

## Carlos da Silva Costa: Sustained growth and development of the Portuguese economy

Address by Mr Carlos da Silva Costa, Governor of the Bank of Portugal, at the National Congress of Economists, Lisbon, 8 October 2013.

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Prime Minister, President of the Portuguese Economists' Association, ambassadors, colleagues:

It is a privilege to take part in the opening of this Conference for two reasons. First, because it is promoted by the professional association to which I belong. Second, due to the close relationship of cooperation that there is between Banco de Portugal and the Association, which involves the co-hosting of conferences, reflecting recognition of the benefits of a shared understanding on topics that concern us.

The thoughts I would like to share with you today have the following theme: “**Sustained growth and development of the Portuguese economy**”. We are now less than a year from the end of the Economic and Financial Assistance Programme (EFAP) and it is now important to look to the future. Bearing in mind that today the great majority of the colleagues here present work (and work well) in roles as company economists, I propose to approach this topic by drawing parallels with corporate management.

Indeed, the questions that arise in managing a company are the same as those we should ask as a country:

- Where are we?
- Where do we want to go?
- What is our strategy for getting there?
- How should we organise ourselves?

Both at national and at corporate level, collective motivation is always necessary to achieve our goals.

My presentation is structured around four points. The first – the macroeconomic adjustment – aims to answer the question: Where are we? The second – medium-term challenges for the Portuguese economy – approaches the question: Where do we want to go? The third and fourth points of the presentation – structural transformation of the Portuguese business sector and a demand-led national system of innovation – mainly answer the question: What is our strategy for getting there? The question “How should we organise ourselves?” is not explored in this address, as it is a topic I tackled in prior addresses, namely in the SEDES conference on 19 March and at the Calouste Gulbenkian Foundation on 24 May.<sup>1</sup>

### 1. The macroeconomic adjustment

*Where are we?*

We are in the process of adjusting macroeconomic imbalances that led us to an absolute financial restriction, in the form of a situation in which we would have ceased external and

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<sup>1</sup> [Address by the Governor of Banco de Portugal, Carlos Silva Costa, at the SEDES conference cycle, “Thinking Portugal: What Macroeconomic Policy Should Follow the Programme?”](#). [Intervenção do Governador Carlos da Silva Costa na Conferência “Consensus e Reforma Institucional”](#) Address by Governor Carlos da Silva Costa at the “Consensus and Institutional Reform” Conference (Portuguese version only).

domestic payments were it not for the assistance of international institutions. We have embarked on an adjustment process through a contractual relationship with those who came to our assistance.

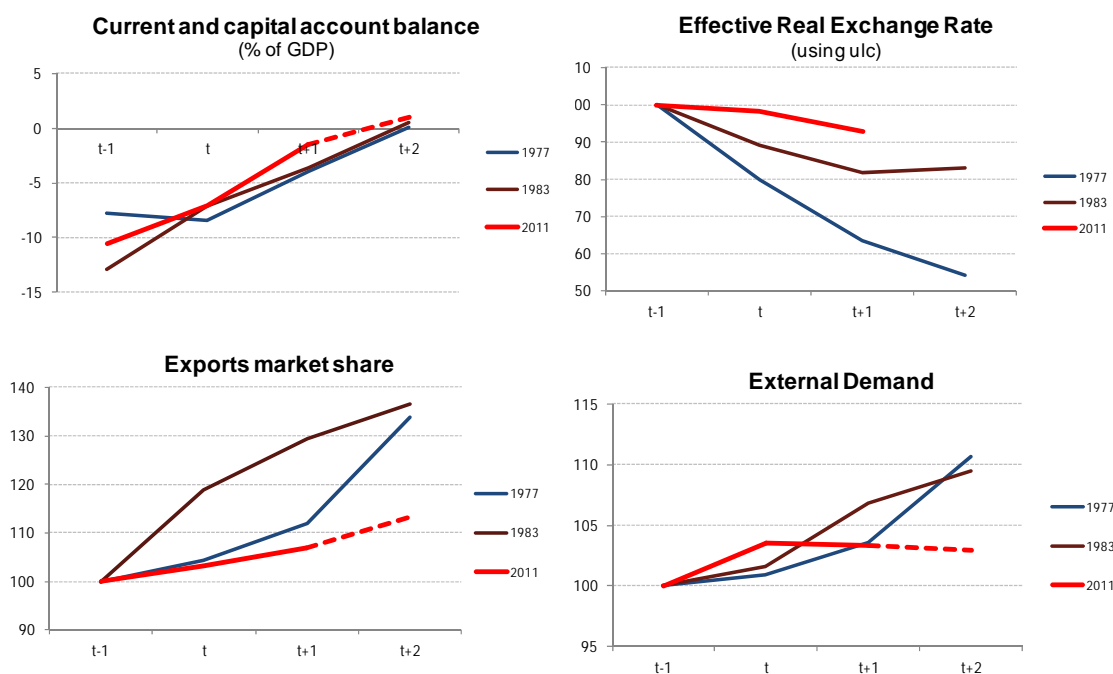
At corporate level, this situation is analogous to what happens when a company falls into difficulties and has to negotiate a restructuring plan with the bank. There are conditions and targets to fulfil that form part of the relationship of trust between the party supplying the financial assistance and the party receiving it.

