

1 Introduction

The crisis makes the need to undertake structural reforms more pressing...

As described in Chapter 1, in the crisis besetting the Spanish economy there has been a combination of external factors and other, domestic factors, linked to the build-up of significant imbalances. These took the form of high private debt, losses in competitiveness and an excessive concentration of resources in the real estate sector, and they were not only due to the factors that drove spending exuberance, but are also related to the persistence of a series of structural obstacles that limit the economy's growth potential. In turn, the crisis, given its dimension and nature, is exerting effects that go beyond the conjunctural impact on activity and employment and bear down negatively on the level of potential output and its growth in the medium and long term.

The rapid application of expansionary monetary and fiscal policies on the demand side to uphold the level of activity has managed to check in the short term the strong recessionary impulses and to circumvent any dangerous feedback loops. But as useful as these policies are in acting as buffers against economic fluctuations, on their own they do not correct the structural problems underlying the crisis and heightened by it. What is more, the lack of any further available room for additional stimuli and the pressing need to swiftly embark on an ambitious fiscal consolidation strategy mean that, also from a shorter-dated perspective directly linked to exiting the crisis, structural reform policies are of paramount importance.

... reforms that accelerate recovery and increase the Spanish economy's potential growth...

Supply-side policies are essential for rapidly reabsorbing the imbalances that have built up and removing the obstacles hampering the economy's growth capacity in the medium and long term, so as to pave the way for a more dynamic recovery. Households, firms and the public sector may thus more readily reduce their debt and restore health to their financial positions so as to resume a sustainable expenditure path in the presence of buoyant national income. In turn, the containment of unit labour costs needed to make headway in improving competitiveness will be easier if the foundations for ongoing productivity gains are laid. Also, reallocating the surplus productive resources in the real estate sector is not conceivable unless there is a more flexible framework that helps provide for shifts in capital and labour towards sectors with greater growth potential.

... through promoting the accumulation of physical, human and technological capital, and improvements in their efficiency

The goal of supply-side policies is ultimately to promote potential growth, with incentives both for a greater accumulation of productive factors (physical, human and technological capital) and for improving their efficiency. As a result of its habitual procyclical behaviour, private investment in capital goods and in technologically innovative activities has contracted particularly sharply during the crisis, adversely affecting the stock of productive capital actually available. Public investment has offset this to some extent, but is being constrained by the pressing need for fiscal consolidation. The accumulation of human capital is also being impacted. The growth of the labour force has slowed owing to fewer immigrant arrivals and to the reduction in participation rates. The unemployment rate has also risen significantly, while the greater demand for education has come up against education system results that show some room for improvement. The increase in the incidence and duration of unemployment tends to reduce workers' employability and productivity, thereby lessening the economy's human capital and placing upward pressure on structural unemployment. Finally, as regards efficiency gains, the regulation of the markets for goods, services and production factors has seen the persistence of certain aspects which contributed, along with other elements, to a sectoral allocation of resources marked by the excessive weight of the real estate sector. Such aspects further contributed to maintaining the productivity growth rate at levels below those in the mid-1990s and,

at present, they restrict competition and detract from the proper management of productive resources, as regards both their sectoral allocation and their organisation within companies. This situation continues to bear down significantly on efficiency.

From this perspective, this chapter analyses the situation regarding the supply of production factors and their efficiency in the Spanish economy so as to identify the obstacles that may be restricting the dynamism of these two sources of growth. This analytical approach helps offer some pointers as to the areas in which the need for supply-side economic policy action is most pressing in order to raise the Spanish economy's level of potential output and medium- and long-term growth and, thereby, pave the way to exiting the crisis.

2 The supply of production factors

2.1 PHYSICAL CAPITAL

The Spanish economy increased its stock of physical capital notably during the expansion...

The three basic types of capital – physical, human and technological – in the economy accumulate, respectively, through investment in equipment and infrastructure, through demographics and the level of educational attainment of the labour force, and through firms' absorption of the results of R+D+i activities.

During the 1994-2007 period, total capital grew in real terms at an annual average rate of 4%. This increase was higher in the case of assets related to new technologies (software, communications, etc.), transport equipment and machinery, and capital goods. Both the private and the public sectors contributed in a similar fashion to this dynamism, with respective growth rates of 4.8% and 4.5% for non-residential productive capital. Under private capital, and by sector of activity, there were also notable differences in the increases: 0.9% in agriculture, 3.2% in industry, 6.7% in construction and 6.2% in market services.¹

From a historical perspective and from an international standpoint, this increase in the Spanish economy's capitalisation was notable. On one hand, the growth rates of capital in the previous decades held up, even increasing in the case of public capital and of new technologies-related assets. On the other, the growth of the total stock of capital was practically twice that of the average for the EU 15. Contributing significantly to this headway in the Spanish economy's capital endowment were capital transfers from the EU, which will be much less sizeable in the coming years.

...but, as employment grew strongly, capital intensity did not increase in the economy as a whole...

Despite high investment, the amount of physical capital per worker (the capital/labour ratio) did not increase significantly. Unlike in previous periods, in which it was more moderate, between 1995 and 2007 the growth of employment was on a similar scale to that of the stock of capital; accordingly, the capital/labour ratio held relatively stable and the Spanish economy's insufficient capital per worker relative to other European countries was therefore not corrected. Conversely, public capital and residential capital per inhabitant increased more than in the euro area (see Table 2.1).

... and nor did the productive capital gap in the most advanced technological sectors narrow

Not only did aggregate capital intensity relative to other developed countries not increase, but its composition by asset and by sector also continued to differ somewhat from that of the advanced economies (see Chart 2.1). The lower capitalisation of the Spanish economy was traditionally more manifest in respect of non-residential capital, whose growth during the expansion was centred on the construction sector (an annual average growth rate of 6.7%), on transport and communications (7.1%) and on business services (9.3%) and social services (9.9% in private education, 10.84% in health and private social services, and 11.8% in other social activities and services). As a result, private productive capital in the high-technology sectors held constant at

1. The data on the capitalisation of the Spanish economy are taken from BBVA and IVE, *El stock y los servicios de capital en España y su distribución temporal (1964-2007)*.

As a percentage	1980	1995	2007
Stock of capital/employment ratio	71.3	77.8	75.5
Stock of productive capital/employment ratio	65.9	84.9	81.5
Private physical capital/employment ratio	79.7	85.8	81.6
Public capital/population ratio	32.0	70.0	82.8
Residential capital/population ratio	61.8	60.5	71.1

SOURCE: Structural indicators of the Spanish economy and of the EU, Banco de España.

around 7% during the 1994-2007 period. Relative to other advanced economies, capital intensity is particularly high in the construction sector and lower in manufacturing and services.

The crisis has exacerbated the shortfall in the Spanish economy's capitalisation...

As is usually the case in recessions, there has been a sharp fall in gross investment (15.7% in 2009), markedly so in the residential component but also in gross capital formation in capital goods (24% in 2009). Bearing in mind this fall in investment, the likely increase in the rate of capital depreciation during the crisis and the rise in the recorded rate of business closures (see Box 2.1), the stock of non-residential capital may well have declined significantly in the past two years.

The increase in the user cost of capital and the financial position of companies limit the possibilities of recovery in private investment, while the necessary fiscal consolidation will adversely impact public investment. As regards residential investment, any recovery in this variable will be uncertain until the real estate adjustment is over and the excess supply built up has been eliminated. Foreseeably, then, there will be no significant rise in investment demand, meaning that physical capital endowment will continue to be relatively lower than that of other euro area countries.

...leading to a fall in the level of potential output

The main determinant of potential growth, measured in per capita terms, is labour productivity growth, whose level depends in turn on capital per worker and on the efficiency of the factors of production. The low growth of the capital/labour ratio and the scant efficiency gains recorded from 1995 to 2007 help explain the low rise in labour productivity over this period. On the estimates available, each percentage point increase in the capital/labour ratio gives rise to an increase in average labour productivity of 0.35 pp.² Consequently, if Spain were to attain the average capital/labour ratio for the euro area (which is 18 pp higher than the Spanish ratio), labour productivity would rise by 6.5 pp, which would bridge approximately 70% of the gap observed in 2007 between European and Spanish labour productivity. The rest of the productivity gap (2.8 pp) would be attributable to the lesser efficiency of the factors of production relative to these countries.

