

## THE WEAKNESS OF BUSINESS INVESTMENT IN THE ADVANCED ECONOMIES

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### Introduction

The recovery under way in numerous developed economies following the Great Recession is proving to be weak and slow, held back partly by sluggish gross fixed capital formation. This is a worrying development, insofar as investment plays a crucial role in determining the accumulation of physical capital and, consequently, the possibility for future growth in an economy. Moreover, the weakness of investment in the most advanced economies is not a recent phenomenon, as shown by the decreasing share of this aggregate in gross domestic product over recent decades, even when the progressive reduction in the relative prices of capital goods associated with technological innovation is taken into account.

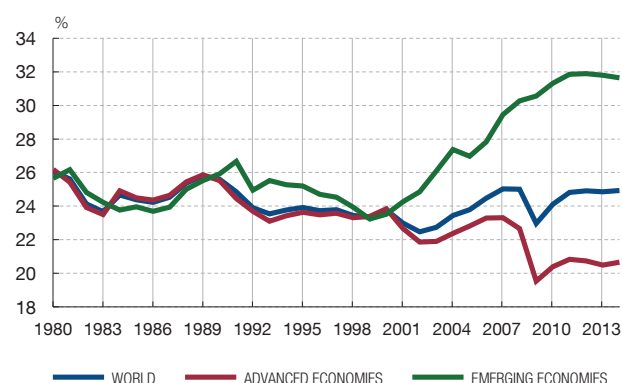
This article analyses the behaviour of business investment in some of the main advanced economies for two purposes. First, it aims to identify the structural factors that may have been responsible for the tendency for investment to decline progressively as a proportion of GDP over the last three decades; and second, it seeks to determine the extent to which business investment during the Great Recession and the subsequent recovery has been in line with its usual determinants, or whether it is necessary to appeal to other factors to explain its behaviour.

The structure of this article is as follows. The next section contains a descriptive analysis of gross fixed capital formation for a broad range of advanced economies, with particular emphasis on business investment, since this is the component that has the most direct impact on capital accumulation and on medium and long-term GDP growth. The third section considers those structural or longer-term elements which may help to explain the tendency for weakness that was already apparent prior to the crisis and that, therefore, has implications for the prospects for recovery of investment in the advanced economies. Of these elements, the following are worth highlighting: the shift in global production and investment towards emerging countries, the changes in the productive structure of the developed economies and the technological progress that drives investment in intangible assets. The fourth section presents the results obtained from estimating econometric models (an accelerator model, an error correction model and an autoregressive vector model) for business investment in the United States, the euro area and the United Kingdom, in order to analyse the impact of various real and financial factors on business investment in recent years, with particular emphasis on the recovery following the Great Recession. The fifth section concludes with a discussion of the possible relevance of these factors for the prospects for recovery of investment in the advanced economies.

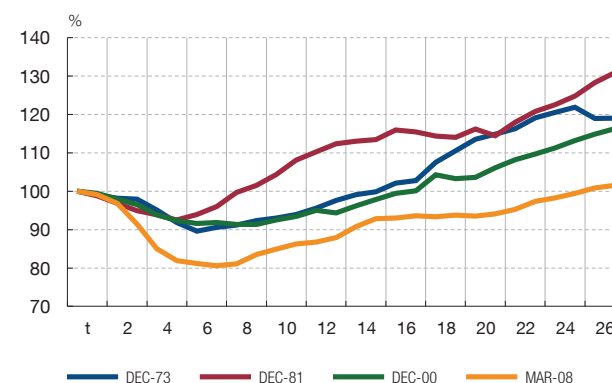
### Main features of investment in the developed economies

Non-residential private investment (i.e. business investment) is the most important component of gross fixed capital formation, on account of its size and of its relevance to capital accumulation and, thus, medium and long-term economic growth. However, as background to its behaviour, there follows a brief discussion of developments in total investment and in its other components (apart from business investment), in both the developed and emerging countries.

TOTAL INVESTMENT (% of GDP)



BUSINESS INVESTMENT IN DEVELOPED ECONOMIES (a)



SOURCES: IMF, OECD and Banco de España.

a The developed economies series corresponds to the aggregate of the United States, the United Kingdom, the euro area and Japan weighted by their weight in PPP.

As can be seen in the left-hand panel of Chart 1, investment,<sup>1</sup> as a proportion of GDP,<sup>2</sup> remained relatively stable in the developed and emerging countries until the end of the 1990s. Thereafter, however, the behaviour of investment varied markedly between the emerging economies, in which a progressive rise was recorded, and the advanced economies, in which it began to show signs of weakness. These differences were accentuated during the most acute phase of the international financial crisis: in 2008 and, especially, 2009, investment declined sharply in the developed economies, leading to a fall in this aggregate at the world level of around 4 pp of GDP. Following a slight recovery in 2010 and 2011, investment has held steady as a percentage of GDP, albeit at 2 pp below its pre-crisis levels. In the emerging economies, on the other hand, investment as a percentage of GDP increased strongly between 2000 and 2011, since when it has held steady at historically high levels.<sup>3</sup>

A large part of the fall in investment during the Great Recession and of the discrepancies observed across countries relates to the behaviour of residential investment; this type of investment, which accounts for somewhat more than 20% of total investment in advanced economies, was that which showed the most notable decline (especially in countries that had experienced a property boom before the financial crisis), and that remained furthest from its pre-crisis level in 2014.