We are making an adjustment under very different conditions from those in force in previous financial assistance programmes, in 1977 and 1983, both in terms of the institutional framework of macroeconomic policy and in terms of the productive and financial structures. But the greatest difference arises from the starting point, which is far more unfavourable in the recent case.

Aside from this, the external imbalance adjusted in line with that observed in previous programmes (Figure 1). This development is notable, as it took place without recourse to the nominal devaluation of the exchange rate and with fairly low growth in external demand. Although exports did not grow as much as in previous adjustment episodes, they increased market shares. I emphasise here the effort made by Portuguese companies in the tradable sector (including tourism) in incremental penetration in the markets and in redirecting supply to new markets. In addition, the performance of the effective real exchange rate shows that even in the absence of a nominal exchange rate devaluation, the Portuguese economy has shown the flexibility needed to adjust through variation of the relative unit labour costs. This is an important accomplishment for Europe as a whole, as it proves that it is possible to make an adjustment in a single currency context.

Figure 1

**Comparison with previous financial assistance programmes:  
external accounts trend**



Notes: t corresponds to the start year of the programme (index=100 at t-1 and data is in real terms unless stated otherwise)

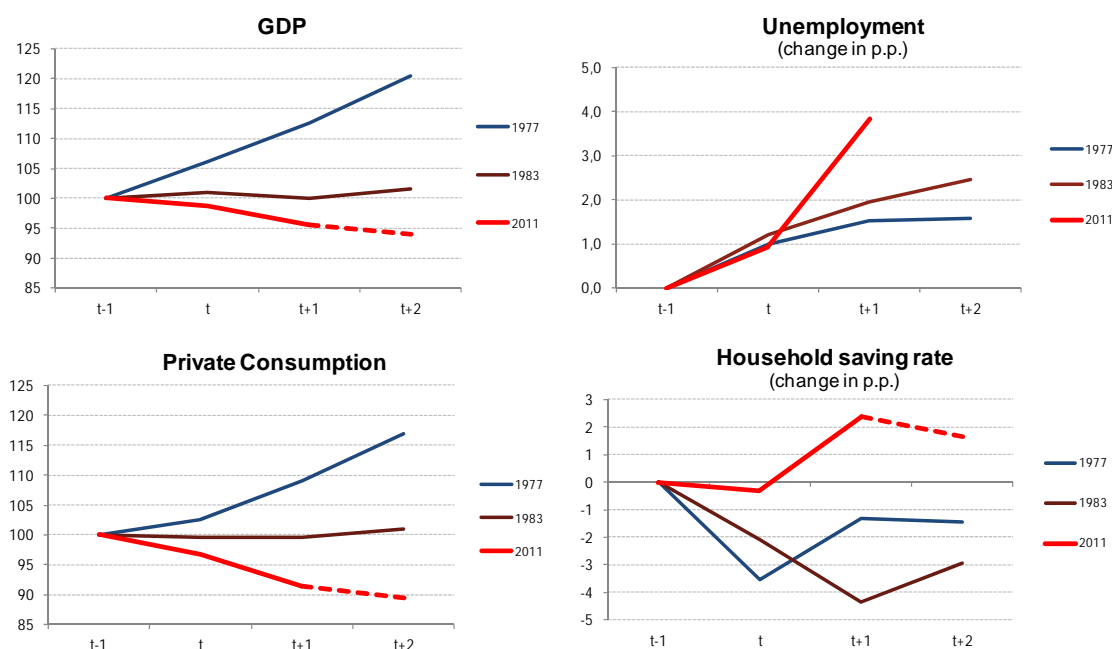
Source: Banco de Portugal

The behaviour of the external component was not enough however to offset the impact on GDP of the contraction in domestic spending. Indeed, domestic spending fell more than in previous programmes, with the clearest difference appearing in the behaviour of private consumption (Figure 2). The current significant reduction in household spending reflects the contraction of disposable income, the impact of the restrictions on access to credit and the effect of high indebtedness on the ability to smooth consumption. Furthermore, the disappearance of the money illusion has contributed to a downward revision in expectations of private