can only be meaningful if three conditions are met.

## (*i*) The cost of equity is higher than the cost of debt.

The first condition is based on the prevailing Modigliani-Miller theorem on financial leverage, which anticipates that, in an environment without distortions, funding by equity or debt does not affect the average cost of capital. For banks, this means that any change in the capital ratio will not affect the cost of borrowing and hence, ceteris paribus, the amount of credit. Each bank can raise unlimited funds to meet any demand for loans. In reality, however, the capital market has several distortions, which cannot ensure market clearance and equilibrium, thus the optimal amount of capital. This means that in practice the amount of capital has short- or long-term effects on lending. The most important distortions are the operation of the financial safety net, information asymmetries in banking relations, the problem of debt overhang and the too-big-tofail effect.

## *(ii) There are binding constraints on the structure of capital.*

The second condition requires that the regulatory minimum capital requirements act as a binding constraint on the management of the bank capital base. If market participants require a capital level much higher than the regulatory minimum, then a change in the regulatory framework might not affect the bank's lending behaviour. But it is more reasonable to assume that the target capital ratio is not independent from the regulatory requirements, and in fact reflects proportional changes in the supervisory requirements, whether across-the-board, i.e. changes in the framework, or bank-specific additional capital requirements (Pillar 2).

### (iii) There are limited alternative sources of business financing.

The third condition states that there should be limited substitutability between bank loans and other sources that are not subject to minimum capital regulation. If the potential of obtaining



alternative financing through capital markets, cross-border banking or shadow banking is significant, then the relationship between bank capital and lending is weaker. Despite the considerable growth of such alternative sources, financial theory establishes that the characteristics of the loan contract are unique and other sources cannot be considered as a perfect substitute. Besides, for major business categories (e.g. SMEs) or industries (e.g. retail), bank lending is the only source of financing.

### 2.2 CHANGES IN BANKS' CAPITAL BASE AND LENDING: BRIEF REVIEW OF THE EMPIRICAL LITERATURE

The first problem encountered by the empirical approach is the issue of causality, i.e. whether changes in capital affect lending or vice versa. When economic conditions deteriorate, banks face losses in the loan portfolio, which, if not covered by provisions, deplete their capital base. In this case, causality runs from the economic environment to loans and, ultimately, to capital. Even if that causality is valid, empirical studies attempt to assess whether undercapitalised banks curtail their lending to businesses with viable investment projects.

When minimum regulatory capital requirements were first introduced, the issue of bank capital management gained in importance, and empirical research focused on the relationship between capital and the degree of risk-taking by banks, and on the risk shifting hypothesis in particular. Later on, capital requirements were associated with lending to the economy and the strengthening of economic activity, as the bank lending channel became increasingly relevant for monetary policy. The framework for these studies is rather standardised. The partial adjustment model is used (see Appendix 1) to estimate the impact on lending from a standard shock to the level of capital requirements by 1%. A general conclusion from these empirical approaches is that, at least in the short run, there is a negative correlation between capital and lending.

The first post-crisis study at the international level was conducted by the BIS (see BIS MAG 2010) and concluded that an increase of 1% in the level of capital ratio has a negative impact on GDP. This impact works through a drop in lending, ranging between 0.7 % and 3.6% with an average of 1.4%, and a concurrent increase of 15.5 basis points in the lending margin. Several other studies confirm the negative correlation, but widely differ as to the intensity of the impact (see Martynova 2015). Aiyar et al. (2014), using data from the United Kingdom,<sup>5</sup> focus on corporate loans in order to investigate whether capital requirements on UK banks lead to "leakage", in the sense that branches of foreign banks can substitute for reduced lending as a result of tighter capital requirements. They calculate that an increase in the capital requirement ratio of 100 percentage points leads to a decrease in corporate lending growth of between 5.7 and 8 percentage points. They also estimate that the "leakage" is substantial, with foreign branches substituting for about one third of the decline. Noss and Toffano (2014), in a study on the dynamics of capital and lending at the aggregate level, use time series and a VAR model to determine the impact on lending from past shocks to capital. They estimate that an increase of 1% in the level of capital requirements leads to a reduction in lending of 4.5%, without lending recovering to its previous trend. Uluc and Wieladek (2016) focus on analysing the mortgage portfolio and estimate that a rise of 1% in capital requirements leads to a 5.4% decline in individual loan size, and this decline is covered by competing banks. In addition, they document the risk shifting hypothesis, since, although they fail to identify a reduction in lending to borrowers with an impaired credit history, they observe such reduction for borrowers with good credentials, e.g. verified income. In addition,

<sup>5</sup> The regulatory framework in the United Kingdom lends itself to similar studies, as a regime of quasi-variable bank capital requirements was established. Since Basel I, the UK supervisory authority would impose additional capital requirements on the basis of banks' risk management, control and corporate governance systems. Of course, such additional capital requirements were relatively low, bank-specific and used on an ad hoc basis. This is not comparable to the present situation, in which variable capital requirements is the official policy of regulators across the world.



Bridges et al. (2014), using the supervisory requirements as defined by Pillar 2, find that an increase of one percentage point in the capital requirement reduces loan volumes by 3.5%, but the impact varies across sectors: it is lower for retail lending (0.7%-0.9%), but much higher (about 4%) for corporate lending. Finally, Mésonnier and Monks (2015), examining the recapitalisation exercise of the European Banking Authority (EBA) for 2011, concluded that, for banks on which an unexpected increase of 1% in their CET1 ratios was imposed, credit growth over the nine-month period of the exercise was 1.2%-1.6% lower than for banks for which no additional capital was required. This of course begs the question whether such policy had been anticipated or not.

Many researchers distinguish between shortterm and long-term effects and find that the negative short-term relationship is reversed in the long run. A study for German banks (see Buch and Prieto 2014) concluded that a longterm increase of 1% in bank capital raises bank loans by 0.23%. Poczter (2016) examines the long-term impact of the large-scale recapitalisation that took place in Indonesia in 1997-98 during the crisis in Southeast Asia, and considers that this has led to a large increase in lending to the economy. Additionally, he concludes that changes in lending cannot be fully attributed to demand, but rather it is supply that plays the most important role. A recent study by Gambacorta and Shin (2016) estimates that a 1% rise in the capital ratio increases lending by 0.6% and lowers borrowing costs by 4 basis points. Kashyap et al. (2010) estimate a weaker impact on the cost of borrowing, ranging between 2.5 and 4.5 basis points. Also, a study by Michelangeli and Sette (2016) on mortgages, using a different methodology, estimates that banks with 1% higher capital requirements have a 0.20% higher probability of accepting an application for a mortgage loan and offering lower interest rates by 30 basis points.