2.2 HUMAN CAPITAL

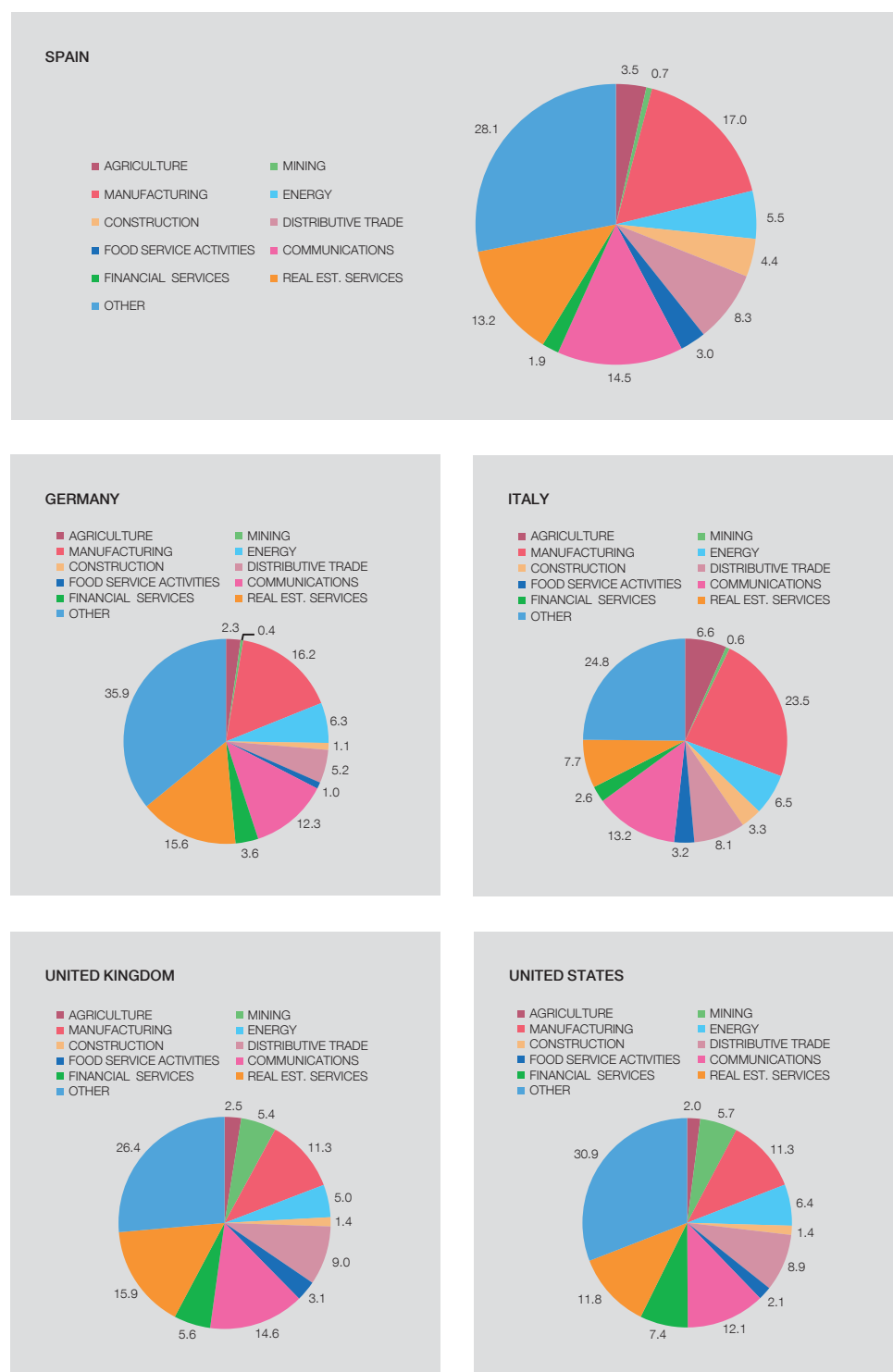
The labour force and the average level of educational attainment also increased notably

The ten years from 1997 to 2007 were one of the periods of highest growth in the Spanish labour force. Running at an average annual rate of 1.43%, this increase was underpinned by the intensity of immigration flows (see panels 1 and 2 of Chart 2.2). The foreign labour force resident in Spain contributed to this average increase by 0.98 pp, compared with the 0.44 pp contribution of nationals. This latter contribution was chiefly based on the rise in the female participation rate (panel 3 of Chart 2.2). In 2009, the growth of the labour force dipped to

2. The estimates of the elasticities of output with respect to physical capital and to human capital are around 0.35 and 0.4, respectively (see A. de la Fuente and R. Doménech (2002), *Human capital in growth regressions: how much difference does data quality make? An update and further results*, CEPR Discussion Paper, no. 3587).

SECTORAL BREAKDOWN OF THE STOCK OF NON-RESIDENTIAL CAPITAL (a)

CHART 2.1



SOURCES: The EU KLEMS Growth and Productivity Accounts, November 2009, and Banco de España.

a. The data are expressed as percentages.

One of the negative aspects of the economic crisis that can most persistently bear on the economy's growth capacity in the medium and long term arises from the adverse impact of the crisis on the economy's stock of capital. This impact derives essentially from the sharp adjustment productive investment has undergone. The destruction of the productive system stemming from business closures during the crisis might also have generated a significant negative effect on the stock of capital which, however, is difficult to estimate. This Box attempts to quantify this effect, drawing on information on the exit of firms from industry in Spain.¹ Firstly, there is a descriptive analysis of the companies that are exiting the market in the current situation of crisis, paying attention both to their number and their sector of activity, size and legal status. Secondly, an estimate is made of the impact of these business closures in terms of loss in the economy's stock of capital.

According to the DIRCE data, in 2008 (the latest year for which information is available) the number of companies that exited the market rose to 398,229, signifying 23.5% more closures than in 2007, the year prior to the outbreak of the crisis. In relative terms, the number of firms that deregistered in 2008 accounted for 11.9% of total active companies, an exit rate more than 2 pp higher than that of 2007² (see accompanying chart). Around two-thirds of the total companies that

deregistered were sole proprietorships or self-employed workers, a percentage 10 pp lower than the historical average, meaning that the closure of mercantile companies appears to have accelerated in 2008. The scant data available for 2009 indicate that the situation might have worsened, given that the number of mercantile companies wound up increased by around 8% in relation to 2008, according to INE statistics on mercantile companies, and the number of self-employed fell by almost 10%, on the latest EPA (Labour Force Survey) data.

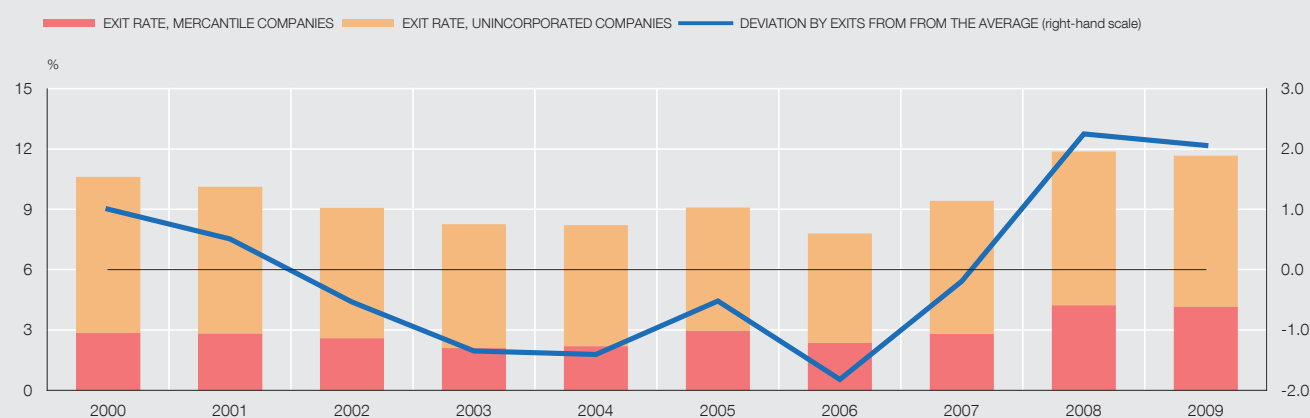
The accompanying table shows the distribution of companies that closed during 2008, according to DIRCE, by sector of activity and workforce numbers, depicting in the first column the rate of change of closures between 2007 and 2008 by sector of activity. As was to be expected, the biggest increase in the destruction of the productive system took place in the construction industry (with a 74% increase in closures), followed by the real estate activities sector. The second column in the table reveals that the construction, other market services and distribution and sale of vehicles sectors amassed two-thirds of total closures. The following columns give the exit rate by size of company. It can be seen that micro-companies, defined as firms with fewer than 10 employees, accounted for more than 98% of total closures in 2008³, a higher percentage than they account for in the total Spanish productive system (around 90%). The percentage of closures with fewer than 10 employees was similar in 2007, although the weight therein of companies with employees was much smaller (scarcely 30% of total closures, compared with 43% in 2008).