agents' permanent income, which has accelerated and amplified the impact of the policy measures on domestic spending. Indeed, in previous adjustments, the money illusion has allowed a great, silent redistribution of wealth: the holders of monetary assets and those with fixed incomes lost purchasing power, but as nominal income rose, they did not notice right away – and far less anticipated – the loss in real terms. In a “numb” process of this kind, the reaction of private demand tends to be less intense and immediate than in a process in which the general public observe that their income is falling. And so it is not surprising that in the current context, the multipliers – which are a measure of the conversion of a stimulus into an effect – are larger than expected initially. The perception of the more permanent nature of the adjustment is also visible in the behaviour of the saving rate, which increased more than in the 1977 and 1983 adjustments.

The strong contraction in domestic demand, along with the adjustment of the previous imbalance in the productive structure – oversized non-tradable sector relative to the tradable sector – resulted in a more marked increase in unemployment. A very significant proportion of unemployment is structural in nature, given the size and lasting nature of the fall in demand affecting various non-tradable sectors, such as property and construction.

Figure 2

**Comparison with previous financial assistance programmes:  
domestic spending trend**

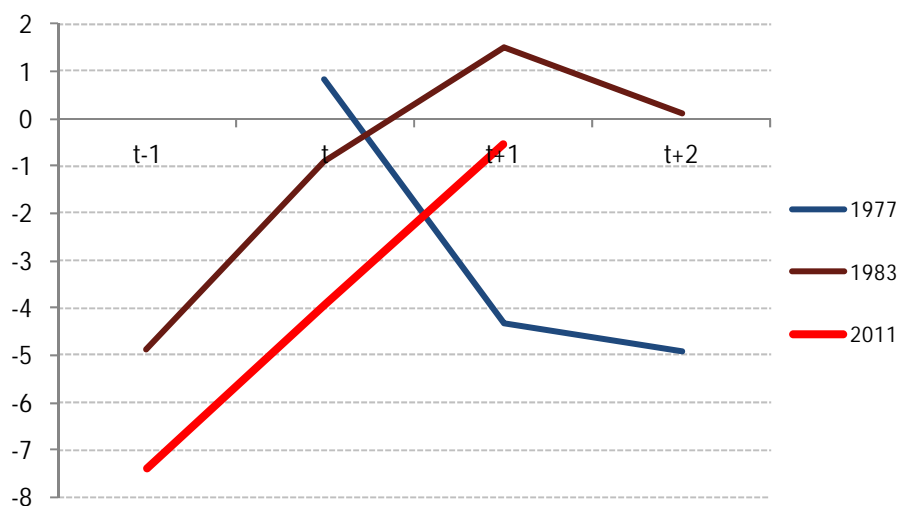


Notes: t corresponds to the start year of the programme (index=100 at t-1 and data is in real terms unless stated otherwise)

Source: Banco de Portugal

The fiscal adjustment of 2010–2012 compares well with that of 1983–1985 (Figure 3). The structural primary balance of general government in 2010–2012 improved 7 p.p. of GDP, which is notable by any international comparison.

Figure 3  
**Comparison with previous financial assistance programmes:  
 general government’s structural primary balance**  
 (% of GDP)



Notes: t corresponds to the start year of the programme.

The structural primary balance is corrected for cyclical effects. It is also adjusted for the most recent period for temporary measures and special effects.