It should of course be noted that the above findings should be viewed with some caution, since the problem of these approaches is that they do not take into account (a) any changes in banks' credit standards and lending conditions; (b) the feedback effects of bank soundness on the economic cycle and monetary policy; and (c) the difficulty of a straightforward separation of demand- and supply-side effects.

### 3 BANK RECAPITALISATION THROUGH GOVERNMENT-SPONSORED RESCUE PROGRAMMES

### **3.I BANK BAILOUT PROGRAMMES**

When a banking crisis takes on systemic proportions, government intervention through the implementation of rescue programmes is warranted. The goal of such programmes is to restore banks' capital adequacy, which can be achieved by capital increases (recapitalisation) or by direct asset management (sale of the troubled portfolio) or a combination of the two. We focus the analysis on the first case.

Although the debate regarding the relationship between ailing banks and economic activity is not new, it was "officially" introduced to macroeconomic thinking, theory and practice very recently, when solutions to addressing the problem of financial contagion were contemplated. The core element of the analysis is the concept of "financial accelerator", under which the financial system is not an independent source of uncertainty, but acts as an accelerator of an external disturbance due to procyclicality in lending.<sup>6</sup> Therefore, as banks act as accelerators of a shock, their financial soundness must be safeguarded, which necessitates the development and implementation of a bank rescue programme to mitigate the effects of the disturbance. Such programmes contribute both to financial stability and to the achievement of macroeconomic goals, as they ease strains on the financial system and help maintain the charter value of banks. Bank failure and closure

6 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.



results in a loss of value, since a bank is an information-intensive institution and information on its banking relationships built over time is typically hard to transfer. On the other hand, it should not be disregarded that direct government intervention has negative consequences as well. When the government acts as the lender of last resort, it increases moral hazard and reinforces risk-taking. A direct intervention raises the probability of similar action in future crises. Whether the effects of a recapitalisation policy prove to be positive or negative remains to be empirically explored.

Among the alternative tools of a rescue programme, bank recapitalisation is at the heart of policy and usually takes place using mostly public funds, because private investors often are generally not able to participate due to the high amounts required. All studies confirm that the successful recapitalisation of banks has a significant positive effect on the probability of economic recovery. Homar and van Wijnbergen (2015), examining 65 crises since 1980, conclude that a typical recession lasts 6.3 quarters if banks are recapitalised and almost twice as long (11 quarters) otherwise. They do not analyse the recovery mechanism at play, but their results corroborate the theoretical prediction that the recapitalisation of banks restore incentives for lending, which increases the likelihood of recovery.

### **3.2 MODALITIES OF THE RESCUE PROGRAMMES**

All academic studies and common experience have shown that the modalities of a recapitalisation programme play an important role in fulfilling the objectives. Recapitalisation must be designed so as not to damage ex-ante lending incentives. In this light, we investigate the key features governing a recapitalisation programme and how these strengthen or weaken the incentives for lending.

We can identify eight key features of recapitalisation that can provide an advance indication of the effects on economic activity, in particular on lending to the economy.

### (a) The size of the recapitalisation

The theoretical models that have been developed demonstrate that the effects of the recapitalisation depend essentially on the amount of capital injections (see Diamond 2001 and Homar 2016). The injected funds should cover (i) minimum regulatory requirements; (ii) the uncertainties of the institutional framework; and (iii) uncertainties in the macroeconomic environment. In other words, the amount of recapitalisation should establish a capital buffer capable of meeting the capital adequacy ratios set by the regulatory framework, any anticipated future capital requirements, as well as a possible deterioration in bank asset quality as a result of external pressures. If the capital buffer meets all of the above, ties are facilitated and incentives are provided for efficient lending policies. The higher the capital buffer, the greater the expansion of lending, since the disincentives from debt overhang are reversed (see Philippon and Schnabl 2013). Conversely, if the injected capital does not meet the above requirements, then its contribution to credit growth is low, as banks are primarily interested in strengthening their capital base rather than in financing the economy.

Therefore, the size of recapitalisation plays an important role in banks' lending behaviour, as it introduces the appropriate incentives. Empirical models estimate a statistically significant relationship between "high" recapitalisation and lending (see Mariathasan and Merrouche 2012 and Brei et al. 2013). Generally, the size of recapitalisation leads to increased lending if it exceeds a critical threshold, which means that the strengthening of banks' balance sheet leads lending. Certainly, the contribution gradually diminishes, which means that there is an optimal level of recapitalisation, which should be the goal of any programme (see Dagher et al. 2016).

Finally, one should bear in mind that recapitalisation is usually carried out in an environment of strong economic, social and political pressure and is often the result of political



processes rather than a politically neutral application of economic ideas. It depends on the political and social system, the relationships developed and the institutional framework in place. In many cases, the height and form of intervention cannot be explained by the severity of the problem, as shown by various economic indicators; there is another parallel mechanism that is associated with the interplay among recapitalisation stakeholders (see Grossman and Woll 2014).

### (b) The size of recapitalised banks

The size of the banks participating in the recapitalisation programme strongly influences their lending behaviour, but it is not possible to calculate the effect in advance. Large banks enjoy economies of scale and have greater loan monitoring and management capabilities, but usually follow transactional lending procedures, which are more vulnerable to changes in the external environment. Small banks have smaller monitoring capabilities, but are more dependent on relationship lending, which proves more resilient in a crisis.

#### (c) The recapitalisation instruments

The financial instruments that are used in a recapitalisation programme should have the highest loss-absorbing capacity. In this light, ordinary shares (Core Tier 1) are the best tool, but also the most expensive. In many cases, instruments with less loss absorption capabilities are preferred (Additional Tier 1 and/or Tier 2) due to lower cost. In general, any instrument with fixed payments is less motivating for effective risk management policies. Shareholders and managers of failed or likely-to-fail banks have little benefit (and thus little motivation) from limiting the risk or lending best customers, because any ensuing benefits would to creditors.