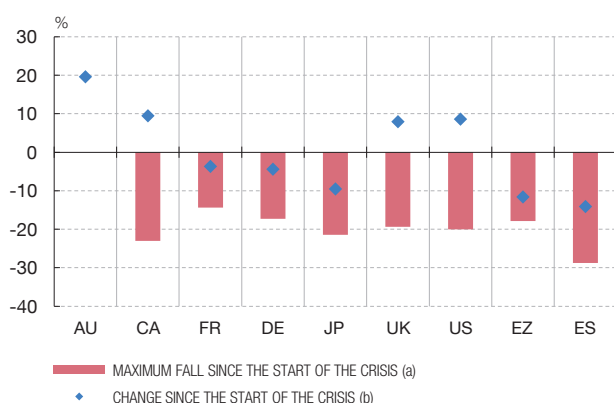
For its part, government investment, which stood at somewhat more than 15% of total investment in the developed economies in the decade leading up to the crisis, increased initially in those countries that implemented fiscal stimulus programmes in response to the crisis but subsequently fell as budget consolidation became widespread. That said, when

1 The preparation of this article has coincided with the transition in European countries from the ESA 95 to the ESA 2010 system of accounts. Where analyses require long time series those corresponding to the ESA 95 are used, while those of the new system are used to characterise more recent developments. In the United States the data always correspond to the new methodology (SNA 2008).

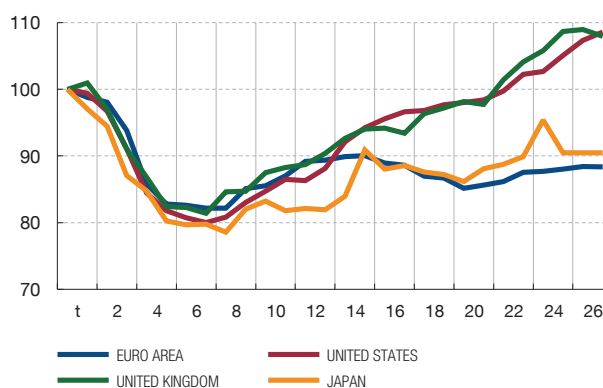
2 Throughout this article the ratio used is the nominal-terms one. The significant changes in relative prices (the price of investment goods has been displaying a downward trend relative to the economy as a whole) and the use of chain-linked indices in national accounts means that the calculation of GDP from the various components cannot be carried out on an additive basis over long periods. There is a discrepancy that increases the further one goes from the year taken as reference (Whelan, 2000).

3 See Box 4.1 of IMF (2015), which describes the highly mixed behaviour of investment in the emerging economies. The much more favourable behaviour in the case of the Chinese economy stands out.

1 MAXIMUM FALL AND SUBSEQUENT RECOVERY



2 BUSINESS INVESTMENT DURING THE GREAT RECESSION AND SUBSEQUENT RECOVERY (c)



SOURCES: OECD and Banco de España.

- a The start of the crisis varies according to the country concerned: AU and US in 2007 Q4; FR, DE, JP, EZ in 2008 Q1; CA, UK and ES in 2008 Q2.  
 b From the start of the crisis until 2014 Q4.  
 c Quarters after the cyclical peak (= 100) in period 0.

its current level is compared with its pre-crisis one, it is apparent that this is the component of investment that fell least.<sup>4</sup>

However, as mentioned, this article focuses on non-residential private investment (i.e. business investment), which is the largest component of investment (accounting for around 60% of the total). As a proportion of GDP, non-residential private investment, in the advanced economies as a whole, stood before the crisis at somewhat more than 10%, having recorded a progressive decline over the previous decade, explained by the machinery and equipment component. As can be seen in the right-hand panel of Chart 1, business investment fell very sharply during the Great Recession, the extent of the fall exceeding that in previous crises (reaching 20% in the developed countries as a whole), and it only returned to its pre-crisis level more than six years after the start of the crisis.

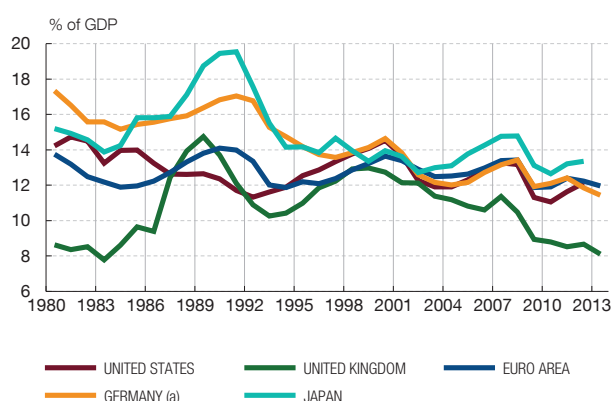
This behaviour masks a high degree of heterogeneity across countries, as seen in the left-hand panel of Chart 2, which shows the magnitude of the decline and subsequent recovery in a selection of developed economies.<sup>5</sup> In countries such as Canada, the United States and the United Kingdom, business investment fell by around 20%, but now stands clearly above its pre-crisis level.<sup>6</sup> In Japan there was a similar fall, but business investment still stands clearly below its pre-crisis level. The euro area, despite having recorded a somewhat smaller fall during the Great Recession, shows the smallest subsequent recovery, which is basically attributable to the countries that suffered the impact of the crisis most severely. In the core euro area countries, although the pre-crisis levels have not been reached, developments have been more favourable. In fact, as can be seen in the right-hand panel of Chart 2, the recovery in investment in the euro area followed a similar path to that seen in the United States and the United Kingdom until 2011 when the sovereign debt crisis occurred.

