

A DISAGGREGATED VIEW OF THE CYCLICAL DEVELOPMENTS IN EURO AREA  
INVESTMENT

## A disaggregated view of the cyclical developments in euro area investment

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### **Introduction**

Gross fixed capital formation is a key factor for economic growth from the standpoint of supply and demand. Thus, agents' decisions about the amount of investment net of depreciation determine the stock of capital built up by an economy and, therefore, affect production capacity, a growth driver. On the demand side, a considerable proportion of the resources generated by an economy is earmarked for gross fixed capital formation. In the specific case of the euro area, since the eighties investment has represented approximately one-fifth of GDP and its average annual growth rate, of approximately 2.3%, has been similar to that of GDP.

Any analysis of total gross fixed capital formation is highly complex, given the heterogeneity of its constituent parts. Firstly, total gross fixed capital formation can be used to replace that portion of capital which has been depreciated or to increase the existing stock of capital. Secondly, the volume of total investment is the sum of aggregating the decisions of different agents (corporations, households and public administration). Lastly, gross fixed capital formation includes various types of assets of a very different nature. For example, construction investment may be severely affected in the very near term by weather conditions and is characterised by long lead times, in contrast to the relative immediacy of equipment investment.

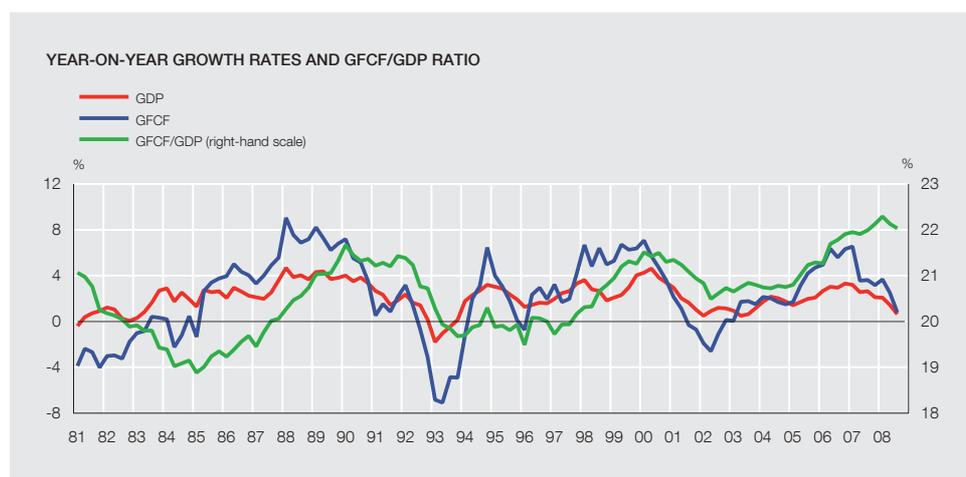
This article reviews the cyclical behaviour of euro area investment in relation to that of GDP since the nineties from a disaggregated viewpoint by purpose, the agent undertaking the investment and the type of asset in which the investment is made. To this end, the next section outlines the most notable features of developments in GDP and of total gross fixed capital formation in the euro area since the eighties; followed by a description of the recent behaviour of the various investment components; then a cyclical analysis is made of the various items of gross fixed capital formation, for which real data are available in relation to GDP, and, lastly, the main conclusions are presented.

### **Recent developments in GDP and total gross fixed capital formation**

In the last thirty years, GDP and euro area investment have experienced several upturns and downturns. As seen in Chart 1, economic recovery at the beginning of the eighties was interrupted by the European ERM crisis and the disappearance of the fiscal stimulus following German reunification; in fact, investment fell by more than 6% year-on-year in 1993. From 1995, however, the improvement in the economy, the new technologies boom and the drop in the cost of capital resulted in a further acceleration of investment<sup>1</sup> which, although it did not reach the heights of the previous cycle, in 2000 Q1 it posted growth of 7.1%. The performance of gross fixed capital formation in subsequent years was largely determined by the trend in profits, activity and financial conditions.<sup>2</sup> In particular, 2001 marked the beginning of a new contractionary phase, albeit less sharp than the previous ones,<sup>3</sup> followed from mid-2002 by an upturn which lasted until 2007 Q1. Since then, investment has gradually slowed, a process which has been especially aggravated in recent quarters by the intensification of the financial crisis.