#### (d) The speed of reaction

The impairment of an asset in a bank should be recognised and reflected in the balance sheet with a total or partial write-off of its value. However, incentives for write-offs are not strong, on the part of both the accounting framework<sup>7</sup> and shareholders<sup>8</sup>, which delays the revelation of the actual situation and impairs the transparency of a recapitalisation programme. Although the speed of reaction is primarily a matter of political will, the detailed breakdown of banks' portfolios prior to the implementation of a bailout helps to remove many objections. Despite the apparent strength of the above argument, Mariathasan and Merrouche (2012) fail to estimate a statistically significant variable on the time of reaction.

### (e) The renegotiation of contracts

In economic models, the renegotiation of contracts is a crucial parameter to achieve a goal. A perfect contract describes every possible contractual arrangement in any state of the world, while an imperfect contract only describes a subset of these states. In the case of bank recapitalisation, it is critical whether governments are confronted with perfect or imperfect loan contracts. In most cases, deposit contracts are imperfect, as they do not allow for a restructuring of the nominal capital. This affects the height and the terms of recapitalisation<sup>9</sup> and, at the same time, reduces discipline in banks' lending decisions.

- 7 A bank has weaker incentives to recognise and write off a non-performing loan. In principle, the accounting framework facilitates retention than write-off. The bank has an incentive to delay the write-off in order to preserve the bank-customer relationship, especially if it is long-standing. The same applies in the case of collateral lending where the collateral covers part of the loan and its liquidation process is long. Finally, there are disclosure concerns, e.g. the provisioning coverage ratio, which is widely used as an indicator of credit risk, is diminishing, thereby pointing to a deterioration in credit risk, when a fully provisioned loan is written off.
- 8 The existing shareholders have no incentive to write off a non-performing loan, because immediate capital injection is warranted in order to meet regulatory requirements. The restructuring or reprofiling of a non-performing loan is a rational behaviour, as it provides the necessary time for corrective action. Naturally, this behaviour is more evident in banks that operate close to the required minimum capital.
- 9 During the current crisis, governments injected sizeable exclusively public finances (bailout); as a result, the banking crisis turned into a fiscal crisis, which set in motion a sovereign-bank nexus. Breaking this negative feedback loop is a primary policy objective in the EU and in this light, the participation of private creditors (bail-in) has been introduced in the regulatory framework. In a way, this approach seeks to convert the imperfect deposit contract into a perfect one.



### (f) The selection of banks

The participation of a bank in a recapitalisation programme may be mandatory or voluntary. In the first case, negative publicity (stigma effect) is avoided; in the second case, adverse selection incentives are generated, since only the worse-off banks are expected to participate in the programme, and free rider issues are to be expected, since non-participating banks can benefit from the overall stability obtained through the recapitalisation. Some studies reveal that the relationship between banks and governments influences the decision as to which banks will eventually participate in the recapitalisation programme (see Li 2013 for the US Troubled Assets Relief Program). To address all these issues, it is proposed to use equity capital, which allows the government to benefit from any positive outcome.

#### (g) The incentives introduced

A recapitalisation programme can introduce various incentives that affect banks' behaviour, the most important ones being: (a) the attainment of specific targets for loan growth; (b) the operational restructuring of banks; and (c) the restriction of excessive remuneration. Targetsetting for loan growth is a popular measure, but its effectiveness is not obvious.<sup>10</sup> Usually the targets are difficult to enforce without causing distortions and, preferably, any increase in lending should be the decision of the bank itself. Otherwise, banks might finance distressed firms (zombie lending) for the sole purpose of meeting the targets.

Regarding bank restructuring, it is important to acknowledge that recapitalisation and other support measures could prove ineffective, if not accompanied by banks' operational restructuring in order to avoid past mistakes and put in place a new framework for fulfilling the functions of intermediation and mainly of lending. Finally, the restriction of excessive remuneration, which is also a popular policy but is not expected to affect lending, may create disincentives for distressed banks to participate in the rescue programmes or incentives for banks to early exit the bailout programmes.

### (h) Resolution of non-performing loans (NPLs)

Resolution of NPLs is fundamental to a recapitalisation programme. If banks are relieved from their troubled portfolios, they find it easier to smoothly continue their activities and fulfill their intermediation role. Otherwise, they need to devote resources to the management of NPLs, which could have been channelled into more productive activities, and uncertainty surrounding the value of NPLs remains. An appropriate NPL policy enhances balance sheet transparency and prevents the contamination of sound balance sheet items. This dissipates uncertainty about a bank's solvency and facilitates its access to money and capital markets. Therefore, a recapitalisation programme must provide clear incentives for an optimal and efficient management of NPLs.

### 4 CASE STUDIES: JAPAN, UNITED STATES, GREECE

Although the need for government intervention to rescue distressed banks is not largely challenged, there is considerable controversy about the effects and their quantification. Government-sponsored programmes for bank recapitalisation have been implemented in several countries. We will consider the cases of Japan, the United States and Greece, analysing the modalities of the respective programmes and checking them against the recommendations above, and we will outline the ex-post impact on the behaviour of banks in terms of lending and risk-taking.

### (a) The case of Japan

The crisis in Japan began in the mid-1990s, and the government decided to use substantial

**<sup>10</sup>** Quoting the then US Treasury Secretary Tim Geithner in his testimony before the Senate in 2011, "... you can't force banks to lend, boosting bank capital would be expected to stimulate lending by those banks".



amounts to stabilise the banking system. Nevertheless, the practice followed was not in line with the recommendations of the theoretical literature. The first problem was the speed of reaction (see Hoshi and Kashyap 2015), as the government was late to recognise and address the problem and tried with institutional changes to strengthen the balance sheets of banks. For example, it allowed the utilisation of deferred tax assets as part of capital or the valuation at market prices of stocks and real estate. The measures had a temporary beneficial impact on banks and boosted profitability due to capital gains, but failed to address the root causes of the problem. So the problems continued, and in 1998 the government decided to use a JPY 1.8 trillion package for the first recapitalisation of banks, without managing to stabilise the system. A year later, it was forced to undertake a second, even larger, recapitalisation of JPY 6.8 trillion, and by 2006 it had to make three additional recapitalisations with lesser amounts. These successive recapitalisations were the result of the second major failure of the government, i.e. the delay in the implementation of structural changes (see Hoshi and Kashyap 2015) both in the economy and in the banking sector. Since then, it is well understood that a recapitalisation programme should be combined with consolidation in the banking sector, as well as with action to address the problem of overbanking. Otherwise, the existing problems will reemerge.