<sup>4</sup> Certain euro area countries that have in recent years implemented drastic budget consolidation are exceptions to this general rule.

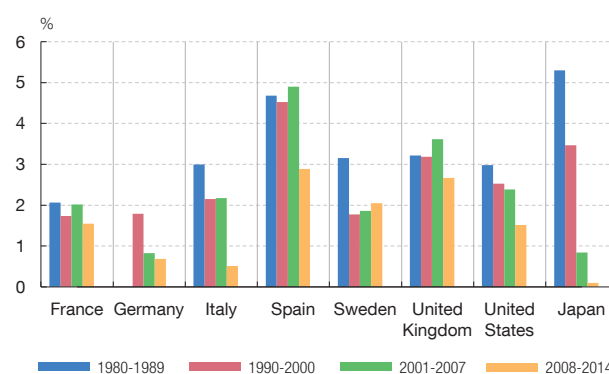
<sup>5</sup> In Australia there was no fall in total business investment, although there was if we exclude investment in the energy and mining sectors (Connolly et al., 2013).

<sup>6</sup> The recovery to the pre-crisis level in 2014 is explained mainly by investment in capital goods, since investment in structures is still below its pre-crisis level.

1 PRIVATE NON-RESIDENTIAL INVESTMENT



2 GROWTH OF THE STOCK OF PRODUCTIVE CAPITAL



SOURCE: OECD.

a In Germany this is non-residential private investment (public and private).

### Structural factors that affect business investment

Beyond its recent cyclical weakness, a progressive decline in the rate of productive investment and in the growth of the productive capital stock has been seen in various advanced economies since the late 1980s, which suggests the presence of other factors of a structural nature.<sup>7</sup> These undoubtedly include the reduction in the relative price of capital goods, which took place generally over the last two decades of the twentieth century, tending to depress the ratio of investment to GDP, in nominal terms. However, this effect is not sufficient to explain the prolonged downward trend in investment in many developed economies (Chart 3).

The long-run determinants identified in the economic literature include, notably, changes in the productive structure, the stimulus that technological developments in ICT have given to investment in intangible assets, and, also, the process of globalisation and the shift in activity and capital flows towards the emerging economies. This section describes how these factors may have influenced the weakness of investment in the developed economies as a whole, although there is insufficient empirical evidence to enable their effects to be quantified or for the possible differences across countries to be assessed.

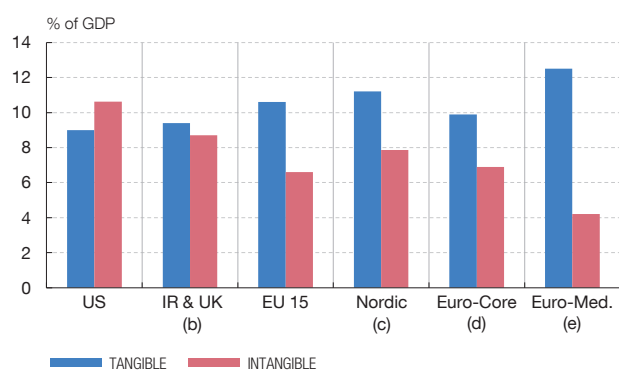
First, the slower rate of capital accumulation may be a reflection of the changes in the productive structure that have been taking place in the developed societies, with an industrial sector whose relative weight has been declining in favour of a greater share for financial and business services. Since the investment effort (measured as the ratio of investment to value added) of industrial sectors generally exceeds that of these services, the shift in activity towards the latter may have led to a reduction in the average rate of investment in the economy. However, the quantitative relevance of this composition effect may be limited, according to a recent OECD analysis.<sup>8</sup>

This process of “tertiarisation” of the developed economies in combination with the process of technological change experienced in recent decades may also have implications for the type of capital goods in which firms invest. The technological progress

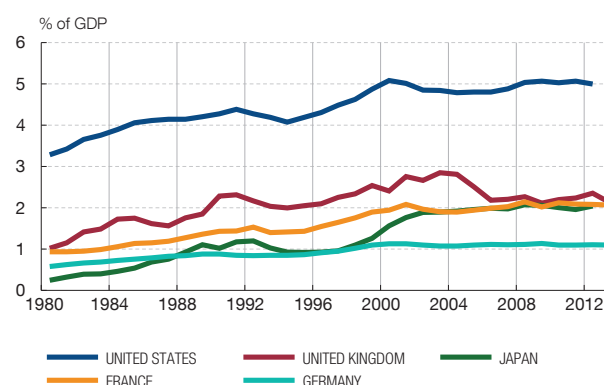
<sup>7</sup> Given these gross investment rates, it may be supposed that the net rates must have fallen to a greater extent since the rate of depreciation of capital has increased as the share of technological capital has increased.

<sup>8</sup> See Sanchez Carretero and Sánchez Pastor (2008) and OECD (2015).

1 INVESTMENT IN TANGIBLE AND INTANGIBLE ASSETS (a)



2 INVESTMENT IN INTANGIBLE ASSETS



SOURCES: OECD and Corrado *et al.* (2012).