From Chart 1 two fundamental features of developments in gross fixed capital formation in relation to GDP are obvious: first, that investment is procyclical and second, that it acceler-

1. See European Central Bank (2003). 2. See European Central Bank (2008). 3. See Goldman Sachs (2008).



SOURCE: Eurostat.

ates more than GDP in expansionary periods and slows more steeply during contractions. In fact, with data from the eighties, the volatility of the year-on-year growth rate of investment (measured by its standard deviation) is almost three times that of euro area GDP,<sup>4</sup> which explains why, in spite of the comparatively low relative weight of this item, it contributes notably to the fluctuations in the GDP growth rate. Both characteristics result in the procyclical behaviour of the investment-to-GDP ratio. Gross fixed capital formation as a proportion of GDP has ranged between approximately 19% and 22% in the last thirty years, albeit notably on a rising trend, which has led investment to play a gradually more important role.

### ***The behaviour of investment from a disaggregated standpoint***

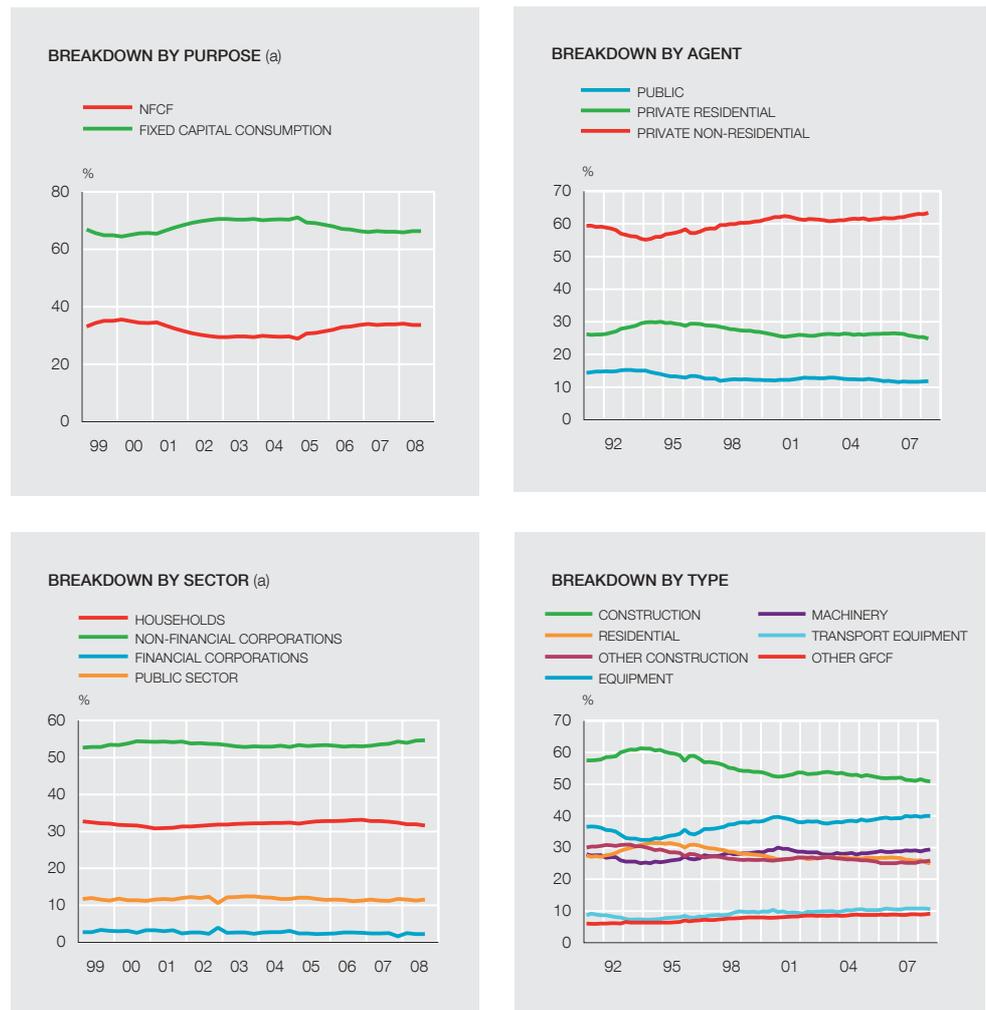
Different breakdowns can be obtained from gross fixed capital formation depending on the classification method used: the purpose of the investment, the institutional sector undertaking the investment and the type of products in which the investment is made.