Furthermore, the theoretical literature of bank recapitalisation places great emphasis on the optimal level of injected capital and the way it is calculated. It is proposed that detailed inspections of banks' portfolios are needed prior to the decision on the amount of required capital and each case should be assessed separately. The Japanese government, although it conducted a stress test exercise in the second recapitalisation, mainly directed the funds towards large banks, and the funds were almost identical across banks to avoid any stigma effects. Moreover, the funds used were not sufficient to restore the capital base of banks. Generally, the programme placed less empha-

sis on the adequacy of bank capital, so most banks continued to have a capital deficit and most of them were unable to meet the minimum regulatory ratio of 8% (see Montgomery and Shimizutani 2009). Instead, greater emphasis was placed on the continuation of financing of the economy. Banks were required to disclose the amount of their lending on a quarterly basis; in the absence of an adequate increase in loans, they received warnings; in the case of a decrease in loans, they received warnings with the threat of sanctions. As judged ex post and based on the results of empirical studies, the goal of stimulating lending was not achieved, justifying the comment of the former US Finance Minister (see footnote 10).

A further problem was that the policies did not directly address the issue of non-performing loans. Banks were given tax incentives for write-offs, but due to linkages to the corporate sector, they used these incentives for corporate restructuring. Where the write-off policy was implemented, new NPLs emerged, as the policy did not address the root cause of the problem (see Calomiris and Klingebiel 2012).

With regard to empirical studies, the only common conclusion is that recapitalisations failed to incentivise banks to lend. Giannetti and Simonov (2013) estimate that the recapitalisation plan did not improve the lending capacity of banks overall, but identify heterogeneous behaviours across banks. Those banks that were sufficiently recapitalised increased their lending, unlike those that remained undercapitalised. Also, taking the analysis one step further, the authors establish that, for undercapitalised banks, the obligation to meet specific loan targets led to evergreening of problem loans and zombie lending, that is lending to distressed firms. None of these phenomena could be observed in adequately capitalised banks. Overall lending to the economy declined because most banks remained undercapitalised. In line with this general conclusion, Nakashima (2016) suggests that, although the two recapitalisation programmes reduced the



default risk of capital-injected banks, they failed to boost their profitability so that they could resume lending. Further, the author notes that non-injected banks did not increase their lending either, and therefore concludes that demand factors prevail, in contrast with the findings of other empirical studies.

The key lessons learnt from the response to the crisis in Japan relate to the speed of reaction, the amount of the recapitalisation, the treatment of NPLs, and the willingness to implement restructuring policies. Everyone agrees that in Japan there was a delayed reaction, since it was attempted to obscure the problem, the injected funds were not sufficient in relation to the intensity of the problem (only 1%) of total bank assets), the NPL problem was not adequately addressed and there was reluctance to proceed with bank restructuring. In many ways the above factors are seen as the key reasons why the country experienced a lost decade after dealing with the banking crisis (see Hoshi and Kashyap 2015).

### (b) The case of the United States

By the outbreak of the 2007-08 crisis in the United States, Japan's recapitalisation programme had been extensively researched and debated, with numerous studies analysing its pros and cons and the lessons learnt from its implementation. In a sense, the US government drew on the lessons from the Japanese experience and applied a different mix of policies. First, as soon as the problem emerged, it was decided to promptly implement a bailout programme, called TARP (Troubled Assets Relief Program), aimed at restoring the liquidity and stability of the banking sector through the purchase of troubled bank assets up to an aggregate ceiling of USD 700 billion. Eleven days after the announcement of the programme, the initial planning was changed and it was decided to channel the funds into the direct recapitalisation of banks. In this context, two new programmes, the Capital Purchase Program (CPP) and the Capital Assistance Program (CAP), were adopted, whereby preferred stock without voting rights and warrants of USD 250 billion were purchased from banks. The main difference between the two new programmes was that the latter (CAP) was preceded by a stress testing exercise to ensure that the funds would only be directed to banks that could withstand a major disturbance. Since then, it has become a standard policy to conduct a stress testing exercise in order to determine the amount of recapitalisation as well as eligible banks.

The objectives of the programmes can be summarised as follows: (a) strengthening banks' capital base to attract private investors; (b) increasing lending capacity and encouraging banks to engage in lending rather than hold funds; and (c) refinancing mortgage loans to avoid foreclosures.<sup>11</sup>

The programme was generous (see Li 2013), but the restrictions on dividends and executive pay made many banks reluctant to participate. Participation was voluntary, and out of 8,400 eligible banks only 707 received funds from TARP. Two years after the initiation of the programme, approximately 75% of the total USD 204.6 billion was repaid and by 2015 almost the entire amount had been paid off. Repayment was led by large banks, while those not exiting the programme were small and weak banks.

Although banks were encouraged to meet the general objectives, no particular quantitative limits were set and no particular incentives or instructions were given on how to handle conflicting situations given the scarcity of funds (see Montgomery and Takahashi 2014). Many welcomed this approach after the experience of Japan, while, more generally, there is a debate as to whether a rescue plan involving recapitalisation can serve two goals simultaneously, namely financial stability and continuation of credit supply to the economy. There is a lag between the two, and the question is

**<sup>11</sup>** For a more detailed description of TARP, see Calomiris and Khan (2015).



whether the modalities of the recapitalisation can minimise it.

Among empirical approaches, Li (2013) estimates that TARP banks increased their loan supply by 6.36% of total assets annually, and lending was channelled to all sectors of the economy. Also, looking at the evolution of non-performing loans at TARP banks two years after the implementation of the programme, he does not find any statistically significant increase in NPLs, so he cannot substantiate the view that the recapitalisation of banks leads to increased risk. Finally, he estimated that one third of TARP funds were used for lending, while two thirds were used to stabilise the capital base.

Berger and Roman (2015) demonstrate that TARP funds were a source of comparative advantage for participating banks, helping them to increase their market shares and market power. They identify the potential underlying mechanism, as the driving factors of the increase in market shares (more aggressive strategy, a general sense of safety after recapitalisation) partially offset the negative factors (stigma and the relatively higher cost of TARP funds), and find that the results were more positive for banks that repaid and exited the programme early.