Source: Banco de Portugal

One important point that should be recognised is that our adjustment has taken place in a context of headwinds. During the adjustment period, conditions external to the Portuguese economy have deteriorated, with external demand falling short of initial expectations. By way of example, a macroeconomic scenario in which external demand evolved as was expected at the start of the Programme, GDP variation would be marginally positive already in 2013, the fiscal deficit would be below 5 per cent in 2013, public debt would be stabilising and employment would be around 1.5 p.p. above that observed over the last three years (Chart 1). An adjustment with headwinds is always more onerous and can undermine the credibility of the fiscal consolidation process when the goals are set in terms of GDP ratio. The variables in the ratio suffer the adverse effect of factors that cannot be controlled by fiscal policy-makers, and may create the perception that the adjust failed. For this reason, I have maintained that the adjustment programmes’ fiscal goals should be set in the form of limits to nominal public spending, goals that are controllable by the fiscal policy-makers and that thereby allow a real assessment of the results achieved and the consequent accountability for failures.

In contrast to the current situation, the adjustments of 1977 and 1983 benefited from certain tailwinds. With tailwinds, the fiscal adjustment becomes easier, as it receives a helpful nudge both from the fiscal revenues side and the GDP side, which also allows any slippage in terms of spending control to be offset.

Table 1

**Counterfactual Macroeconomic Scenario  
with external demand as in the initial EFAP**

	Counterfactual Macroeconomic Scenario with external demand as in the initial Programme			Difference versus observed/estimated			
	2011	2012	2013	2011	2012	2013	2011-2013 (cumul.)
<b>External demand</b>	<b>6,3</b>	<b>6,4</b>	<b>6,6</b>	<b>2,8</b>	<b>6,7</b>	<b>7,0</b>	<b>17,3</b>
<b>GDP</b>	<b>-1,0</b>	<b>-2,1</b>	<b>0,1</b>	<b>0,3</b>	<b>1,1</b>	<b>1,8</b>	<b>3,3</b>
Private consumption	-3,2	-5,1	-1,4	0,1	0,4	0,7	1,2
Public consumption	-5,1	-4,8	-2,0	0,0	0,0	0,0	0,0
GFCF	-10,2	-13,1	-6,4	0,3	1,2	2,0	3,5
Exports	8,7	8,4	12,7	1,8	5,2	6,9	14,5
Imports	-4,4	-3,8	5,9	0,9	2,9	3,9	7,8
<b>Public Finance (% GDP)</b>							
Fiscal balance	-4,3	-6,0	-4,7	0,1	0,4	1,2	
Public debt	108,0	122,2	123,5	-0,3	-1,6	-4,4	
<b>Other variables</b>							
HICP	3,6	3,0	1,2	0,0	0,2	0,5	0,7
Employment	-1,4	-3,8	-2,8	0,1	0,4	0,8	1,4
Goods and services balance (% GDP)	-3,5	1,1	4,2	0,3	1,1	2,1	
Current and capital balance (%GDP)	-5,5	2,0	5,6	0,3	1,2	2,6	

Source: Banco de Portugal

We recently completed the 8th and 9th quarterly reviews under the Programme. We now have a short while until the Programme ends, during which we have to manage the return to the markets. Returning to the markets means refinancing the debt that matures during 2014 and financing the additional needs of general government. To finance us, the markets need to be confident about the sustainability of our public finances. That confidence will be assessed on the basis of three indicators: 1) fulfilment of the EFAP; 2) political commitment to maintaining a sustainable trajectory for public financing over time; and 3) determination in fulfilling our obligations (e.g. willingness to pay).

In this regard, the message coming out of the country is very important. Public debt interest rates are currently inviting and, when public financing sustainability becomes credible, there will certainly be investors interested in Portuguese public debt and, as a result, we will see the spreads versus our European partners fall, as was the case in Ireland.

## 2. Medium-term challenges for the Portuguese economy

*Where do we want to go?*

Portugal faces two tough medium-term challenges:

- Sustaining economic growth
- Absorbing the high level of structural unemployment

I distinguish between these two challenges because economic growth may be based on productivity increases, thereby coexisting with continuing high structural unemployment levels. From my point of view, this is not a good equilibrium. Structural unemployment has personal and social costs that go far beyond lack of income, creating a corrosive effect on social cohesion. So we need to sustain growth in increased productivity and employment.

Indeed, sustained growth achieves four goals at the same time:

- (i) Public debt sustainability
- (ii) External debt sustainability
- (iii) Increased per capita income level
- (iv) Increased employment

The reallocation of human resources between the non-tradable sector and the tradable sector is going to take time, requiring mechanisms to be strengthened or created to mitigate the effects of this adjustment on social cohesion. The process will be slower the less clear or more misaligned the incentives are from economic and social policy. It is up to society as a whole to establish or strengthen cohesion mechanisms that ease the effects of unemployment, namely the risk of social exclusion through lack of income. Furthermore, it is necessary to create support mechanisms to re-skill the long-term unemployed, to prevent them from passing into inactivity, through obsolescence of the knowledge acquired previously. Preferably, re-skilling and the acquisition of new skills takes place within companies.