#### INVESTMENT BY PURPOSE

Total gross fixed capital formation can be used to replace the investment depreciated due to use or the passing of time (known as fixed capital consumption) or to increase the economy's capital stock (known as net fixed capital formation). According to available nominal data for the euro area,<sup>5</sup> at present approximately 66% of total investment is used to replace the depreciated capital stock, while the remaining 34% is earmarked for increasing it (see Chart 2). Although current proportions are very similar to those of 1999, there has been a gradual process of, first, a slight decline, and subsequently, a rise in the weight of net investment – and the opposite, naturally, for fixed capital consumption.

Given the relative stability of the weight and the year-on-year growth of fixed capital consumption, this component's contribution to the expansion of gross fixed capital formation has generally remained constant in recent years (see upper panel of Chart 3). On the contrary, the growth rate of net fixed capital formation has been highly variable, ranging between –12% and 22% since 1999. Thus, the item triggering the fluctuations in total gross fixed capital formation in recent years has been net investment.

4. Among the internal demand components, investment displays greater relative variability (2.8), since the fluctuations in private consumption are similar to those in GDP and the ratio for government consumption is 0.68. Regarding net external demand, the standard deviation of the year-on-year growth rate of exports and imports is 3.16 and 3.40 times that of GDP, respectively. 5. The available data range from 1999 to 2008 Q3. Furthermore, these data have been seasonally adjusted using the TRAMO program.



SOURCES: Eurostat and OECD.

a. Nominal data.