Instead, Montgomery and Takahashi (2014) estimate that for every 1% increase in the amount of capital injected, loan growth declines by 3% in the next year. Under pressure to improve their capital adequacy, banks seem to have shifted to safer assets and away from high-risk loans. Moreover, this deterioration in loan growth is not evenly distributed across sectors, since there is a decrease in corporate loans while retail loans are not affected. In this light, the goal of TARP to stimulate bank lending was not achieved; in fact, the decrease in lending is greater, the larger the amount of capital injected.

Similarly, Duchin and Sosyura (2014), examining mortgage loan approvals, cannot demonstrate statistically that TARP banks increased loan approvals. Instead, they find that these banks have underwritten riskier loans, i.e. loans with lower loan-to-income ratios. The conclusion about higher riskiness is in line with Black and Hazelwood (2013), who estimate that, in addition to a reduction in lending, the average risk of corporate loans increased at large TARP banks and decreased at small ones.

### (c) The case of Greece

The Greek banking system has been recapitalised several times and in all cases the need was driven primarily by external factors.<sup>12</sup> All recapitalisation schemes were aimed at strengthening banks' capital base and safeguarding financial stability. The ultimate goal was to incentivise banks to resume lending. As mentioned, for this to be achieved, the capital base must be first stabilised in order to eliminate any uncertainty and to increase intermediation capacity and resume lending.

The first programme was initiated in 2007-08 after the shock of the global financial crisis, although Greek banks did not hold toxic assets. This was carried out in the context of similar programmes in the EU, and its objective was primarily to enhance liquidity through the issuance of government-guaranteed bank bonds and secondarily to strengthen the capital base. The whole framework was implemented in a way to observe the level-playing field rules in the EU. Subsequently, the country's debt crisis erupted, with a sharp deterioration in all macroeconomic indicators, which cut off the Greek sovereign and its banks from international capital markets. The quality of bank assets worsened and, combined with the consequences of the Greek debt restructuring (PSI - Private Sector Involvement), necessi-



<sup>12</sup> See Yannis Stournaras, "The impact of the Greek sovereign crisis on the banking sector – challenges to financial stability and policy responses by the Bank of Greece". Keynote speech at an event organised by the London Business School Greek Alumni Association and Stanford Club of Greece entitled "Breaking the Bottlenecks – Steps towards Sustainable Growth", Athens, 8 June 2016.

tated a new recapitalisation in 2012. Greek banks suffered a loss of about EUR 38 billion, corresponding to 170% of core equity at the time, resulting in many banks experiencing negative equity. The Bank of Greece, recognising the problem in a timely manner, conducted a strategic assessment of the banking sector to investigate the viability prospects of each bank. The results of the assessment triggered resolution processes for non-viable banks and recapitalisation processes for the remaining banks, leading to a high concentration of the banking system. In 2014, the Bank of Greece conducted a new stress test and a new assessment of banks' capital needs, which were covered by private funds, while two banks repurchased their preferred shares held by the Greek State under the first programme. Nevertheless, heightened economic uncertainty, the capital controls and the burgeoning level of non-performing exposures (NPEs) led to a new need for recapitalisation in 2015.

The 2015 recapitalisation scheme was the result of banking sector developments and the decision to address the problem without delay in order to ensure a return to normality. The programme was mandatory for all banks; voluntary participation was out of the question. For the four systemic banks, the ECB and the Bank of Greece conducted a comprehensive assessment in accordance with the Financial Assistance Facility Agreement signed on 19 August 2015, which provided a total amount of EUR 25 billion for the recapitalisation and resolution of banks. In this context, an Asset Quality Review (AQR) and stress tests were conducted under a baseline and an adverse scenario in order to assess recapitalisation needs. The outcome of these exercises indicated a capital shortfall of EUR 4.4 billion under the baseline scenario and EUR 14.4 billion under the adverse scenario, i.e. much lower than the amount originally anticipated. Banks were invited to cover the capital shortfall under the adverse scenario, and the effort proved successful since they covered the shortfall entirely with private funds or with the help of the Hellenic Financial Stability Fund.

As discussed earlier, the amount of recapitalisation is crucial for the lending behaviour of banks. The questions that arise in this respect refer to whether: (a) minimum capital requirements were covered; (b) a sufficient capital buffer was created; and (c) macroeconomic uncertainties were addressed. The answer to question (a) is affirmative, because the calculation of the required capital was not arbitrary, but was based on a stress testing exercise per bank and the CET1 ratio was set at 9.5% for the baseline and 8% for the adverse scenario. On 31 December 2015, the aggregate CET1 ratio was around 18%, much higher than the requirements of the exercise and the capital adequacy rules. Although there is criticism about the effectiveness of stress testing exercises as supervisory tools, as they have failed in many cases, these are currently the best available tool to calculate capital needs over a specific time horizon. Moreover, the mere disclosure of the stress test results can smooth out fluctuations in the markets.

The answer to question (b) is less straightforward. Variable capital requirements and other regulatory aspects introduce some uncertainty, regarding mainly the following: (i) the phasein features of capital adequacy requirements according to CRDIV/CRR<sup>13</sup>; (ii) the capital requirements of Pillar 2; (iii) the requirements for the macroprudential buffers; (iv) the requirements for the maximum distributable amount - MDA; (v) the minimum requirement for own funds and eligible liabilities - MREL - under Directive 2015/59/EU (BRRD)<sup>14</sup>; (vi) the requirements for the deferred tax assets (DTAs) as part of capital; and (vii) the requirements of the leverage ratio. The total effect from these future regulatory requirements cannot be calculated with safety. Although the buffer that has been created is satisfactory, the

<sup>14</sup> This directive was transposed into national law with Law 4335/2015 (Government Gazette A 87) "Recovery and resolution of credit institutions and investment firms (transposing Directive 2014/59/EU, OJ L 173), and other provisions".



<sup>13</sup> This directive was transposed into national law with Law 4261/2014 (Government Gazette A 107) "Access to the activity of credit institutions and prudential supervision of credit institutions and investment firms (transposition of Directive 2013/36/EU), repeal of Law 3601/2007, and other provisions".

future requirements represent a source of uncertainty. Of course, the problem cannot be solved exclusively at the national level, but rather supranational coordination is warranted in order to reduce regulatory uncertainty.