From the viewpoint of social cohesion, it is key to safeguard two aspects: firstly people must not be condemned to remain outside the labour market; and secondly the mechanisms for re-skilling workers must be efficient and the employment created is not artificial but economically sustainable. Similarly, a balance must be struck between the income support mechanisms and the stimulus for returning to the labour market. In other words, the income support mechanisms cannot disincentivise the recipient from returning to the labour market.

To address these challenges, the economy must be capable of attracting domestic and foreign investment that is productive. The productive base for tradable goods and services must be strengthened and the specialisation level in the Portuguese economy must be improved, both in terms of sectors and in terms of product ranges. The support infrastructure and services are available, they just need to be made profitable.

### **3. Structural transformation of Portuguese companies**

*What is our strategy for getting there?*

In my view, the strategy should be developed along four lines:

- 1) Optimisation of the installed productive capacity utilisation
- 2) Endogenous improvement of the intra-sectoral specialisation level
- 3) Endogenous improvement of the inter-sectoral specialisation level
- 4) Attraction of Foreign Direct Investment

#### **3.1. Optimisation of the installed productive capacity utilisation**

Optimisation of the installed productive capacity utilisation means taking advantage of the investment made to-date, increasing production, going in search of new markets and new clients. In the sectors producing tradable goods, it is essential to continue redirecting production to external markets. In the services sector, installed capacity utilisation must be boosted through providing services to non-residents. In the tourism sector, an approach must be designed that increases the density of supply (that is, that covers the various market segments that are compatible with our production costs) and that ensures a high utilisation rate of installed capacity throughout the year. In parallel, deterioration must be avoided in the market segments where we are already present. Aside from tourism, greater advantage must be taken of increasing international mobility of individuals to boost sectors such as health, education and knowledge.

In this regard, we must prioritise the speedy resolution of those companies that are economically viable but are in financial litigation. Alternatives should be considered such as selling the company or transferring the management, to avoid losing the company's social capital which is far more important than the financial capital. We must ensure that the mechanisms in place for recovering companies are agile, which depends greatly on the attitude of all those participating in the process.

### **3.2. *Endogenous improvement of the intra-sectoral specialisation level***

The second strategic line consists of endogenous improvement of the intra-sectoral specialisation level, through absorption of so-called "incremental innovation". This means that we have to evolve upwards to higher market segments in the sectors where we are already present. The footwear sector is a good example of success in this regard. This sector made a notable change in its place on the value chain, progressing to higher segments and today is very near the top of the market segments.

To put this strategy into practice, it is critical that companies have capacity to increase their scale and take advantage of new knowledge and qualifications in terms of products and production processes. In other words they need the capacity to absorb incremental innovation.

Indeed there are various restrictions on growth for Portuguese companies – which operate like a kind of "glass ceiling". To start with, the high degree of leverage, but also the low quality of management, which translates into a lack of strategy, organisation and endogenous capacity to keep up with the markets and innovation.

In this respect, the following changes must urgently be made to Portuguese companies:

- a) Creation of a scale dynamic – "larger SMEs"
- b) Strengthening of capital adequacy
- c) Strengthening of capacity for absorbing knowledge
- d) Strengthening of internal organisation
- e) Clear separation between ownership and management
- f) Professionalisation of management

These six transformation areas are interlinked. It is impossible to have a functionally complex organisation that is capable of absorbing knowledge and responding to the market without scale. The creation of a scale and growth dynamic involves the availability of funds, but also requires professionalised management that is clearly separated from ownership, which is capable of supplying transparent and reliable information to the different stakeholders.

#### ***Creation of a scale dynamic***

With regard to companies' scale, it is known that Portuguese companies are too fragmented. According to Eurostat data,<sup>2</sup> in 2010, 95 per cent of non-financial companies employed between one and nine workers, while less than 1 per cent employed more than 50. This restriction limits the possibility of optimising processes, attracting qualified human resources and asserting companies in external markets, while reducing companies' endogenous capacity for keeping up with markets and technological innovation. In short, it limits productivity gains.