1. The data sources used in this Box are, firstly, the DIRCE (Central Directory of Enterprises) maintained by INE, which draws essentially on companies' fiscal data and, on an annual basis, publishes data on the number of active companies in Spain by sector, legal status and workforce numbers, along with some business demographics data such as the entry and exit of companies during the year under analysis. The latest figure provided by DIRCE is for 1 January 2009, i.e. it refers to the year 2008. The second source used is the Social Security system, which provides monthly data on the deregistration of companies with workers affiliated to the general regime or to the special coal mining regime. Taking these data as a basis and bearing in mind the proportion of companies without employees in Spain, an approximate estimate has been made of the total number of companies that exited the market in 2009. Lastly, the information furnished by the Banco de España CBSO-Mercantile Registers data will be used. 2. The exit rate in 2007 was 9.4%, a very similar figure to the average for the period 2000-2006, which was around 9%.

Turning to the estimate of the impact of business closures in terms of loss of installed capital, at least three difficulties are posed. First, DIRCE does not offer information on the fixed capital of companies that close. This is why this Box approaches the capital of companies that have closed under the assumption that such capital is equivalent to the level of property, plant and equipment net of depreciation of compa-

3. 55% of these had no employees, while 43% had between 1 and 9 workers.

BUSINESS CLOSURES BY LEGAL STATUS (% OF STOCK OF ACTIVE COMPANIES)



SOURCES: DIRCE and Banco de España.

nies with similar characteristics in terms of sector of activity (two digits), workforce numbers and legal status, as drawn from the Banco de España CBSO-Mercantile Registers data.⁴ The second difficulty stems from the lack of knowledge about the residual value of the closed company's installed capital, i.e. about the portion of the installed capital's value that a company can recover on its closure. In this case, two scenarios have been considered. The first assumes that the residual value of the capital is zero, i.e. it is assumed that there is no possibility to re-sell or re-use the capital to recover part of its value. The second scenario assumes that 60% of the value of the capital can be recovered at the end of the company's life. Third, no data are available yet on closures for 2009, meaning that an estimate has had to be made drawing on the data provided by the Social Security system.⁵

4. Only firms set up as a mercantile company are obliged annually to file their accounts with the provincial mercantile registers. Accordingly, to make the estimate, it has been assumed that the installed capital of unincorporated companies is zero. The latest data available from the CBSO-Mercantile Registers are for 2007. It will therefore be the value of property, plant and equipment in 2007 that is used as a reference in the estimate. To approximate to the total installed capital of closures each year, the median value of the property, plant and equipment of mercantile companies operating in a specific sector (defined taking the first two digits of the NACE 93) and which have a specific number of employees and legal status has been estimated, with the property, plant and equipment relating to the total closures (or stock of companies) being obtained between 2007 and 2009 by means of their multiplication by the number of companies with these characteristics that have closed (or were active) according to the DIRCE in the year under study. Given that it is reasonable to think that the property, plant and equipment of companies that close is somewhat less than that of the other active companies, an alternative estimate has been made using the median property, plant and equipment of the companies that close in each of the cells defined by a given size, sector and legal status. 5. The estimate of the number of closures in 2009 made using the Social Security system's data is very conservative; consequently, it should be considered as a floor. Alternative estimates, using EPA data for instance, would considerably raise the number of closures for 2009.

On the basis of these assumptions, the first column in the second table shows an estimate of the impact, in terms of installed capital, of the closure of companies in 2007. That year the effects of the crisis had still not been felt, meaning that the impact of the exit of companies could be taken as that for a normal year. It can be seen that company closures that year would have entailed the disappearance of 3% of the economy's installed capital under scenario 1, and of 1% under scenario 2.⁶ Columns 3 and 4 in the tables show that the crisis would have generated an increase in the destruction of installed capital, owing to the closure of companies, in relation to that occurring in 2007, of somewhat less than 2 pp per year under scenario 1 and of 0.70 pp a year under scenario 2, which would be equivalent in both cases to a temporary increase in the rate of depreciation of aggregate capital of a similar magnitude.

In short, this box shows that the current situation of crisis has raised the number of companies that have been obliged to close. The destruction of the economy's stock of capital derived from this phenomenon might therefore have been significant. Business closures, according to the diagnostic snapshot for 2008, were concentrated in the construction, other market services and distribution and sale of vehicles sectors. The vast majority of these companies were, moreover, very small.

6. This percentage would be considerably lower, and would be around 1% in scenario 1, if the median property, plant and equipment of the companies closing were used, instead of that of all the companies with given characteristics. However, since the estimates of the number of closures for 2009 is clearly conservative, multiplying a lower level of property, plant and equipment by a larger number of closures in 2009 would give an estimate of capital destroyed by the crisis that were very similar to that offered in the second table.

1 BREAKDOWN BY SECTOR AND BY WORKFORCE SIZE OF CLOSURES IN 2008 (%)

Business closures	Change 2007/2008	Total 2008	By workforce size				Total
			No employees	1-9 employees	10-19 employees	Over 20 employees	
Mining and quarrying	12.5	0.0	42.3	56.1	1.1	0.5	100.0
Manufacturing and energy	18.5	5.2	50.0	46.5	2.3	1.2	100.0
Construction	74.2	27.2	43.6	54.2	1.5	0.7	100.0
Distribution and sale of vehicles	4.5	21.9	61.5	37.9	0.4	0.2	100.0
Hotels and restaurants	-0.3	9.6	49.6	49.7	0.6	0.2	100.0
Transport	8.2	4.5	63.2	36.1	0.4	0.2	100.0
Post and telecommunications	15.1	0.3	60.0	37.9	1.5	0.7	100.0
Fin. intermediation and insurance	19.3	1.7	77.6	22.2	0.1	0.1	100.0
Real estate activities	49.8	6.3	47.4	52.1	0.4	0.1	100.0
Other market services	17.5	13.7	69.6	29.6	0.5	0.3	100.0
Non-market services	10.4	9.5	64.9	34.0	0.7	0.5	100.0
TOTAL	23.5	100.0	55.8	43.0	0.9	0.4	100.0

SOURCE: DIRCE.

2 ESTIMATE OF THE COST OF BUSINESS CLOSURES

Fixed capital	% of stock of capital destroyed by closures (scenario 1)	% of stock of capital destroyed by closures (scenario 2)	Capital destroyed by closures in 2008- 2009 as % of 2007 stock (scenario 1)	Capital destroyed by closures in 2008- 2009 as % of 2007 stock (scenario 2)
	2007	2007	Annual average	Annual average
Mining and quarrying	1.1	0.5	0.9	0.4
Manufacturing and energy	1.6	0.6	1.8	0.7
Construction	3.9	1.6	7.7	3.1
Distribution and sale of vehicles	2.3	0.9	2.9	1.2
Hotels and restaurants	4.0	1.6	4.3	1.7
Transport	2.1	0.8	2.2	0.9
Post and telecommunications	4.8	1.9	5.5	2.2
Financial intermediation and insurance	3.1	1.2	6.1	2.4
Real estate activities	4.6	1.8	9.1	3.6
Other market services	3.5	1.4	5.2	2.1
Non-market services	2.2	0.9	2.7	1.1
TOTAL	3.0	1.2	4.7	1.9

SOURCES: Social Security and Banco de España.