INVESTMENT  
BY INSTITUTIONAL SECTOR

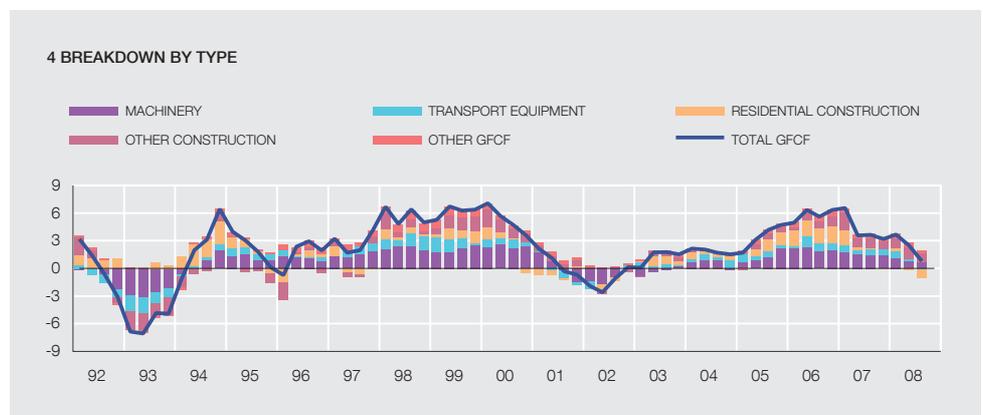
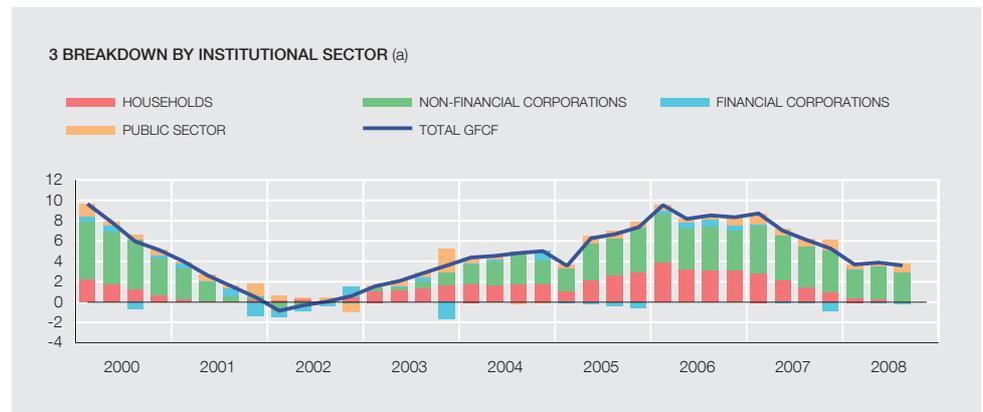
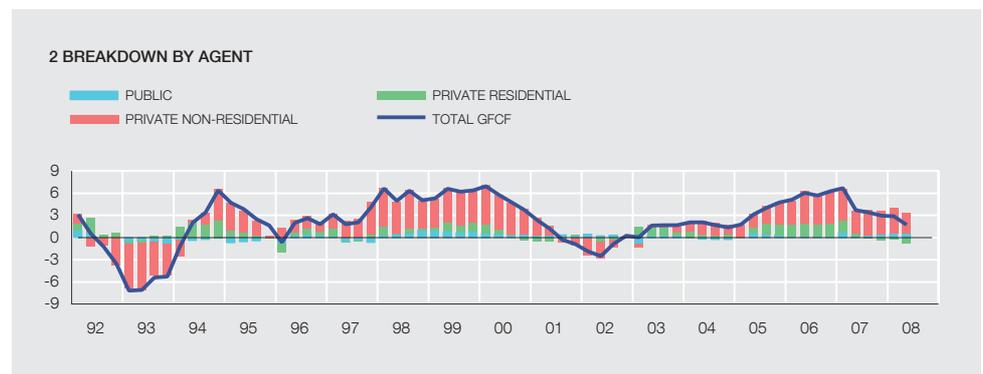
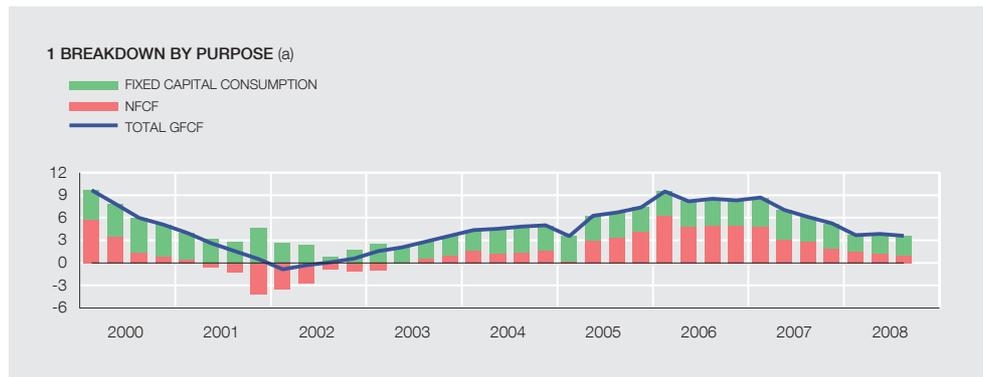
Expenditure on gross fixed capital formation is undertaken by the public sector or private agents, namely households and corporations. Chart 2 shows that, according to OECD data, since 1991 the private sector has taken on the bulk of total euro area investment, where non-residential investment is particularly important, while government investment has been less so. The relative weight of each component has varied slightly in these years. Thus, public investment and private residential investment have decreased since 1994 (to 12% and 25%, respectively, in 2008) in favour of private non-residential investment, which represents 63% of total gross fixed capital formation. For a greater level of disaggregation by agent of the private investment, only nominal data from 1999<sup>6</sup> is available. According to this information, non-financial corporations account for the highest percentage of private investment (around 61%), followed by households (36%) and, in last place, by financial corporations (3%).<sup>7</sup> These relative weights have hardly changed since 1999.