Various empirical findings suggest that the differences in scale of companies between the various countries are related to the differences in the quality of their social capital. For

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<sup>2</sup> Eurostat Structural Business Statistics (3 September 2013).

example, research by Bloom et al (2009) and Garicano (2000)<sup>3</sup> show that the countries/regions where mutual trust levels are highest typically have larger size companies. This is one reason behind the many large companies in the USA and the countries of northern Europe, as opposed to the countries of southern Europe and Asia (India for example), where companies are very small. Indeed, the opening up of capital and the decentralisation of management, key conditions for the growth of companies, presupposes a relationship of trust. As is known, Portugal is part of the group of countries where trust is generally low.

### **Capital adequacy**

Portuguese companies have to increase their equity in order to grow. Portuguese companies generally have very low levels of capital adequacy. According to data from Banco de Portugal's Central Balance-Sheet Database, in 2012, the level of capital adequacy in non-financial companies was 36 per cent on average, and over half had levels below 25 per cent (Table 2). Capital adequacy is very similar among companies of different sizes (micro, SMEs and large enterprises) and also between companies of different sectors (only holding companies have a higher capital adequacy). Also, in 2012, interest's share of cashflow was on average above 60 per cent (and above 10 per cent for over half of all companies), and more than half of Portuguese companies had a debt/EBITDA ratio above 3.5.

Table 2  
**Financial situation indicators**  
**Non-financial companies**

	2008	2012
<b>Capital Adequacy Ratio</b>		
Median	23,0	24,0
Weighted Average	39,3	36,4
<b>Interest as a % of Cashflow</b>		
Median	18,3	10,7
Weighted Average	49,1	63,7
<b>Financial Debt as a % of EBITDA</b>		
Median	281,0	367,1
Weighted Average	670,6	1172,6

Source: Banco de Portugal (Central Balance-Sheet Database)

Portuguese companies' high leverage ratios, when compared to those of companies in most mainland European countries, lead to a double fragility among our companies: financial fragility, as companies are particularly vulnerable to alterations in financing conditions, both

<sup>3</sup> Bloom, N., Sadun, R., Reenen, J. (2012) "The Organization of Firms across Countries", The Quarterly Journal of Economics, Oxford University Press, vol. 127(4), pages 1663–1705.  
Garicano, L. ( 2000) "Hierarchies and the Organization of Knowledge in Production", Journal of Political Economy 108 (5):874–904.



in terms of volume and cost; and strategic fragility, given that the high leverage of Portuguese companies is inconsistent with investing in their sustained growth. It is therefore vital to develop financial instruments for boosting capital adequacy and define an economic policy framework, in particular on the fiscal side, which encourages interest in opening and increasing equity in companies.

### ***Quality of management and separation between ownership and management***

In the last few years, several international studies have quantitatively assessed the quality of management of companies in various countries. The results confirm that in Portugal's case companies are badly managed on average. For example, Bloom et al (2012)<sup>4</sup> conclude that the US scores highest on average in terms of business practice, followed by Japan and Germany; the lower part of the ranking features countries from southern Europe – Greece and Portugal – and developing countries, like Brazil, China and India. The study also shows that in the case of Greece and Portugal, there is significant dispersion in the quality of management of companies, with a particularly high percentage of badly managed companies (the distribution has a “long tail”).

The other result of this study that I would like to bring out is that in all the countries analysed, the companies managed by the founders or their direct descendents tend to be badly managed. In family firms, there is a deterioration in the quality of management when it passes from the founder to the second generation and from the second to the third. When it reaches the third generation, there is a high chance of it entering into an entropic phenomenon, due to lack of leadership, management disputes or even income disputes.

These results clearly show the need for professionalising management in Portuguese companies and separating management from ownership. To this end, mechanisms must be found that facilitate the transmission of companies between heirs or to third parties, for example through management buy-out operations (MBOs).

### ***3.3 Endogenous improvement of the inter-sectoral specialisation level***

Sectoral diversification is another key line for the success of our sustained growth strategy. It relates to the development of new products and new technologies, through the absorption of radical innovation. Indeed, radical innovation has the capacity to change business opportunities completely.

Research and development activities often create an individual with “an idea”. But for the idea to then lead on to the creation/launch of new companies, an “entrepreneur” and a “financial backer” must be found. And to increase the likelihood of the project succeeding, “management and organisational capacity” must be sourced. In fact, how ever similar the birth rate of new companies in Portugal is to our European partners, their success rate is much lower.