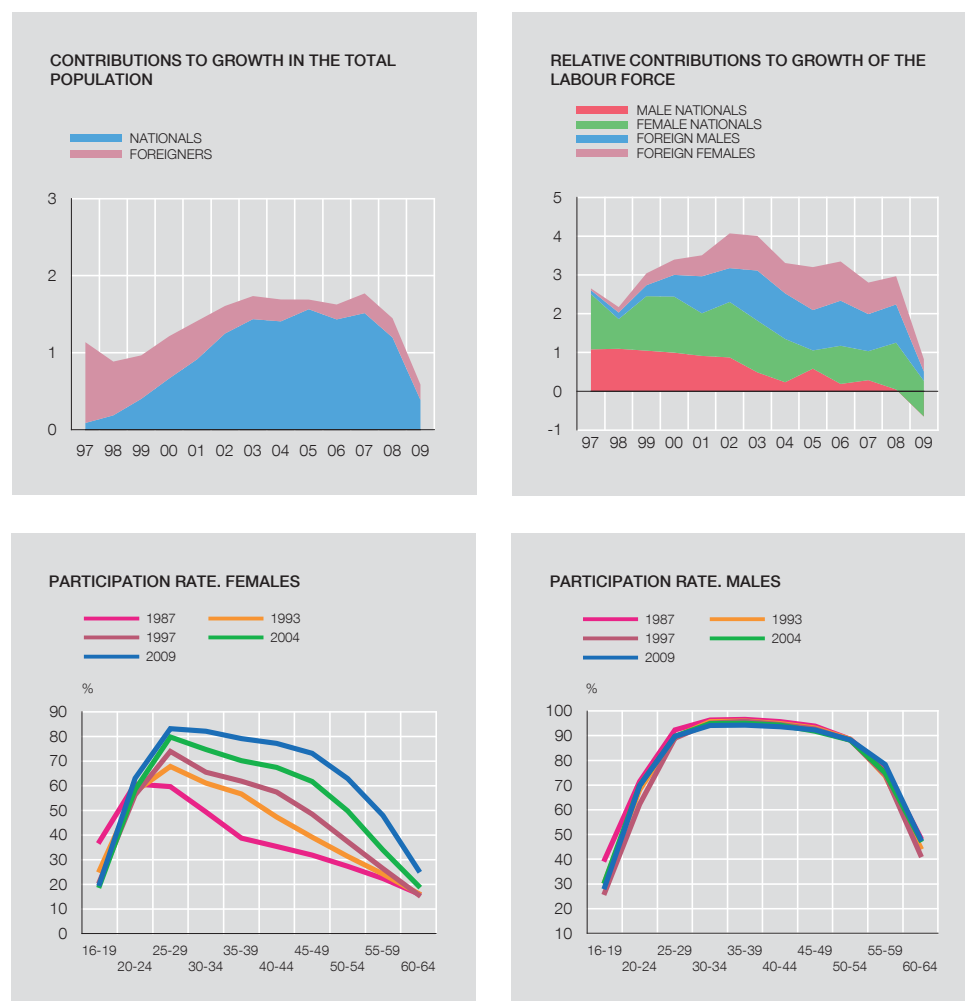
0.59%, with the foreign labour force contributing 0.39 pp, and nationals 0.20 pp, with greatly differing behaviour (panels 3 and 4 of Chart 2.2) between the male (negative contribution of 0.65 pp) and female (positive contribution of 0.92 pp) populations.

An habitual indicator of per capita human capital is the ratio of the weighted sum of the working-age population, with weights based on level of educational attainment, to the figure resulting from this sum assuming that the entire population had reached the maximum level of educational attainment. According to this indicator, the stock of human capital per person of working age is estimated to have increased, between 1995 and 2007, by almost 9 pp, and the gap with the euro area to have narrowed by almost 8 pp, including when adjusted for the relative quality of the educational system (see Table 2.2).³ The increase in human capital was boosted by notable growth in public spending on education. Weighted by the population aged 16 to 64, such spending increased from 58.3% to 81.3% of that corresponding to the euro area average. During the crisis, however, the youth participation rate fell considerably in relation to 2007, especially in the 16-19 age group (by 5.8 pp for males and by 4.1 pp for females), which is partly associated with an increase in the demand for education.

Nonetheless, there is some polarisation of the level of educational attainment of the labour force...

Despite the notable increase in the average level of educational attainment, a high proportion of the working-age population has still not completed secondary education (49% in 2007, compared with 30% on average in the OECD countries). When the high growth of the population with a university education (29% of the population aged 25-64 resident in Spain in 2007

3. To make this adjustment, regard is had to the results of the OECD PISA (Programme for international student assessment) programme and public spending per student. See S. Puente and M. Pérez, "Las series de stock de capital humano y tecnológico en los indicadores de convergencia real", *Boletín Económico*, December 2004, Banco de España.



SOURCE: INE.

HUMAN CAPITAL INDICATORS

TABLE 2.2

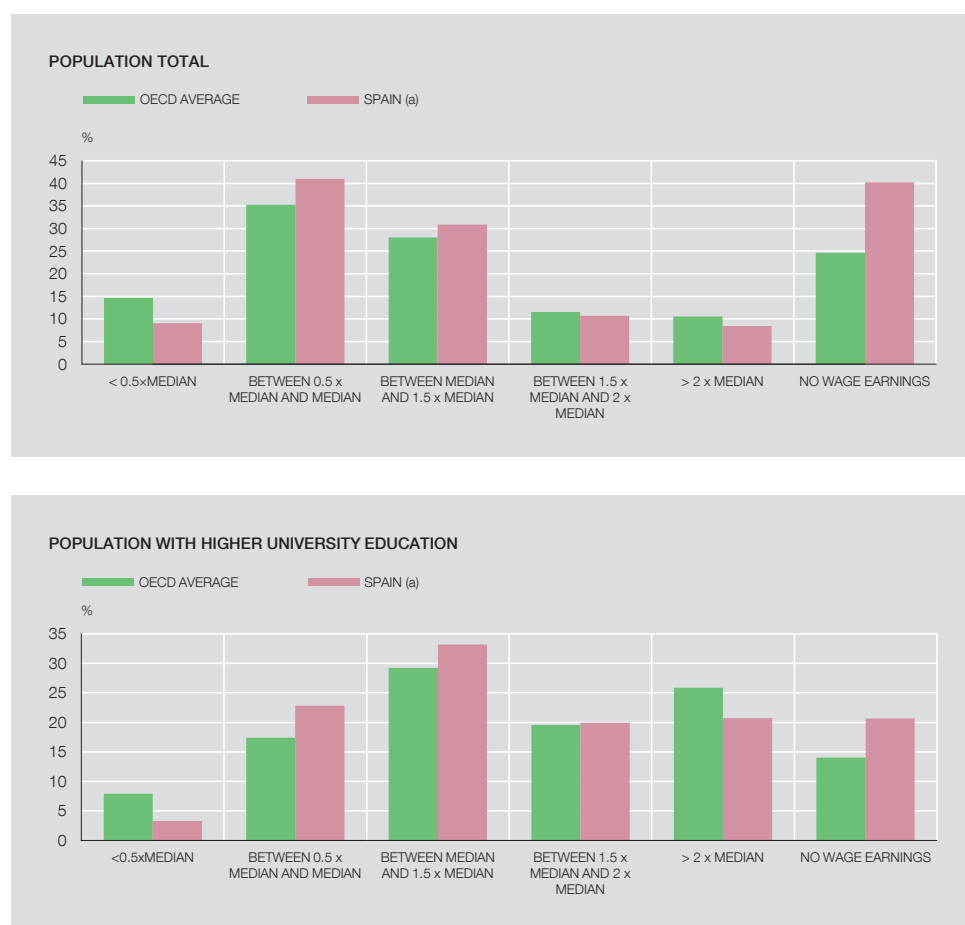
	1995	2007
Human capital per capita (a) (b)	51.4	60.6
Quality-adjusted human capital (b)	50.3	59.1
Population in continuous training (b)	9.6	10.4
Population with higher education (b)	23.9	37.4
SPAIN RELATIVE TO THE EURO AREA		
Human capital per capita (a)	87.5	95.4
Quality-adjusted human capital	85.6	93.0
Public spending on education per capita (a)	71.3	81.3 (c)
Continuous training	223.4	123.8
Higher education	122.6	128.7

SOURCE: Structural indicators of the Spanish economy and of the EU, Banco de España.

- a. The population comprises persons aged 16-64.
 b. Percentages.
 c. Refers to 2006 figures.

DISTRIBUTION OF THE POPULATION AGED 25-64 BY LEVEL OF WAGE EARNINGS

CHART 2.3



SOURCE: Education at a glance (2009), OECD.

a. Data available for 2004.

had a university qualification, compared with 27% on average in the OECD countries) is factored in, this gives a situation in which the weight of the population with solely a secondary education is half that relating to the OECD average (22%, compared with 44%). This polarisation results, therefore, in a notable shortage of medium-skilled workers from the official education system's vocational training programmes.

... labour market returns to education are relatively low...

Another habitual indicator to evaluate the dynamism of human capital accumulation is what is known as wage returns to education. In short, this measures the increase in wage earnings that would be obtained as a result of staying in the education system longer, acquiring higher qualifications before joining the labour market. Insofar as wage earnings were associated with productivity, this indicator would measure the impact of increases in the level of educational attainment on quality-adjusted human capital endowment. However, the interpretation of this indicator should also bear in mind that the recent expansion, by its very nature, may have affected the wages of workers with different skills differently and that the distortions in the Spanish labour markets may give rise to a gap between wages and productivity. Accordingly, wage returns to education are not an exclusive reflection of the effectiveness of the educational sector when it comes to accumulating human capital.

In Spain, the values of this indicator are low as a result of two factors, which are illustrated in Chart 2.3. Firstly, wage levels are somewhat more concentrated than in the average for the

OECD countries (top panel), with only 8.4% of the population with wage income over the double of the median and 9.1% of the population below half the median (compared with 10.5% and 14.7%, respectively, in the reference zone). Secondly, having a university qualification raises to a lesser extent the likelihood of earning wages more than twice the median (around 12 pp in Spain, against 15 pp for the OECD average), which is partly due to a high occupational mismatch among university graduates who, in an excessive proportion, hold jobs whose skills are below their level of educational attainment.