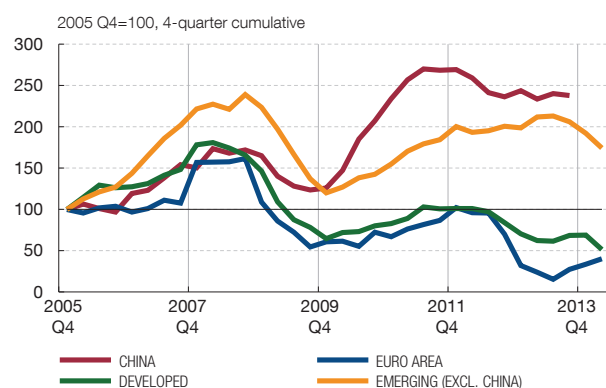
- a Estimates of Corrado *et al.* (2012).  
 b Ireland and United Kingdom.  
 c Denmark, Finland and Sweden.  
 d Austria, Belgium, France, Germany, Luxembourg and the Netherlands.  
 e Greece, Italy, Portugal and Spain.

and growing importance of business and financial services tend to drive investment in intangible assets, linked to creativity and knowledge. This process is relevant to interpreting developments in business investment since the concept of investment used by national accounting does not incorporate a large part of these assets. Until recent times, of the three largest categories of this type of asset,<sup>9</sup> only the acquisition of computer software was considered to be investment in the national accounts, although the new system of accounts, the ESA 2010, has also incorporated spending on research and development. In any case, it is not clear whether this type of asset has tended to crowd out more traditional investment, or whether, by contrast, there is a certain complementarity with investment in tangible assets, by favouring efficiency gains. The accumulation of these assets has, moreover, another type of implication due to their inherent characteristics, which makes them less suitable for use as collateral, while problems of asymmetric information increase to obtain financing, in comparison with tangible assets. Accordingly, this type of investment is related to the increase in liquid resources of non-financial firms that has occurred during the crisis in various economies, as in the case of the United States.<sup>10</sup>

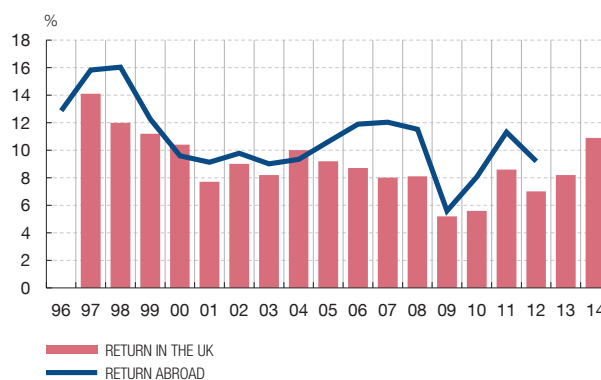
There are marked cross-country differences regarding the relative significance of investment in intangible assets (left-hand panel of Chart 4). In the euro area countries, the rate of investment in this type of asset is less than in other EU economies, such as the Nordic countries or the United Kingdom. In the United States, investment in intangible assets is estimated to have even exceeded traditional investment in tangible assets. During the Great Recession, investment in intangible assets proved most resilient in most of the developed economies and, in a good number of them, the assets included in the national accounts continued to increase relative to GDP, albeit at a lesser pace than in the preceding years (right-hand panel of Chart 4). Accordingly, it may be inferred that a

<sup>9</sup> Investment in intangible assets is usually classified in three categories: a) software and databases, b) research and development or other activities that may derive in scientific or artistic property rights, c) economic competencies, such as improvements in employee skills, in organisational structure or brand reputation development.

<sup>10</sup> See Falato *et al.* (2013).

1 DIRECT INVESTMENT  
(Inflows)

2 RETURN ON INVESTMENT IN MANUFACTURING



SOURCES: IMF and Office for National Statistics (ONS).

hypothetical incorporation of the remaining intangible assets into gross fixed capital formation would give rise to a milder decline in investment during the crisis and, indeed, the new accounting estimates of business investment, which include a portion of these assets, are along these lines.

Lastly, among the factors that may have diminished the intensity of investment in the developed economies over the past two decades, the integration of a good number of emerging economies into the world economy and the growing internationalisation of firms are particularly relevant. Both processes were boosted by historical milestones (such as the fall of the iron curtain in Eastern Europe), the liberalisation of capital movements in various regions, various trade and economic integration agreements (such as the creation of the euro area and of the European Union, and their enlargement to the Eastern European countries, China joining the World Trade Organisation and its integration into global trade), and technological developments, especially in respect of communication networks. All this has contributed to driving the development of global production chains, a notable increase in cross-border services trade and, in general, a process of globalisation of all economic activity, both real and financial. As a result of this process a growing proportion of world production and investment has been located in emerging economies, with expanding markets and lower production costs. The evolution of capital flows in the form of direct investment reflects this shift (Chart 5). Thus, flows into emerging countries have been growing, continuously, while those to the advanced economies, especially those to the euro area, have declined since the start of the crisis.

The impact on investment in the developed economies of this shift in capital flows towards the new emerging markets is an issue subject to debate and the empirical evidence is hardly conclusive. Various studies support the hypothesis that investment abroad is a substitute for domestic investment,<sup>11</sup> since both compete for financial resources that have a rising cost, while others, by contrast, are favourable to the hypothesis of complementarity,<sup>12</sup> based on the idea that both combined allow production to take place at a lower cost, thereby increasing the returns of the multinational firm, with the result that production and investment are higher, both in the domestic economy and in firms located abroad.