The answer to question (c) depends on the credibility and severity of the adverse scenario. Although the development of scenarios in a crisis may make them unreliable,<sup>15</sup> the macroeconomic assumptions used were very pessimistic, e.g. for 2015 the GDP growth rate was assumed at -2.5%, compared with a final outturn of -0.2%. Also it is very reassuring that private funds covered their baseline scenario capital needs, and two banks covered the adverse scenario as well. So we can reasonably argue that market participants' requirements were largely met.

More generally, for the evaluation horizon (3 years) the amount of the recapitalisation is deemed sufficient, despite any regulatory and macroeconomic uncertainties, and this is consistent with economic theory, which using the case of Japan documented that the adequacy of the injected funds is a necessary condition for to restart the financing of the economy after a crisis. The question is whether it is also a sufficient condition. The answer is negative: the other conditions set out in the third section have also to be fulfilled. With regard to the Greek case, our analysis will focus on the problem of non-performing exposures (NPEs) and on bank restructuring.

One of the biggest challenges faced by Greek banks is the issue of non-performing exposures (NPEs). It is commonly accepted that when NPEs are burgeoning, they exhibit toxic characteristics and persistence and they influence the behaviour of banks, which tend to cut back their lending activity (see IMF 2014, Annex 1.3). Resolution of the problem increases balance sheet transparency, prevents the contamination of sound items, frees up resources that can be used for more productive activities and alleviates doubts about the solvency of banks. This in turn facilitates their access to financial markets. Against this background, the NPE ratio is part of any macroprudential policy toolbox.

To address the problem of NPEs, Greek banks have set up dedicated NPE workout units, aiming mainly to maximise recoverable amounts. Over time they have acquired the appropriate expertise in managing a large volume of NPEs<sup>16</sup> and have formed a clearer and more detailed picture of the NPE situation. What remains now is the choice of the most appropriate governance and management. These units can be either fully integrated into the bank, which has the ultimate operational control (captive workout unit) or be under the auspices of third parties to which the bank essentially delegates the management of its NPE portfolio (non-captive workout unit). Both options have advantages and disadvantages. Outsourcing is a more market-based solution, but the crucial factor is the existence of the so-called accelerators, i.e. the appropriate institutional and legal framework, the necessary management tools, the necessary strategies and public acceptance, which facilitate the efficient and effective resolution of the problem. The appropriate institutional framework is in place (Law 4354/2015 and its amendments, Code of Conduct, Framework for the establishment and operation of NPL managing or acquiring companies, etc.) and a strategy for the progressive reduction of NPEs has been outlined with concrete implementation steps, such as out-of-court settlement, the improved bankruptcy law, the training of specialised judges, the removing of obstacles to the creation of a secondary market for NPLs, the issuance of guidelines on the restructur-



<sup>15 &</sup>quot;In crisis times, there is the risk that crucial inputs such as macroeconomic variables are under- or over-estimated and that adverse scenarios become unrealistic – either too benign or too severe. In consequence, there are ambiguous outcomes that are difficult to interpret." See Speech by Yannis Stournaras, Governor of the Bank of Greece, at the Croatian National Bank "Financial stability and policy intervention by Central Banks in Europe – where do we stand and what challenges lie ahead", Zagreb, 23 March 2016.

<sup>16</sup> The business model for the management of NPEs is different from the business model for loan underwriting/origination and requires special expertise. Banks cannot treat performing borrowers in the same way as delinquent borrowers; the latter case requires a more personalised and possibly more legalistic approach.

ing of private debt, etc. (see EC-Greece Supplemental MoU, 16.6.2016). There are also binding targets for the reduction of NPEs which the banks are required to meet, by implementing appropriate policies. All these represent positive steps towards effectively tackling the NLP problem, but the overall process is time-consuming. This hinders the reorientation of banks' business model towards its core intermediation function, i.e. the provision of loans. All outstanding issues will have to be dealt with quickly, to make up for the considerable delays in addressing the problem in the previous recapitalisations and to remove one of the biggest obstacles to a resumption of lending.

Further, a recapitalisation scheme for banks should be accompanied by a restructuring plan of the banking system and individual banks. The restructuring of the banking system has almost been completed, and the recapitalisation of smaller banks is expected (see EC-Greece Supplemental MoU, 16.6.2016). Restructuring at the level of individual banks is also under way, geared towards stronger internal control, enhanced risk management and a management structure that responds to the new conditions. So far, two steps have been taken in this direction: (a) banks have submitted and begun to implement restructuring plans; and (b) the senior management evaluation is in progress, beyond the standard "fit and proper" evaluation. The goal is to ensure the independence of banks' management, decision-making, strategies and commercial operations and, at the same time, ensure that banks continue to operate in line with market principles (see EC-Greece Supplemental MoU, 16.6.2016). Moreover, the central focus of restructuring must be on upgrading and improving risk management systems in order to avoid repeating the bad practices of the past and to put the loan portfolio on a new, healthy basis. The Greek banking system has undergone major consolidation in recent years, and it is normal that there are some malfunctions. The faster the restructuring is completed, the faster the bank capital base will stabilise and banks will be able to resume lending to the economy.

### **5 CONCLUDING REMARKS**

Government-sponsored bank rescue programmes have been implemented in many countries, and the core of all programmes is the recapitalisation of banks. The aim is both to strengthen the capital base of banks, enabling them to cope with external shocks, and to safeguard financial stability through the continuation of financial intermediation functions and especially lending. The first question posed in the academic literature and arising from the experience with such schemes is whether a recapitalisation scheme can achieve both objectives simultaneously. It tends to become widely accepted that the recapitalisation of banks needs first to stabilise the capital base of banks, in order to allow them to resume lending. In this perspective, recapitalisation is a necessary condition, but not sufficient. It can only become sufficient if the modalities of the recapitalisation programme promote ex-ante incentives to resume lending. Additional conditions must be fulfilled, most importantly referring to the speed of reaction, the size of recapitalisation and the ability to address the root causes of the problems. These conditions are suggested by theoretical research, as well as by the experience with recapitalisation programmes in a number of countries. In this study, we looked at two such programmes, those of Japan and the United States, aiming to highlight the lessons learnt and compare with the Greek case, in particular the latest bank recapitalisation of November 2015. The main conclusion reached by the study is that recapitalisation covered the regulatory requirements and created a significant capital buffer, as a necessary condition for resuming lending. A sufficient condition for this to happen is to address a number of uncertainties that hamper a stabilisation of the capital base, including uncertainties about future regulatory requirements, effective NLP management and the organisational and opera-



tional restructuring of banks. Positive synergies in this direction can also be expected from the restoration and normalisation of banks' funding sources. The sooner the above conditions are fulfilled, the sooner lending to the economy should resume.