When taking into account also the public financing of education (cost of education, scholarships, etc.) and other economic returns thereto, such as the probability of having a job and the differential impact of direct taxes and of social transfers by income level (unemployment benefits, pensions, etc.), the increase in income resulting from investment in education over the life cycle is even lower in Spain compared with other EU countries: for each additional year of education, the private return to education in Spain is around 7.8%, while in the EU as a whole it is almost 9%. Even so, this return is higher than that of other assets, which justifies private and public investment in education.⁴

... and are on a declining trend

The fact that the wage return to education in Spain is relatively low is the result of the declining trend observed in the past decade. Generally, the studies that use microeconomic data report that it has fallen from around 7% in 1995 to less than 6% in 2006 when a comparison is made of individuals with different levels of educational attainment but with other similar personal characteristics (age, sex, etc.), and who, moreover, perform the same type of work (sector, occupation, type of contract, etc.).⁵ One important factor that has contributed to this decline is the occupational mismatch arising from the fact that many low-skilled jobs are occupied by workers with a high level of educational attainment. Consequently, when indices of the quality of human capital are constructed, weighting the population's levels of educational attainment by the wage return to education, the increases prove to have been rather insignificant, since the positive impact of the growth of the level of educational attainment is partly offset by the negative effects of the lower value of education that stems from occupational mismatch.⁶

Since wage returns to education depend on the relative supply and demand of labour with different skills, and as there is some evidence that the new technologies may have prompted an increase in the relative demand for workers with a higher level of educational attainment, the reduction in wage returns to education is paradoxical. Admittedly, the supply of these workers has also increased considerably; but there has likewise been a similar increase in other countries where, unlike in Spain, increases in wage returns to education have been recorded. Hence, the declining trend of these returns seen in Spain indicates the existence of two potential gaps in the process of human capital accumulation: an insufficient increase in the quality of education, and demand for labour biased towards labour-intensive activities for which the general skills offered by the education system do not prove very productive.

In the future, the growth of human capital will depend to a greater extent on improvements in the quality of education

Looking ahead, several factors that may contribute to increasing the supply of human capital are limited. On one hand, the working-age population will stagnate and even fall in the coming decade. On the latest INE demographic projections, the 16-64 population will decline at an annual average rate of 0.3% in the period 2009-2015 and of 0.17% during

4. See A. de la Fuente and J.F. Jimeno (2009), "The Private and Fiscal Returns to Schooling in the European Union", *Journal of the European Economic Association*, December, vol. 7, no.6, pp. 1319-1360. 5. The data for these studies are drawn from INE's *Encuesta de Estructura Salarial* (Wage Structure Survey) for the years 1995, 2002 and 2006. 6. See A. Lacuesta, S. Puente and P. Cuadrado (2008), *Omitted Variables in the Measure of a Labour Quality Index: the Case of Spain*, Documentos de Trabajo, no. 0835, Banco de España.

the following five years. And on the other, participation rates have little room for growth, given that, except in the oldest cohorts, female cohorts are already very close to those of males. Moreover, the crisis is adversely affecting the youth participation rate, with young people extending their stay in the education system, and the participation rate of older workers, who leave the labour market to a greater extent in recessions and take early retirement. There might be some permanent component to these effects, which could prompt a decline in the labour force, even bearing in mind that, if the current youth population raises its level of educational attainment, in the future their participation rate might be higher. Although immigration might increase once more given the envisaged scenario, where most room for growth in the labour force appears to reside is in the lengthening of working life. Among other measures, this will require changes in the rules governing qualification for and the calculation of retirement pensions, and a reduction in the unemployment rate, for which a labour reform is needed. There is another major factor of risk stemming from the crisis that must be added here, which may adversely affect the accumulation of human capital. As with physical capital, the rate of depreciation of human capital may have increased significantly owing to the longer duration of periods of unemployment. The empirical evidence on the loss of human capital and the subsequent negative effects on the employability and productivity of workers who undergo long periods of unemployment is fairly conclusive (see Box 2.2). While these adverse effects of unemployment duration are likely to materialise to a lesser extent than in previous crises, it cannot be ruled out that the structural unemployment rate, or NAIRU, will increase, with the subsequent reduction in potential output.

Accordingly, under the current demographic and labour scenario, the increase in human capital will tend to be sustained to a greater extent by increases in the working population's level of educational attainment and in the quality of education, and by improved training programmes for the unemployed. There is ample room for improvement in the level of educational attainment by means of lowering the percentage of the population that does not complete secondary education, while improvements in quality require the revision of certain aspects of education policies so as to increase the effectiveness of public spending on education. It would also be advisable to improve the way in which training programmes for the unemployed are managed.

2.3 TECHNOLOGICAL CAPITAL

Technological innovation activities increase potential growth by means of the introduction of product innovations, which may also translate into the emergence of new companies and industries; the introduction of process innovations, normally in parallel with the incorporation of new machines; and organisational improvements, which harness the complementarities between factors of production, thereby providing for greater productive efficiency.

Technological innovation activities also increased...

R+D spending as a percentage of GDP rose from 0.8% in 1995 to 1.35% in 2008. Other indicators also show advances in this area: personnel in R&D activities as a percentage of the employed population increased by 0.5% in 1995 to 1.1% in 2008. Consequently, the gap with the euro area regarding the technological capital/GDP ratio narrowed by 23 pp from 1995 to 2007 (see Table 2.3).

... albeit with some imbalance between public and private financing...

However, the technological investment drive has been undertaken with some imbalance between public and private financing. While the public budget for spending on R+D+i showed growth rates of 25% per annum in the period from 2004 to 2008 and private-sector spending on R+D+i increased considerably (from 0.4% of GDP in 1995 to 0.74% in 2008), private financing, as a proportion of the total, fell from 48% in 2004 to 45% in 2008, a figure that contrasts with the target of 66% established under the Lisbon Strategy. Consequently, it may be

Lasting unemployment may lead to an erosion of the skills acquired through work experience, which can affect future wage earnings. According to the EPA data, the proportion of the long-term unemployed has risen from 22% in early 2008 to almost 35% in 2009 Q4, meaning almost 1.5 million more people are jobless.¹

Various international studies show that the long-term unemployed have greater difficulty finding a new job and their return to the labour market is associated with permanent wage losses. A long-term wage decline of between 10% and 25% of the initial wage has been quantified in the United States for those workers who lost their jobs in the 1993 and 1982 crises, respectively.² In Germany, a comparable estimate for workers who lost their job during the 1982 recession would be around 13%. In Spain's case, as there have not recently been any appropriate wage statistics to make these calculations, the losses arising from a prolonged spell of unemployment have been evaluated by examining the changes in the likelihood of moving out of unem-

ployment into a job. Arellano, Bentolila and Bover (2002) estimate that the exit rate from unemployment for those who have been jobless for more than one year may be up to 12 pp lower than for those unemployed for three months.

The availability of new statistical sources with wage information for the same workers at different points in time [e.g. the *Muestra Continua de Vidas Laborales* (Continuous Survey of Working Life) conducted by the Secretariat of State for Social Security, allows a calculation to be made of the differences in wage earnings between two people – one of whom lost their job during 1993 Q1, while the other continued working – in the same sex, age, educational attainment and sector of employment categories. These wage differences are assessed taking into account the fact that, according to the latest Social Security records, the average wage in 1992 was €1,180 and that income takes a value of zero in those years in which the individuals do not work.³ For the purposes of this comparison, all workers

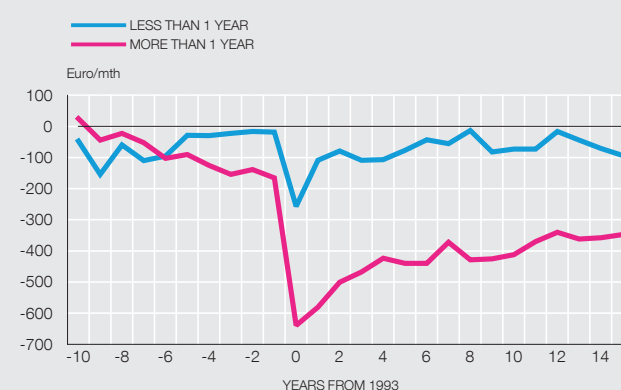
1. Those who have been out of work for more than one year are considered to be long-term unemployed. 2. For the case of the United States, the evidence is in Jacobson, Lalonde and Sullivan (1993), "Earnings Losses of Displaced Workers", *American Economic Review* 83 (4), pp. 685-709. For the case of Germany, Bender, Schmieder and Von Wachter (2010), *The Long-Term Impact of Job Displacement in Germany during the 1982 Recession on Earnings, Income, and Employment*, Working Paper DP0910-07, Columbia University.