<sup>11</sup> See, for example, Feldstein (1995) and Belderbos et al. (2013).

<sup>12</sup> See, for example, Desai et al. (2005)

According to this literature the type of integration that characterises the activity of the multinational firm is a fundamental determinant of the impact of capital flows on investment in its home country. If the firm is characterised by the vertical integration of its activity (with fragmentation into stages of the productive process distributed over different geographical locations), the dominant relationship between the domestic and foreign investment will be one of complementarity, as seems to be the case in the United States.<sup>13</sup> By contrast, if the multinational firm is characterised by the use of intermediate goods in multiple plants with similar characteristics (horizontal integration), the decision to invest in foreign markets involves, with greater probability, not serving those markets by means of exports. This strategy seems to best describe the case of Japanese multinationals, whose international expansion seems to have stemmed from the lower relative cost of producing abroad.<sup>14</sup>

The economic integration processes and agreements have entailed a large boost to capital movements since they facilitate the reorganisation of production according to the relative profitability of different geographical areas. For example, in the case of UK manufacturing firms, the return on direct investment abroad has been higher than that on domestic production (Chart 5), which must have favoured some offshoring of the British industrial sector. By contrast, in the services sector the profitability differential favours activity in the British Isles. Overall, net investment abroad has tended to have been at the expense of domestic investment in the British economy, especially since the setting up of European Monetary Union, which facilitated access to European markets. This is indicated by the negative effect that direct investment abroad has on business investment, according to the equation estimated for the United Kingdom (see the next section). Conversely, in the case of Germany, whose firms are characterised by a high degree of vertical integration, especially in the case of investment in Eastern Europe, direct investment abroad and productive investment in Germany tend to move broadly in parallel, which would point to a certain complementarity between them.

#### Determinants of business investment

Apart from these long-term trends, as mentioned in the descriptive section, business investment has been markedly weak during the recent period. It is important to analyse the extent to which this sluggishness may reflect the moderate growth displayed by demand in the main advanced economies in recent years or whether by contrast other factors play an important role. Among these factors, several that are specific to the Great Recession stand out, such as the increase in uncertainty and the deterioration of corporate financing conditions.

For this purpose, various models of investment have been estimated, using quarterly data exclusively from the pre-crisis period (1980-2007), for the three largest advanced economies: the euro area, the United States and the United Kingdom. The explanatory power of each model is assessed by comparing the investment predicted by the model for the period 2008-2014 with the investment actually observed.

The specification of these models is based on the economic literature, which proposes various theories regarding the main determinants of business investment, notable among them being the accelerator model of investment and the neoclassical model. According to these theories, economic activity is the fundamental determinant of business investment,

<sup>13</sup> See Desai et al. (2005). The departments that are most intensive in their use of intangible assets, like design and innovation, are usually kept in the advanced economies.

<sup>14</sup> Braunerhjelm et al. (2005) propose a model along these lines, which contrasts with industrial data that are distinguished by type of integration (horizontal/vertical) of production. See Belderbos et al. (2013) for an analysis of the case of Japan.

so that, insofar as the current economic situation may be indicative of a low level of present and future sales, this leads firms to postpone their investments in new capital.

Specifically, the accelerator model assumes that firms adjust their capital stock gradually until it reaches a level proportional to their output, meaning that investment responds positively to changes in current and past output. In short, this model provides the historical elasticity of investment with respect to economic activity, enabling an assessment to be made of whether recent behaviour has deviated from the average behaviour in the past.

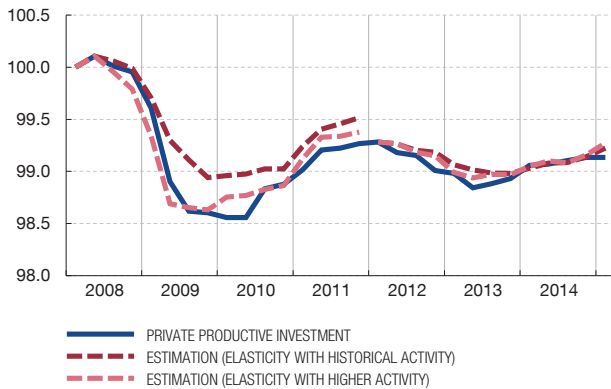
The left-hand panel of Chart 6 compares the behaviour of business investment recorded since the start of the crisis with the behaviour obtained using the accelerator model estimated for the preceding historic period for each of these countries. Two conclusions are drawn from this analysis. First, the contraction in business investment during the first part of the Great Recession (the blue line in the chart) was more intense than would have been predicted by the historical relationship to output (red line). Thus, as shown by the red broken line, a larger short-term response to activity is required to replicate the depth of the recession in these three geographical areas.

Second, in the United States and in the euro area the relationship between investment and economic activity during the recovery follows the historical pattern and only in the United Kingdom is the recovery in investment weaker than predicted when using the historical GDP-elasticity. Specifically, investment in the United States recovered gradually from its cyclical low, in line with its historical relationship to activity, and has even been somewhat higher than this in recent quarters, as the red solid line in the chart shows. In the euro area, the incipient recovery of investment was cut short at the beginning of 2011 by the sovereign debt crisis, which led to a further contraction in GDP. However, during this second recession, investment contracted in line with the prediction of the model (red solid line). In the case of the United Kingdom, following the decline of 2008-2009, predicted investment, based on a response to activity in line with the historical pattern, involves a faster recovery in business investment than observed, it being necessary again to assume a larger short-term response to activity (red broken line).