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## **APPENDIX** I

In the partial adjustment model, the current level of the capital ratio  $C_{ii}$  is a weighted average (using  $\lambda \in [0,1]$  as a weight) of the target capital ratio  $C_{ii}^*$ , the lagged ratio  $C_{ii-1}$  and a random effect  $\varepsilon_{ii}$ .

$$C_{it} - C_{it-1} = \lambda \times (C^*_{it} - C_{it-1}) + \varepsilon_{it}$$

In each time period, the bank covers a percentage  $\lambda$  of the gap between the current ratio and the target ratio. The smaller the  $\lambda$ , the longer the time required to close the gap. Therefore,  $\lambda$  is interpreted as the speed of adjustment.

The target ratio  $C_{ii}^*$  is unobservable and is not necessarily constant over time. It is typically estimated as a function of bank-specific variables  $x_{it-n}$  with the appropriate time lags.

 $C_{it}^* = \alpha_i + \theta' x_{it-n}$ 

so that

$$C_{it} - C_{it-1} = \lambda \alpha_i + (1 - \lambda) C_{it-1} + \lambda x_{it-n} + \varepsilon_{it}$$

Using the estimated capital ratio, the capital gap is approximated as

$$Z_{it} = (C_{it} - \hat{C}_{it}^*) / \hat{C}_{it}^*$$

and the following equation is estimated

$$\Delta L_{it} = a_i + \beta \times Z_{it} + \sum_{j=1}^{\mu} a_j \Delta L_{it-j} + \sum_{j=1}^{\mu} b'_j m_{t-j} + \theta' x_{it-n} + \varepsilon_{it}$$

where  $L_{it}$  = the volume of loans and

 $m_t$  = a set of macroeconomic variables.

The vector  $m_t$  captures feedback effects, i.e. the effects of capital on loans, and thus the remaining relationship interprets the causality between capital gap and loans.



## **APPENDIX 2**

## (i) Phase-in

The capital requirements framework envisages transitional arrangements for the implementation of capital buffers. The latter will be gradually phased in by 2019 and in exceptional cases later. National supervisory authorities have the discretion to shorten the phase-in period.

## (ii) Pillar 2

Pillar 2 includes capital for risks that are not covered or only partly covered by Pillar 1 and are defined through the annual Supervisory Review and Evaluation Process (SREP). The results are bank-specific and depend on each bank's risk profile and management and internal control system. Pillar 2 requirements are a prudential supervision tool, but there is some ambiguity about the distinction between capital requirements and capital guidance. Capital requirements result from the Pillar 2 processes and must be met at all times; on the other hand, capital guidance results from the implementation of hypothetical scenarios, such as the adverse scenario in a stress test, and becomes mandatory if a bank systematically fails to meet Pillar 2 capital requirements, i.e. if the management of its capital base is systematically inadequate.

#### (iii) Macroprudential capital buffers

The capital requirements framework provides for capital buffers which serve broader macroprudential purposes. These are the countercyclical buffer and the capital buffer for systemically important banks (O-SII). The former is designed to address the procyclicality of credit expansion and leveraging, ranges between 0% and 2.5% and is set on a quarterly basis, using credit expansion as the primary criterion. For the first quarter of 2016 it has been set at 0%. The latter is designed to limit the systemic implications of excessive risk-taking by big banks. It is set on an annual basis and cannot exceed 2%. For the four systemic Greek banks, the O-SII buffer has been set at



#### (iv) Maximum distributable amount (MDA)

If the combined capital buffer is not met, then the regulatory framework provides that the bank is subject to restrictions on the distribution of earnings (dividends on CET1 capital instruments, interest coupons on AT1 instruments, bonuses, etc.). A specific methodology is envisaged for the calculation of the earnings that can be distributed, or the maximum distributable amount (MDA), which ranges between 0% and 60% of the earnings depending on the CET1 capital shortfall. In other words, an MDA threshold has to be calculated as a trigger for the adoption of supervisory measures. When capital falls below this threshold, a decision-making process is activated with regard to the abovementioned restrictions. The likelihood of a bank exceeding this threshold or not depends on the level at which this threshold will be set, and this is at the discretion of supervisory authorities.

## (v) Minimum requirement for own funds and eligible liabilities (MREL)

The new bank resolution framework includes debt restructuring (bail-in tool) among resolution tools. If this option is applied, a minimum amount of capital and liabilities must be available that can be used in the event of resolution and do not obstruct smooth recapitalisation. The question is whether these items are among the existing instruments or new types of capital are required. The existing types of capital (Pillar 2, capital buffers) serve other purposes and it is doubtful whether they can be used for resolution purposes.

### (vi) Deferred tax assets (DTAs)

Deferred tax assets (DTAs) arise when a bank incurs losses as a result of exogenous factors and is allowed to carry forward the loss to be set off against future gains when its tax obligations are calculated. Deferred tax must be



gradually deducted from capital (ECB Regulation 2016/445), except for that part that does not rely on future profitability (deferred tax credit – DTC), and is given a weight of 100%. This arrangement creates uncertainties regarding the structure of banks' capital, as half of total capital of the Greek banking sector (close to EUR 20 billion) is accounted for by deferred tax, which is not a permanent source of capital, has a reduced loss-absorbing capacity and may cease to exist in the absence of future profitability (see IMF Country Report No. 16/130, May 2016, Box 3).

## (vii) Leverage ratio

As a supplementary measure to monitor excessive leveraging, the new capital requirements

framework introduces the leverage ratio, which is calculated in combination with the riskweighted capital adequacy ratio. The capital adequacy ratio depends on the riskiness of a bank's assets: the more a bank invests in risky assets, the higher the capital requirement. By contrast, the capital requirement arising from the leverage ratio is independent of whether the bank invests in safe or risky assets: banks are required to maintain a certain level of capital irrespective of the riskiness of their portfolios. If a bank invests in low-risk assets, the capital adequacy ratio may be lower than the leverage ratio and the latter may be more of a constraint for the bank, and vice versa in the opposite case. In any case, the introduction of a second method for calculating leverage entails additional uncertainty for banks.