3. The average shown is expressed in constant 1993 euro and includes the stochastic imputation of those wages that are higher than the maximum contribution base. The conclusions in the medium term are not notably affected by this imputation. Further, if the income derived from benefits were to be taken into account, similar conclusions would be reached. Evidently, in that case, the fall in income during the first three years after job loss (the new-job search period) would be less.

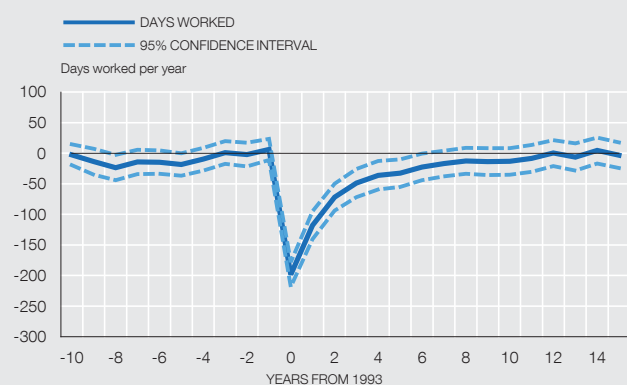
1 LOSS OF PRODUCTIVITY (a)



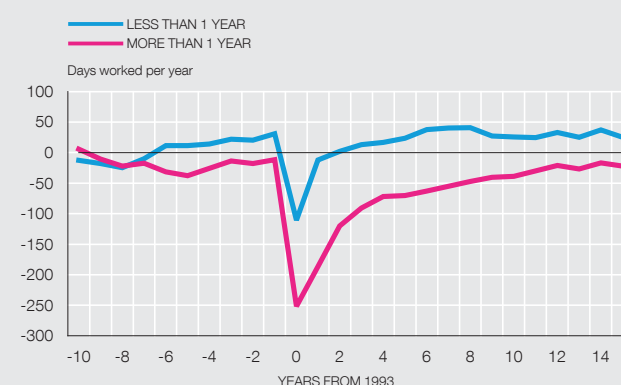
2 PRODUCTIVITY LOSSES BASED ON UNEMPLOYMENT DURATION (a)



3 DIFFERENCE IN DAYS WORKED (a)



4 DIFFERENCE IN DAYS WORKED BASED ON UNEMPLOYMENT DURATION (a)



SOURCE: Banco de España.

a. The differences in productivity and working days are calculated in all cases with respect to the persons who continued working.

who were at least one year in the company before losing their job and the unemployed who did not return to their initial company following job loss are considered. It can be seen that, before the period of unemployment, the group of those made unemployed received, on average, slightly less than the group who remained in employment. The fact of being jobless considerably increased the differences between

the two groups and, as the unemployed progressively moved back into a job, the differences narrowed. However, six years after losing their jobs, wages remained appreciably below those in the group who retained their job, and this difference holds even beyond 10 years (see Panel 1). This loss is more marked for those who were more time unemployed, as can be seen in Panel 2, where wages in the case of

LOSSES IN PRODUCTIVITY ASSOCIATED WITH THE 1993 CRISIS AND COMPARISON WITH THE CURRENT CRISIS

Panel A: Effect of job loss in 1993 Q1 on average monthly wage between 1998 and 2003 (a) (b)

%	
TOTAL	-17.1
SEX	
Males	-18.8
Females	-16.6
UNEMPLOYMENT DURATION	
Less than 1 year	-3.1
More than 1 year	-29.2

Panel B: Percentage of employed losing their job in relation to the average for the quarter (c)

	2008 Q4	2009 Q1	1992 Q4	1993 Q1
SEX				
Males	0.96	0.94	0.90	0.94
Females	1.00	1.04	1.21	1.13
AGE				
16-24	2.94	2.56	2.48	2.16
25-34	1.26	1.33	1.07	1.08
35-45	0.89	0.96	0.59	0.63
Over 45	0.57	0.60	0.59	0.73
SECTOR				
Agriculture	1.07	1.46	1.11	1.49
Industry	0.83	0.85	0.95	0.94
Construction	2.11	2.33	1.54	1.70
Services	1.00	0.98	1.00	0.99
General government	0.52	0.46	0.69	0.66
OCCUPATION				
Managerial and professional	0.42	0.38	0.65	0.55
Middle-ranking professionals	0.83	0.71	0.73	0.69
Clerical	1.24	1.10	1.44	1.07
Manual	1.44	1.58	1.12	1.31

SOURCES: INE (EPA) and Social Security MCVL (Continuous Survey of Working Life).

a. Prepared in-house using MCVL.

b. The effect is calculated as the average wage received 5-10 years after job loss, in percentage terms, in relation to the last wage received before becoming unemployed. The median of individual losses is shown.

c. Calculations based on EPA data.

the unemployed who returned to employment after less than one year are compared with the wages of those who were unemployed for more than one year.

In terms of the median, workers who lost their job in 1993 Q1 saw their wages diminish by close to 17% in the 6-10 years following job loss. There are no major differences between men and women. The loss is very small (3%) for those workers who are unemployed for a short time, but substantial (30%) for those who are jobless for more than one year (Panel A of the accompanying table). These results are consistent with the assumption that permanence in unemployment during the 1993 crisis generated a notable loss of human capital in the medium term.

To extrapolate these results to the current crisis, it would first be necessary to consider the differences between the characteristics of those who became unemployed in the previous crisis and those who have recently become jobless, and between the duration of each of the groups in unemployment, along with the way in which recovery comes about in the current episode of crisis. Concerning the first two points, some evidence can be had from EPA flows. As is specified in Panel B of the accompanying table, the composition of those becoming unemployed in 1993 shows certain similarities with the composition of those in the current crisis, since in both episodes there was both a contraction

in the construction industry and a fall in house prices following an expansionary period. Nonetheless, in the current crisis, males, youths, unskilled workers and construction workers are beset by a relatively greater rate of job destruction. Conceivably, a priori, the specific human capital of labour that accumulates in lower-skilled jobs is less than in the remaining occupations, meaning that the estimated effects for the 1993 crisis would be at a higher level than expected. Also, at present, long-term unemployment is less than in 1993 (when, on EPA figures, it amounted to almost 50%), whereby these two directions would suggest an aggregate loss lower than 17% for those who lose their job in the current crisis. However, the recovery of the economy after 1993 was relatively swift and sharp, especially for services, but also for construction, and it was possible to absorb in a relatively short period a sizeable amount of unskilled labour that was unemployed, while in the current situation, not being able to use the exchange rate may lead the real wage adjustment to run for a longer period. Although the exit rate from unemployment remains relatively high (25% in quarterly frequency terms, rising to 56% for the unemployed who have been in this situation for fewer than three months, according to the Labour Observatory of the Economic Crisis)⁴, it will be necessary to wait to observe how developments are unfolding.

4. See <http://www.fedea.es/observatorio/>.

warranted to maintain a public budgetary drive in this area⁷, particularly in phases of cyclical weakness, since there is empirical evidence suggesting that this type of investment is of a somewhat procyclical nature.

... while headway was made in giving backbone to the Spanish innovation system

In addition to this public drive in terms of R+D+i spending, progress was also made on the design of the programmes and initiatives through which public aid is channelled. That said, certain gaps remain which could be tackled in the implementation of the new Science Act. Such gaps include improving the governance of the public research system and the career stream for research personnel; the reorganisation of the official research bodies (OPIs by their Spanish acronym); the creation of an autonomous agency entrusted with the financing of R+D+i; support for the start-up of technology-based companies from public research entities; and greater flows of workers between these entities and private-sector firms. Likewise, there is significant room for improving the effectiveness of public support to R+D+i by cutting red tape and making access to public incentives easier.

Corporate structure and technology-transfer problems hamper efforts to harness innovation...

The transmission of technological breakthroughs to activity is slower in Spain than in other advanced economies owing to technology-transfer problems from the research sector towards the final goods and services sectors. Among other factors, these problems are a reflection of the scant collaboration between research centres and companies, shortcomings in the functioning of science and technology parks, and the restrictions on the business activities of certain groups of researchers.⁸ Moreover, Spanish firms' absorptive capacity in respect of

7. See Á. Estrada and J.M. Montero (2009), *R&D investment and endogenous growth: an SVAR approach*, Documentos de Trabajo, No. 0925, Banco de España. 8. *Informe Anual 2009*, Fundación COTEC.