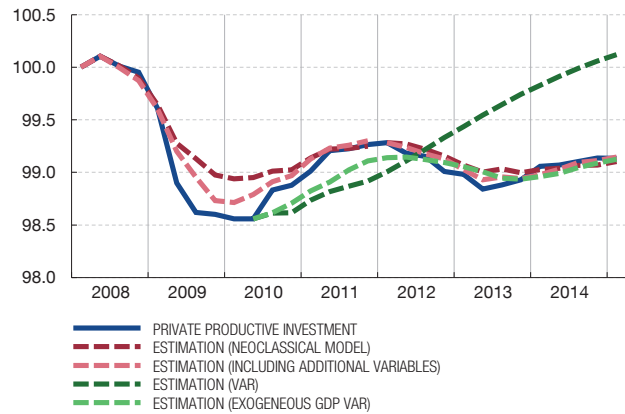
There follows a fuller analysis of the determinants of investment, based on an estimation of a neoclassical model of investment, in the period 1980-2007, for the same three economies referred to above. This theory postulates the existence of a long-term relationship between, on one hand, investment and, on the other, its user cost and economic activity (Jorgenson, 1972). The user cost of capital is defined as the product of the evolution of the long-term expected real interest rate, discounting capital depreciation, and the price of capital relative to that of output, the latter variable attempting to capture the effect of the technological improvements specifically incorporated into capital. Usually, the user cost is included relative to the cost of labour, as measured by real wages. It should be noted that in most advanced economies and, in particular, in the three considered in this paper, the historical decline in the user cost of capital relative to labour moderated from the early years of the 21st century, flattening out almost completely in the United States and the United Kingdom, largely due to a progressive moderation in real wage growth. That is to say, the moderation in labour costs may have slowed the process of replacement of labour by capital in the advanced economies from that time, which would help to explain the lower intensity of investment. Finally, short-term changes in investment would be explained, as in the accelerator model, by the business cycle, but also by changes in the user cost of capital and of the other factors of production.



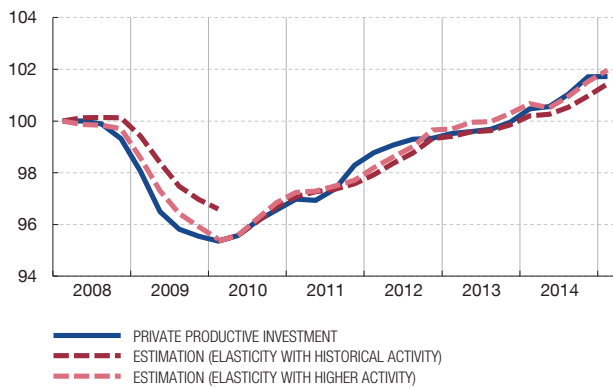
1 ACCELERATOR MODEL FOR EURO AREA



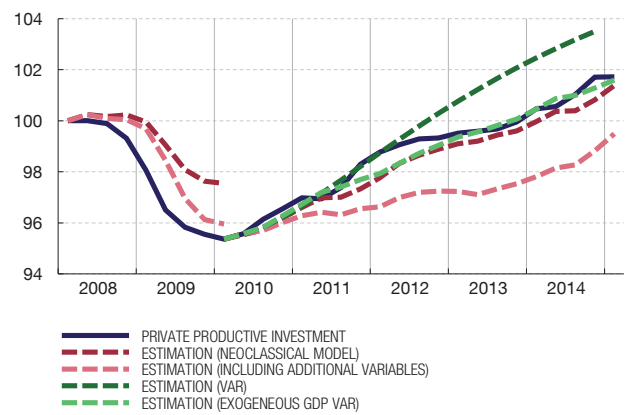
2 ERROR CORRECTION AND AUTOREGRESSIVE VECTOR MODEL FOR EURO AREA



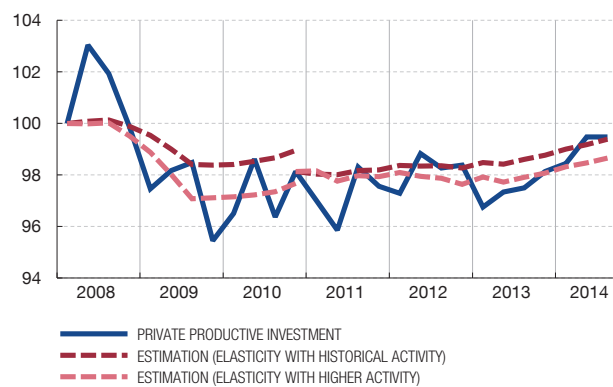
3 ACCELERATOR MODEL FOR UNITED STATES



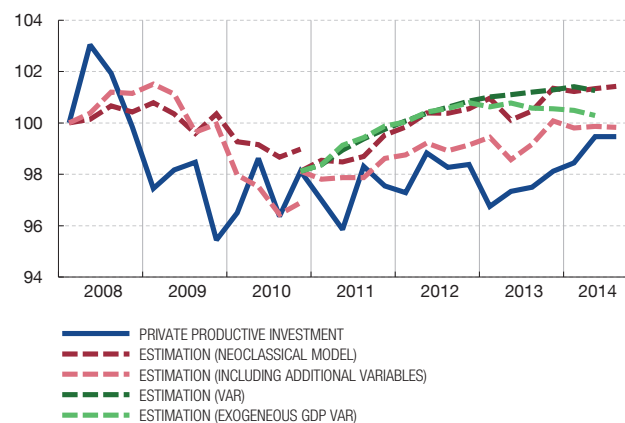
4 ERROR CORRECTION AND AUTOREGRESSIVE VECTOR MODEL FOR UNITED STATES



5 ACCELERATOR MODEL FOR UNITED KINGDOM



6 ERROR CORRECTION AND AUTOREGRESSIVE VECTOR MODEL FOR UNITED KINGDOM



SOURCES: OECD, ECB and Banco de España.

a Quarter-on-quarter rates.