# WORKING PAPERS (JANUARY – JUNE 2016)

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#### Systemic early warning systems for EU15 based on the 2008 crisis

Working Paper No. 202 Savas Papadopoulos, Pantelis Stavroulias and Thomas Sager

Reliable forecasts of an economic crisis well in advance of its onset could permit effective preventative measures to mitigate its consequences. Using the EU15 crisis of 2008 as a template, a methodology that can accurately predict the crisis several quarters in advance in each country is developed. The data for the predictions are standard, publicly available macroeconomic and market variables that are preprocessed by moving averages and filtering. The prediction models then utilise the filtered data to distinguish pre-crisis from normal quarters through standard statistical classification methodology plus a proposed new combined method, enhanced by an innovative threshold selection and goodness-of-fit measure. Empirical results are very satisfactory: Country-stratified 14-fold cross validation achieves 92.1% correct classification and 85.7% for both true positive rate and positive predictive value for the EU15 crisis of 2008. Results will be of use to policy makers, investors, and researchers who are interested in estimating the probability of a crisis as much as one and a half years in advance in order to deploy prudential policies.

#### Credit risk stress testing for EUI5 banks: a model combination approach

Working Paper No. 203 George Papadopoulos, Savas Papadopoulos and Thomas Sager

In bank stress tests, the role of a satellite model is to tie bank-specific risk variables to macroeconomic variables that can generate stress. For valid stress tests it is important to develop a comprehensive satellite model that both preserves the sense of known economic relationships and also exhibits high predictive ability. However, it is often difficult to achieve these desiderata in a single satellite model. Multicollinearity of key macro variables and limited data may militate against inclusion of all important stress variables, thus limiting the range of stress scenarios. In order to address this problem, the analysis departs from the custom of using a single model as the "true" satellite. Instead, a full

space of candidate models is generated, which is then screened for reasonable candidates that remain sufficiently rich to cover a wide range of stress scenarios. Composite models are then developed by combining the surviving candidate models through weighting. The result is a composite satellite model that includes all the desired macroeconomic variables, reflects the expected relationships with the dependent variable (NPL growth) and exhibits more than 20% lower RMSE compared to a commonly used benchmark model. An illustrative stress testing application shows that this approach can provide policy makers with prudent estimates of credit risk.



#### Macroeconomic forecasting and structural changes in steady states

Working Paper No. 204 Dimitrios P. Louzis

This paper proposes methods for estimating a Bayesian vector autoregression (VAR) model with an informative steady state prior which also accounts for possible structural changes in the long-term trend of the macroeconomic variables. The empirical analysis, which is based on three key macroeconomic variables for the US economy (namely, GDP growth, inflation and short-term interest rate), shows that the proposed time-varying steady state VAR model can (a) accurately capture various structural changes in the long-term trend of the variables and (b) lead to superior point and density macroeconomic forecasting compared to constant steady state VAR specifications.

## Underinvestment and unemployment: the double hazard in the Euro Area

Working Paper No. 205 Nicos Christodoulakis and Christos Axioglou

An alarming legacy of the austerity programmes in the euro area is the vast disinvestment that has taken place over the recent years, and especially so in the peripheral economies. Unless it is quickly reversed, disinvestment not only hinders long-term growth, but also undermines the prospects of a gradual reduction of unemployment and risks further imbalances in, and threats to, the monetary union. Combining a neoclassical Diamond model with labour market imperfections, the paper shows that unemployment is a function of capital investment under either CES or Cobb-Douglas production functions. A cross-section estimate for the euro area economies confirms the theoretical findings and can be used to determine the required investment for the return of employment to its pre-crisis levels.

#### Structural and cyclical factors of Greece's current account balances: a note

Working Paper No. 206 Ioanna C. Bardakas

This note examines the relative importance of cyclical and structural factors in determining Greece's current account performance. A number of filters have been used to remove the longterm component and isolate the cyclical factors. It is shown that for the last 15 years the structural component explains most of the variation in the current account. Cyclical factors show a small increase in importance during the economic crisis. Thus, for any improvement in the current account to become permanent, emphasis should be placed, among other things, in the adjustment of structural factors such as development of import substitution and export promotion strategies and in finding ways to improve flows of trade financing to exporting firms.



#### How Friedman and Schwartz became monetarists

Working Paper No. 207 James R. Lothian and George S. Tavlas

During the late 1940s and the early 1950s Milton Friedman favoured a rule, under which fiscal policy would be used to generate changes in the money supply with the aim of stabilising output at full employment. He believed that the economy is inherently unstable because of endogenous movements in money supply under a fractional-reserve banking system. In her work, Anna Schwartz downplayed the role of monetary factors in business cycles and the role of monetary policy as a stabilisation tool. It is shown how the joint work of Friedman and Schwartz from 1948 to 1958 led Friedman to view money as the "primary mover" of the business cycle and underpinned his shift to a rule based on money growth, so that discretionary monetary policy would not act as a source of destabilising shocks. The decisive factor in the evolution of Friedman's thinking was the empirical confirmation that the Great Depression had been both initiated and deepened by the Fed. The largely neglected influence of Clark Warburton on the evolution of Friedman's thinking provides a missing – but crucial – link in explaining Friedman's recognition of the role of monetary factors in the Great Depression and of the Fed's ability to offset the destabilising effects produced by shifts from deposits into currency under a fractional-reserve banking system.

### Firm investment and financial conditions in the euro area: evidence from firm-level data

## Working Paper No. 208 Hiona Balfoussia and Heather D. Gibson

The paper explores whether the sensitivity of firm-level investment to cash-flow, typically associated with an external financing premium, is time-varying and in particular whether it varies with overall financial conditions. It is found that financial conditions have indeed played a significant role in corporate investment decisions over recent years, rendering financing constraints even more binding. This finding appears to be robust to a number of control variables and robustness tests. Moreover, the impact of credit conditions is not uniform across firms, but rather it varies depending on firm size and leverage, with constrained firms being substantially more likely to condition their investment decisions on overall credit conditions. The results cast new light on the interplay between financial and real cycle downturns and underline the need for monetary, fiscal and macroprudential policy to be countercyclical with respect to financial conditions.



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