%	1980	1990	1995	2007
Technological capital/GDP	2.9	3.5	4.4	5.9
R+D expenditure/GDP	...	0.8	0.8	1.3
Public R+D expenditure/GDP	...	0.3	0.4	0.6
Private R+D expenditure/GDP	...	0.5	0.4	0.7
Applications for patents per resident (a)	1.1	6.5	9.9	28.6
SPAIN RELATIVE TO THE EURO AREA				
Technological capital/GDP	24.8	33.8	41.9	54.9
R+D expenditure/GDP	...	45.2	47.0	68.5
Public R+D expenditure/GDP	...	29.1	61.8	82.0
Private R+D expenditure/GDP	...	34.5	36.9	60.1
Patent applications per resident (a)	3.2	8.7	11.8	17.5

SOURCE: Structural indicators of the Spanish economy and of the EU, Banco de España.

a. Per 1 million inhabitants.

technology, which is determined by the experience they have built up in research activities, is scant.⁹ While it is true that the Spanish productive system comprises - to a greater extent than other developed countries - small and medium-sized enterprises specialising in medium or low-technology products and which have a lesser propensity to innovate, large corporations too innovate relatively less, with the difference in services sector companies proving particularly striking.¹⁰

As is known, labour skills and the provision of training by companies play an important role in the undertaking of innovative activities and in the assimilation of technological processes generated outside the company. There is evidence in Spain suggesting that temporary hiring has an adverse impact on business innovation, the roots of which lie both in the lesser motivation that derives from the low probability that these workers have of achieving a permanent employment contract, and in the lesser likelihood that they will receive in-house training.¹¹

... and there is ample room for improving results

Significant progress has been made in R+D+i results, with higher growth in the pertinent indicators than in other advanced economies. Thus, for instance, the number of patents per one million inhabitants climbed from 9.9 in 1995 to 28.9 in 2007 (see Table 2.3). Spanish scientific production has also grown swiftly: from 2.5% of the world total in 2000 to 3.2% in 2007.¹² However, despite this headway, Spain's relative position regarding technological and scientific production, once other indicators of its impact are taken into account, does not appear to have changed substantially.¹³

3 Efficiency in the use of factors of production

In addition to the accumulation of physical, human and technological capital, potential growth feeds on advances in the efficiency in the use of such factors of production. To measure productive efficiency, productivity indicators are used. These habitually refer to the labour factor

9. See P. López and J.M. Montero, *Understanding the Spanish business innovation gap: the role of spillovers and firms' absorptive capacity*, forthcoming as a Banco de España working paper. 10. See E. Gordo (2005), "Características de la innovación tecnológica en las empresas españolas", *Boletín Económico*, June 2005, Banco de España; and L. Abramovsky, J. Jaumandreu, E. Kremp and B. Peters (2004), "National differences in innovation behaviour: facts and explanations", mimeo. 11. C. Albert, C. García-Serrano and V. Hernanz (2004), "Firm-provided training and temporary contracts", *Spanish Economic Review*, Vol. 7, No. 1, pp. 67-68. 12. *Informe Anual 2009*, Fundación COTEC. 13. In fact, the indices of the impact of Spanish scientific production or the position of Spanish universities in the habitual rankings (Shanghai, etc.) do not show significant improvements.

or, once the contribution of the different types of capital has been discounted, to total factor productivity (TFP).¹⁴ This latter indicator proxies the effects on economic growth of technological progress not incorporated into capital and other advances in the allocation of productive factors to alternative sectoral activities and in their organisation within companies. International comparisons and the changes over time in TFP allow conclusions to be drawn on possible changes in the relative contributions of the various determinants of economic growth. These conclusions, however, should be viewed with some caution, since these indicators are not free from measurement problems either at the aggregate scale or, in particular, in their sectoral decomposition. Further, it should also be taken into account that low TFP growth economy-wide may, on occasions, mask significant progress in management and gains in international competitiveness at specific firms. This is precisely the case of the Spanish economy, in which certain companies have consolidated positions of world leadership in several industries in recent years.

Recent economic growth came about due to the increase in factors of production, not so much to efficiency gains...

During the 1995-2007 period, economic growth in Spain was essentially based on the increase in employment, while conversely, the increase in TFP was far lower than that recorded in previous periods (Chart 2.4). Although as far as the sources of growth are concerned there are some cross-sectoral differences, the slowdown in TFP in recent years was fairly generalised. Even in manufacturing industry, where the contribution of the growth in employment over the last decade prior to the crisis was practically non-existent, a considerable reduction in efficiency gains can be observed. In construction, it was the contributions of employment and of non-technological capital that provided for the strong growth of output, with the contribution of TFP in this sector proving particularly negative. The increase in TFP in the finance sector was related to specific innovation processes that were developed in step with the strong credit expansion and which, in some cases, did not prove sustainable.¹⁵

... and was based on productive specialisation in sectors of low productivity growth

The low growth of TFP was also the outcome of the concentration of productive resources in labour-intensive and low-productivity-growth sectors, to which numerous factors contributed. The excessive expansion of credit proved particularly favourable to sectors, such as construction and real estate development, that produce or trade assets that may be used as collateral for loans.¹⁶ Losses in competitiveness, in turn, made investment opportunities in the tradeable-goods as opposed to the non-tradeable-goods sector less attractive. And, finally, without seeking to provide an exhaustive list, abundant labour supply arising from immigration, the favourable tax treatment of house purchases, and other labour- and property development-related regulatory factors were also particularly propitious for the growth of real estate activity.

As a result, productivity growth was significantly lower than in other developed countries

The introduction of new information and communications technologies is, in principle, conducive to TFP growth through, above all, changes in working arrangements and improvements in productive efficiency. The empirical studies available highlight that the positive effects of the

¹⁴. The measurement of TFP requires estimates of the amounts of factors of production (capital, labour, raw materials, etc.) used to obtain a certain amount of output, and of the elasticities of output in respect of each of the factors of production. To measure the labour factor, total hours worked weighted by the quality of the labour factor are used, while for capital an estimate of productive services provided by the stock of installed capital is used. The methodology available to make estimates of inputs and of their elasticities has been internationally developed and harmonised [see, for example, Marcel Timmer, Mary O'Mahony and Bart van Ark (2008), *The EU KLEMS Growth and Productivity Accounts: An Overview*, University of Groningen and University of Birmingham (www.euklems.net)]. Nonetheless, when using TFP data it must be borne in mind that the difficulties these estimates pose are particularly relevant in the case of some economic sectors. For an assessment of how alternative assumptions used in estimating TFP affect the results obtained in the case of the Spanish economy, see J. Segura (2006), *La productividad en la economía española*, Fundación Ramón Areces, where it is shown that the low growth of TFP since the mid-1990s cannot be attributed to the use of specific assumptions for its measurement. ¹⁵. The well-known difficulties of precisely measuring output in this sector should also be borne in mind. ¹⁶. See O. Arce, J.M. Campa and A. Gavilán (2008), *Asymmetric collateral requirements and output composition*, Documentos de Trabajo, No. 0837, Banco de España.



SOURCE: The EU KLEMS Growth and Productivity Accounts, November 2009.

a. The data depict the contributions of the various factors, by sector, to economic growth.



SOURCE: Structural indicators of the Spanish economy and of the EU, Banco de España.

new technologies on productivity come about, above all, due to efficiency gains arising from the complementarity between technological capital, human capital and the reorganisation of work within companies. In countries such as the United States and the Nordic economies, where the possibilities of staff reorganisation are not especially constrained, a strong acceleration in TFP associated with the introduction of new technologies is observable. In contrast, the greater constraints existing in Spain have meant the introduction of these technologies has been slower and their impact on productivity less, meaning that the gap between labour productivity and TFP between Spain and other advanced countries has widened considerably (Chart 2.5).

The recent rise in the productivity growth rate cannot be interpreted as a lasting improvement

In the past two years there has been swift growth in apparent labour productivity, with growth rates of 0.7% in 2007, 1.5% in 2008 and 3.1% in 2009. Nonetheless, it would be mistaken to interpret this rise as a genuine efficiency gain resulting from increases in TFP. The data on the stock of capital needed to calculate this variable are only available with a lag of several years, meaning figures on its most recent behaviour cannot be obtained. In turn, the diminished weight of activities with lower productivity growth, unlike the case during the expansion, would account for a rise in this variable attributable to the temporary effect arising from the change in sectoral composition. Finally, the growth rate of TFP has a very volatile behaviour, whereby its average values over lengthy periods must be taken to detect significant changes.

Efficiency gains depend essentially on institutional factors...

The allocation of production factors to specific productive activities and the more or less efficient mix of such factors within companies may be influenced both by working regulations and by competitive restrictions in the market for goods and services. Such restrictions constrain efficiency gains and raise the cost of business start-ups with productive investment projects, favouring the maintenance of companies with lower productivity.