First and foremost, this strategy requires the development of a culture in which whoever has an idea trusts someone else to promote it. An institutional framework that guarantees rights of ownership and that promotes trust between individuals is therefore an essential condition. On the other hand, it is necessary to promote entrepreneurial capability. Entrepreneurship does not invent itself overnight, it depends on history, education, a culture of innovation and risk, as well as a responsive attitude and one of adapting to the challenges of competitiveness. So we have to encourage an institutional framework that favours entrepreneurship. Where there is no strong entrepreneurial capability, it has to be created, for example, through creating forums for presenting business ideas to potential investors (business angels, seed forum).

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<sup>4</sup> Bloom, N., Genakos, C., Sadun, R., Van Reenen, J. (2012) “Management Practices across firms and countries”, WP 17850 NBER.

It is also not easy to find investors ready to finance innovative firms based on knowledge at a start-up phase. In the case of radical innovation, the results are highly uncertain and normally involve long maturing periods before bearing fruit. While incremental innovation is normally capable of obtaining bank financing, traditional banking does not task itself with financing radical innovation.

Thus new forms of financing must be encouraged and alternative financial instruments developed, including seed capital and risk capital.

### **3.4 *Attracting Foreign Direct Investment***

Foreign Direct Investment (FDI) offers benefits to the recipient country which go far beyond the direct effects on production and employment. Typically, FDI involves transferring technology, introducing new management skills and corporate culture techniques, enabling change in the countries' productive base and among their institutional frameworks. This means that we have to create conditions that make the Portuguese economy an attractive place to invest and work.

The question that arises is: what are the conditions that attract international production factors?

There are many studies (theoretical and empirical) which investigate the reasons why the flow of capital from developed countries to developing countries is relatively limited, despite the latter having lower per worker capital levels – called the “Lucas Paradox”. The main findings from this research link explanations to differences in fundamentals that affect the poorer economies' productive base, such as the quality of human capital, macroeconomic, regulatory and fiscal stability and the quality of institutions. Thus the prerequisites for attracting FDI include investment in professional education and training, stability and reliability and a good institutional framework.

#### ***Quality of human capital***

Investment in education and human capital is key as a source of economic growth and an explanatory factor of the differences across countries in terms of growth trends and per capita income. This result is robust for various theoretical approaches to economic growth, but is also robust to a multitude of empirical approaches based on a variety of methodologies and samples.

In reality, it is easy to understand that more qualified workers are more productive. Education facilitates the transmission of the knowledge necessary for adopting new working methods and new technologies, but education also increases an economy's capacity for innovation through developing new ideas.

#### ***Stability and reliability***

Investment is inter-temporal, requiring high trust and reliability levels. According to the World Economic Forum's recent global competitiveness report for 2013–2014, Portugal fell from 49th to 51st place among 148 countries. Macroeconomic instability, loss of trust in politicians and the government and difficulty in accessing finance contributed significantly to this fall.

We have to be aware that uncertainty is one of the main inhibitors of investment in Portugal. We cannot control the conditions that result from demand, but we should ensure that the macroeconomic, legislative, regulatory and fiscal frameworks are stable. Stability encourages both more investment and higher quality investment.

#### ***Quality of institutions***

In the last few years, a considerable amount of economic literature has emphasised the role of quality institutions in the economic growth and development of different countries. Indeed, the framework of values, standards and institutions – called “social capital” in the literature –

has a key role in economic development, as it boosts the productive impact of physical capital, the qualification of the labour force and the accumulation of technical and organisational knowledge. This framework includes the laws that sustain the rule of law and ensure rights of ownership, but also those that define the political institutions and the interaction between social partners.

The framework of values, standards and institutions influences the trust underpinning economic agents' interactions and the security levels governing the relationships with third parties. This means that that framework governs the way the economy functions and also the incentives that motivate individuals. When there is no trust, transactions do not take place. An OECD study from 2011 shows that mutual confidence is larger in the richer countries where there are fewer inequalities in the distribution of income. The countries of northern Europe are those with the highest levels of trust.

A good institutional framework is generally synonymous with a transparent and impartial legal environment, which protects ownership rights, with low corruption levels and public services providing equitable conditions for all, while individuals participate in the activities that best suit their skills and abilities. Thus, the introduction of improvements to the legal and judicial systems, in executing contracts or adopting laws that establish compulsory education are examples of areas in which significant gains in terms of growth potential can be achieved.