Apart from these traditional factors, the financial accelerator theory, proposed by Bernanke, Gertler y Gilchrist (1999), suggests that financial restrictions tend to amplify the impact of the business cycle on investment. According to this theory, a decline in activity, reflected in lower sales, may worsen the financial position of firms and make it difficult for them to fulfil their financial obligations, as well as limiting their ability to obtain new funds to expand investment.

Finally, the high degree of uncertainty regarding future prospects, which has characterised the situation of the advanced economies during the Great Recession, and in the case of the euro area up until the end of 2013, may also have helped to depress investment. Thus, the irreversible nature of spending on capital may lead firms to postpone their investment decisions until the uncertainty is dispelled, while the higher risk premiums raise the cost of financing.<sup>15</sup>

Table 1 shows the result of estimating a neoclassical model for the period 1980-2007 for the three economies considered.<sup>16</sup> The upper panel sets out the coefficients of the long-term relationship between investment and its determinants, which proves to be relatively similar for the euro area and the United States. In the case of the United Kingdom, direct investment abroad is also included, to capture the change in the long-term trend of investment that occurred in the United Kingdom at the beginning of the 2000s, as a consequence of the changes in its industrial structure and the increase in direct investment abroad (as mentioned in the previous section).

As regards the short-term dynamics estimated for the same period (middle panel of Table 1), the determinants of each country are observed to be relatively heterogeneous. First, the speed at which investment converges on its long-term level is higher for the United Kingdom (less than two years) and somewhat slower for the United States and the euro area (five and seven years, respectively). In the euro area, the dynamics are explained primarily by the business cycle and, to a lesser extent, by the real cost of the factors of production, while in the United States these determinants have similar weights. For its part, the main determinant in the United Kingdom is the cost of the factors, followed by capacity utilisation.

Finally, the lower panel of Table 1 shows the impact of the new variables considered on investment dynamics in each country. In the United States the variables that have been included to reflect the financial position of firms are the change in the gross operating surplus and the debt-to-asset ratio (lagged by one period), while for the United Kingdom employers' opinions regarding the financial restrictions on investment decisions are included.<sup>17</sup> In the euro area financial variables are not relevant for explaining the recent period, probably because although the high level of financial fragmentation following the crisis has given rise to financial conditions that vary greatly from one Member State to another, their impact on investment can hardly be captured using aggregate indicators. As regards variables reflecting the level of uncertainty, in the euro area the European Commission's business climate indicator has been considered (with a negative sign) and in the United States the measure of uncertainty regarding economic policies developed by

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<sup>15</sup> See European Commission (2013).

<sup>16</sup> Note that in the long-term relationship for the euro area and the United Kingdom the restrictions derived by assuming a Cobb Douglass type production function with constant returns to scale are imposed. Accordingly, the coefficient of the user cost of capital is not estimated, but rather set as equal to the empirical value of the share of the labour factor in GDP in these countries.

<sup>17</sup> CBI Industrial Trends Survey.

	Euro area	United States	United Kingdom
Long-term equation (1980 Q1-2007 Q4)			
Constant	2.590*** (0.021)	0.067*** (0.020)	0.332*** (0.033)
GDP	1.000	1.000	1.000
User cost of capital-wages (b)	-0.600	-0.655*** (0.032)	-0.640
Relative prices	-1.875*** (0.178)		
Trend	0.003*** (0.000)		
Direct investment abroad			-0.656*** (0.106)
Short-term equation (1980 Q1-2007 Q4)			
Traditional variables (sum of lags)			
Constant		0.046*** (0.017)	0.131*** (0.032)
Error correction mechanism	-0.035** (0.017)	-0.051*** (0.019)	-0.184*** (0.043)
Investment lags	0.264*** (0.06)	0.438*** (0.180)	
Real wages	-0.361 (0.194)		
Cost of capital-wages		-0.513* (0.296)	-1.262** (0.542)
Capacity utilisation			-0.092* (0.047)
GDP	1.343*** (0.166)	0.547** (0.281)	
Additional variables			
Financial restrictions			-0.276* (0.166)
Gross operating surplus		0.142** (0.063)	
Debt		-0.003** (0.001)	
Uncertainty	-0.002*** (0.001)	-0.001* (0.000)	

SOURCE: Banco de España.

a The standard deviation of the estimates is shown in brackets. The asterisks indicate the level of significance of the coefficients. In the case of the long-term relationship, these are only given as a guide, since the estimates do not have a standard distribution.

b The user cost of capital is defined as  $a \cdot \log(\text{PI}/\text{PY}) + b \cdot \log((1 + \text{RN}/100)^{0.25} / (\text{PI}/\text{PI}(-1)))$ , where PI is the business investment deflator, PY the GDP deflator and RN the nominal interest rate. In the case of the United States the restriction is imposed that  $a=b$ , and in the case of the United Kingdom that  $a=0$ .