... in particular, those arising from labour legislation...

As regards labour legislation, two aspects are particularly counterproductive. Firstly, the high incidence of temporary hires and their predominant role in employment adjustments not only adversely affect entrepreneurs' and employees' incentives to invest in human capital, but they also make the closer adaptation of working arrangements to new technologies less attractive. Hence, on one hand, companies resort to continuous labour turnover instead of harnessing the productivity gains that arise from the experience that longer employment periods give; and, on the other, faced with the need to shed labour, the jobs that are first destroyed are those held by temporary employees, who are less costly to dismiss, instead of lower-productivity jobs, held by workers with permanent contracts, where the dismissal costs are higher. As to collective bargaining, the prevalence of industry-wide, regional and national agreements as opposed to firm-level agreements, and their scant adaptability to changing conditions stemming, for instance, from the introduction of new forms of production, frequently prevent numerous small and medium-sized enterprises from reorganising their workforce in the quest for greater efficiency. As shown during the crisis, this lack of adaptability, from which mostly large companies with their own collective bargaining agreement draw benefit, has too often resulted in the failure of firms which, in another setting, might have been viable over the medium term.

... which determine the dynamics of business start-ups and failures

In a modern economy, economic growth comes about through the continuing reallocation of production factors within companies and production sectors. Largely, this reallocation of resources is carried out through the process of business start-ups and failures, meaning that obsolete companies and business models are replaced by new institutions and more productive models, which generates notable productivity gains. Certain regulations for goods and services markets that impose entry barriers and restrict competition hinder this process of "creative destruction". Various studies have attempted to measure the productivity gains derived from sectoral reallocation and, although the results depend on the measurement method used and on the period, country and economic sector under analysis, a general conclusion may be drawn for Spain's case: to a greater extent than in other countries, productivity growth occurs in pre-existing companies and does not come about so much due to the entry of more efficient companies replacing less productive ones.¹⁷

4 Policies to boost potential growth

Supply-side policies combine budgetary measures and regulatory changes

To boost potential growth and make productivity more dynamic requires a major drive on the part of all agents to increase efficiency. Entrepreneurs have a particularly important role in improving corporate management, staff training and the upgrading of skills, and in routing investment towards the most competitive sectors. The public authorities can exert influence on household investment decisions in human capital and on business decisions regarding physical and technological capital by means of regulations and budgetary measures that lay down the appropriate incentives. These instruments can affect the costs and benefits of different alternatives in respect of investment and the organisation of factors of production, and promote the channelling of productive resources towards more efficient activities. Among the set of regulations, those governing the markets for goods, services and labour are particularly relevant. Human capital investment decisions depend partly on wage returns to education and on labour stability. And these, in turn, are determined by labour regulations, which also affect

17. See P. López-García, S. Puente and Á.L. Gómez (2007), *Firm productivity dynamics in Spain*, Documentos de Trabajo, No. 0739, Banco de España.

efficiency by means of the limitations they introduce into working arrangements and the management of work within companies. As to the regulation of competition in the market for goods and services, decisions to invest in physical and technological capital and on the sectoral allocation of factors of production are influenced by public-sector participation in certain industries, obstacles to business activity through opaque administrative or regulatory rules, the administrative burden weighing on start-ups and barriers to trade.

Supply-side policies must be carefully designed in order to be effective...

It is important that the measures implementing supply-side policies should, in order to be effective, be clear (precisely defining objectives and instruments) and straightforward (using the least possible number of instruments per objective). The use of overly complex instruments entailing excessive bureaucratic and administrative obstacles should be avoided. Frequently, the lack of coordination between different general government bodies and between these and local and regional entities leads to an interplay of different instruments that are contrary to simplicity and efficiency. In a situation like the present, in which budgetary consolidation is a high priority, the effectiveness of transfer programmes seeking to influence decisions by private agents or for the provision of public goods (education, training, etc.) should be rigorously assessed.

... and be structured so as to complement one another

For supply-side policy measures to be consistent, their complementarity must be taken into account. Budgetary measures prove more effective when the regulatory framework is the appropriate one and, in turn, certain regulatory changes may have a positive budgetary impact, since by helping reduce the public debt they increase the budgetary room for manoeuvre available. For example, on certain estimates, structural reforms would, through their impact on productivity in the medium term, significantly slow the increase in public-sector indebtedness and mitigate the adverse short-term impact on GDP that a fiscal consolidation might have.

The Sustainable Economy Law adds fresh impetus to supply-side policies

The Sustainable Economy Law envisages a raft of measures aimed at creating employment and at achieving a new economic model, through the attainment of five objectives: competitiveness, environmental sustainability, the normalisation of the housing sector, innovation and vocational training, and support to new economic sectors. Along with the development of this legislation, other measures have been announced. These include the Science Law and those envisaged in relation to the modernisation of justice, the reform of the Administration, the overhaul of the financial system, combating fraud and the shadow economy, boosting innovation and competitiveness, sectoral modernisation, the development of a sustainable energy model, transport, employment and the welfare state. The result is a wide-ranging action programme, though desirably it should all be organised by ranking and prioritising the most relevant and pressing reforms.

The implementation of these legislative initiatives offers a fresh opportunity for further progress in improving the regulation of goods and services markets and in setting in place more effective sectoral policies. Such action is essential if potential growth is to pick up.

Reforming the education system is a pressing priority...

Among the structural reforms that require tackling, that of the education system is essential for achieving an increase and improvement in human capital. Although the Spanish population's level of educational attainment has increased considerably, there still remains some room for improvement in areas such as the shortage in the supply of medium-level skills and the raising of the standards of university education, at least in the segments to which most of the student population accede, and in particular among immigrants' children, who achieve poorer results and are more likely to drop out of the official system than nationals.

The restrictions on public spending on education are not a particularly significant factor when explaining these shortcomings. International evidence shows that there is no clear relationship

between spending on education and the indicators of education system results. And the Spanish experience shows that results have not closely followed the increase in spending in recent years. Hence the emphasis should be on reforms that enable an increase in the efficiency of the resources earmarked for education. Some aspects of education policies – in particular regarding syllabus design, post-secondary education other than university and the promotion of educational excellence in university teaching – are essential in this respect. It is also important that educational and labour reforms should be consistent and complementary, so as to overcome the evident mismatch between the education system and the labour market.

... along with the re-design of incentives to accumulate technological capital...

Likewise, to increase the accumulation of technological capital, changes must be considered to the current system of incentives for R+D+i. Although notable efforts have been made, the level of spending both on R+D+i and on information and communications technologies (ICT) remains significantly lower in Spain than in other advanced countries, and the spillover effects of public financing on private investment appear, on the evidence available, to be fairly low, despite the fact that Spain has one of the OECD's most generous tax credit systems for R+D+i. This clearly indicates that there is room for improvement in the mechanisms for managing incentives for R+D+i and that the setting in place of rigorous evaluation systems for the programmes under way is especially necessary.

... the management of active labour market policies...

The importance of the reform of labour regulations and of employment policies to improve the functioning of the labour market has been addressed in depth in Chapter 1 of this report. It suffices here to indicate some of the consequences in respect of increasing productivity and medium and long-term growth. From this perspective, mention should be made of the importance of active labour market policies. These are aimed at increasing workers' employability and productivity by means of specific training and the reduction of the duration of unemployment spells, the goal being to address the necessary sectoral reassignment of employment from sectors which, as a result of the crisis, will undergo a permanent adjustment towards alternative sectors with greater growth potential.

... a far-reaching reform of hiring arrangements...

From the standpoint of productivity growth, the duality of the current hiring system has adverse consequences for the accumulation of human capital and for the incentives for efficient working arrangements. For both employees and employers, investment in company-specific training is hardly profitable if the duration of the employment relationship is short. This is because both sides anticipate that, in the event of the need for labour shedding, temporary workers will be the first to lose their jobs, irrespective of their productivity relative to permanent employees. Also, business needs regarding regional and occupational mobility are ultimately met through temporary hires, instead of harnessing the efficiency gains arising from the reorganisation of a more stable workforce.

... and the reform of collective bargaining

Similarly, the way collective bargaining agreements are structured and their content are not conducive to the reorganisation of productive resources with a view to increasing productivity. Collective bargaining agreements scarcely lend themselves to adaptation to the economic and technological changes that companies must face; they introduce significant wage rigidity mechanisms and restrict regional and occupational mobility. The possibilities of introducing new forms of organising work that enhance efficiency are also constrained by sectoral agreements at the provincial level. The content of these agreements evidences a high degree of inertia and notably restricts both business decision-making capacity concerning the management of human resources and the very competitiveness of companies.