A recent Banco de Portugal study (Júlio, Alves e Tavares, 2013)<sup>5</sup> suggests that improvements in institutional performance in Portugal, involving convergence to European best practice, could increase FDI into Portugal by around 60 per cent.

#### **4. Demand-led national innovation system**

The success of the Portuguese economy's tradable goods and services sector depends greatly on its ability to absorb and take advantage of innovation. But taking advantage of innovation depends on the endogenous entrepreneurial capacity and the FDI that we are able to attract, which in turn, depend on the framework of values, attitudes and behaviours and the quality of the national innovation system's governance and performance.

The national innovation system comprises the centres producing knowledge, education and professional training. This system conditions the economy's specialisation level and, in particular, productivity and innovation, both incremental and radical. That is why it has to be designed and channelled according to the productive system's present and future needs and has to be able to detect those needs and collaborate with the corporate base.

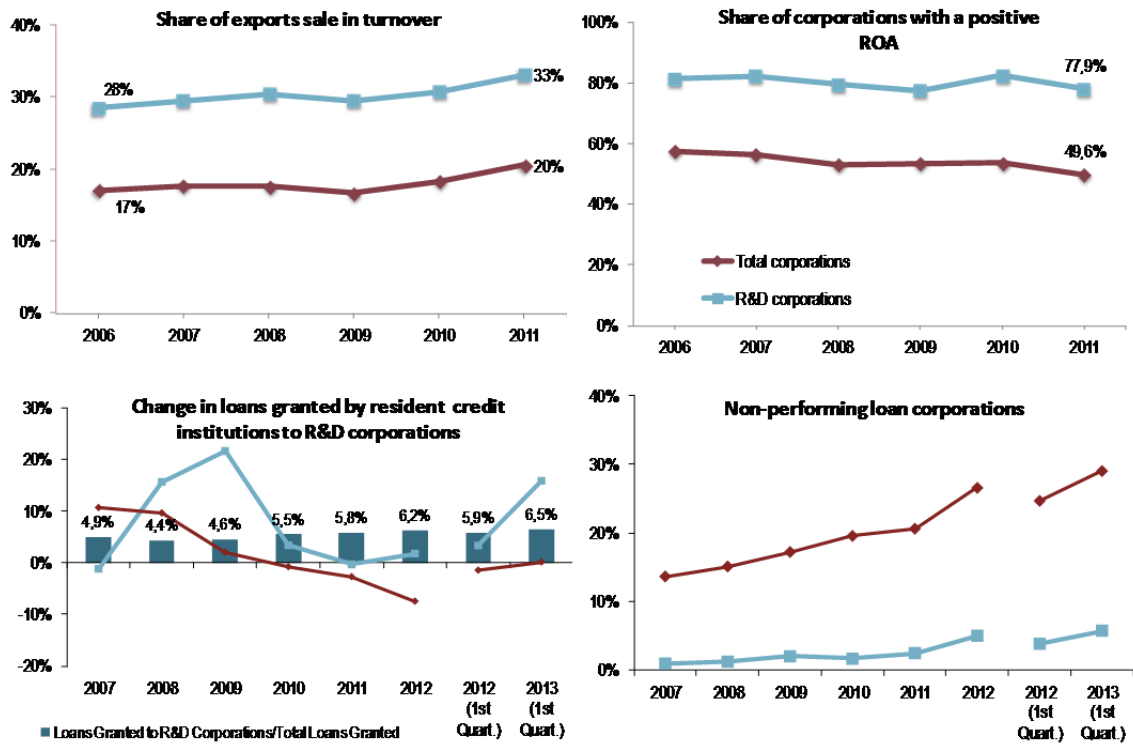
Portugal has to change the national innovation system to a demand-led approach, responding to the needs of the national productive system. A competitive economy's national innovation system must be governed by the present and future needs of its productive base.

To conclude, it is worth looking at the result of an analysis conducted by Banco de Portugal on the relative performance of the companies investing in R&D in Portugal. Irrespective of the causality relationship, it is clear that the companies investing in R&D perform better in terms of exports, profitability and risk perception on the part of the banking system (Figure 4).

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<sup>5</sup> Júlio, P., Alves, R. and Tavares, J. (2013), "Foreign direct investment and institutional reform: evidence and an application to Portugal", Banco de Portugal Working Papers 06|2013.

Figure 4  
Companies with R&D in Portugal



Source: Banco de Portugal