Baker et al. (2012). In all cases the variables are statistically significant to explain the behaviour of investment during the pre-crisis period and have the expected sign.

The right-hand panel of Chart 6 shows a similar exercise to that performed for the accelerator model, comparing the behaviour of business investment since the beginning of the crisis with that predicted by the neoclassical model estimated for the preceding period. In a similar manner to the previous analysis, it is shown that with the traditional factors (red solid line) it is not possible to explain the extent of the fall in 2008-2009 in any of the three areas. This decline is only approximated, albeit not completely, when the increase in uncertainty is incorporated and the variables that reflect the financial difficulties of firms (red broken line) are incorporated. As regards the projections for the period after

2009 it can be seen that the traditional determinants of business investment enable the process of recovery of investment in the United States and in the euro area to be adequately explained. In both areas, once the observed behaviour of activity and the user cost of capital are taken into account, investment behaves in line with its historical patterns. Indeed, when additional variables are incorporated, the United States model predicts much more moderate growth of investment than that recorded, while in the case of the euro area the projection does not change significantly. In the case of the United Kingdom, by contrast, additional variables need to be included to capture the behaviour of business investment in the most recent period. The inclusion of a measure of financial restrictions enables the marked moderation in investment recorded during the recovery to be approximated, albeit not entirely.

In the case of the euro area it should be noted that the aggregate behaviour of investment masks a high level of heterogeneity across countries, so that this result obtained for the euro area as a whole cannot be extended to each of the economies that make it up. In some countries, such as Germany and Spain, this variable has behaved in the most recent period better than its determinants, while in others, such as France and, especially, Italy, the opposite has been the case.<sup>18</sup> At the same time, the relationship between investment and certain financial variables, such as debt, is complex and may be subject to non-linearities, which may explain why in relatively simple models such as those proposed in this article it is difficult to capture their influence.

This analysis suffers from a limitation, deriving from the simultaneity existing between investment and activity, which makes it difficult to discern statistically the direction of causation between these two variables. That is to say, investment may be depressed owing to the low level of demand or vice versa. Accordingly, and in order to check the robustness of the above results, a vector autoregressive model in levels has lastly been estimated, enabling business investment, activity and the user cost of capital to be determined simultaneously. The projections obtained using this methodology (the dark green broken lines in the right-hand panel of Chart 6) indicate that investment during the recovery was clearly lower than expected given the historical relationship between these variables in the three areas considered. In the case of the euro area and the United States this result stems from the fact that the model predicts GDP growth well above that observed. If this exercise is repeated by making the projection conditional upon the behaviour of activity (light green broken line), the projected investment is much more in line with reality, thus suggesting that the low investment in these areas results from the weakness of demand and not the reverse. This fact confirms the robustness of the result obtained with the previous approximations. By contrast in the case of the United Kingdom, as the above models suggest, investment is depressed for reasons other than demand weakness, including notably the effect of financial restrictions and changes in the industrial structure.

## Conclusions

The behaviour of investment in the developed economies in recent years has been marked by two basic features. First, the ratio of investment to GDP has been declining for the last three decades in several of these economies (including Japan, the United Kingdom and some of the euro area countries) and this is a phenomenon that goes much further than the observed reduction in the relative price of these products. Second, during the Great Recession, almost all the developed economies recorded a sharp decline in investment, which was followed by a recovery that varied significantly from one country to another

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<sup>18</sup> See Posada et al. (2014) and IMF (2014).

(stronger in the United States and the United Kingdom than in the euro area and Japan). This article has analysed the determinants of these two developments.

The relative decline in investment in recent decades is principally a consequence of more structural or long-term factors (relating to the productive structure, its internationalisation and new forms of investment). Some of these factors relate to some of the structural changes underlying the formulation of the “secular stagnation” hypothesis.<sup>19</sup> However, the increasing importance of intangible assets enables the idea of declining rates of investment to be qualified, since it is possible that these are being undervalued in the national accounts, which do not fully consider the capital accumulated in the form of assets linked to creativity and knowledge, a heading that is becoming progressively more important in the developed economies.

As regards the most recent behaviour of investment, the econometric estimates made show that in the euro area and the United States the weakness of investment in recent years has largely been a consequence of the moderation of economic activity. In both areas the traditional determinants of business investment (activity and, to a lesser extent, relative factor cost) can explain the recovery process observed following the Great Recession, but not the extent of the fall recorded in 2008 and 2009. In order to replicate the behaviour of investment in this period it is necessary to incorporate additional variables into the models to reflect the impact of the difficulty of accessing external financing and/or the high level of uncertainty characterising this crisis. In the case of the United Kingdom, only when these additional variables are included is it possible to replicate the magnitude of the fall and, to some extent, the subsequent recovery of business investment.

In any event, it is very complicated to capture the influence of financial factors and uncertainty on investment with the econometric tools used in this paper, since the available evidence suggests that the impact of these variables may be non-linear, being weaker during the recovery than the recession.

In the case of the euro area it should be noted that the aggregate behaviour hides different behaviour across countries, partly linked to the high degree of financial fragmentation observed following the sovereign debt crisis, which gave rise to financing conditions that varied greatly among the member states. In this respect, when these differences in the cost of financing have recently been significantly reduced, business investment has picked up in some of the countries that were originally severely affected by the debt crisis, such as Spain and Ireland.

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