In keeping with its major role, the largest contributor to the growth of total gross fixed capital formation has been private non-residential investment, followed by private residential invest-

6. These data have been seasonally adjusted using the TRAMO program. 7. The weight of private residential investment coincides generally with that of household investment since, on the one hand, most of the latter is earmarked for housing – and only a small share (that corresponding to small family firms) is earmarked for private non-residential investment – and, on the other, corporations hardly make residential investments.

**BREAKDOWN OF EURO AREA INVESTMENT.  
CONTRIBUTIONS TO YEAR-ON-YEAR GROWTH**

CHART 3



SOURCES: Eurostat and OECD.

a. Nominal data.

ment and, to a smaller degree, by government investment (see Chart 3). In the most recent cycle and, in particular, from 2005 there has been a noteworthy increase in the role of private residential investment, bigger even than that seen during the upturn at the end of the nineties. In recent quarters, however, the slowdown of the property market in certain euro area countries has led to a downward correction of this item, which has even posted negative rates following the significant boom of previous years.

#### INVESTMENT BY PRODUCT TYPE

By product type, the distinction can be drawn between equipment investment, construction investment and other investment. Equipment investment includes acquisitions (less disposals) of machinery and transport equipment; construction investment covers acquisitions of housing and other buildings and structures; and other investment includes acquisitions (less disposals) of, on the one hand, cultivated assets (for example, trees or livestock), which are classified as investment in agriculture, and, on the other, intangible assets (such as computer software), which are classified as other.<sup>8</sup>

The real information available from 1991 included in the lower right-hand part of Chart 2 shows that, although there have not been any brusque changes in the components' relative weights, in the second half of the nineties, a slight decline in the role of construction investment in favour of equipment investment, especially machinery,<sup>9</sup> can be discerned. These developments were partly marked, on the one hand, by the high residential stock built up following reunification and the changes in housing policy in Germany and, on the other, the implementation of technological improvements in the telecommunications sector towards the end of the decade. In any event, construction investment currently remains the largest component of gross fixed capital formation, with a weight of slightly more than 50%, followed by equipment investment (approximately 40%) and other investment (around 10%). At a more disaggregated level, residential and non-residential investment are almost equally important (accounting for around 25% of the total), while, within equipment investment, that earmarked for machinery is the largest item, which represents almost 30% of total gross fixed capital formation, in comparison with investment in transport equipment, which only represents 10%.<sup>10</sup>

Equipment investment, firstly, and construction investment, secondly, have governed the behaviour of gross fixed capital formation over these years (see the lower part of Chart 3). In relation to previous cycles, in the latest cycle, however, the increased importance of construction investment is worth noting (in particular, that of residential investment) in comparison with investment in machinery and transport equipment.<sup>11</sup>

#### ***Cyclical analysis of investment components and GDP***

Given the heterogeneity in the performance of its various components described in the previous section, a disaggregated analysis of the cyclical behaviour of investment with respect to that of GDP is presented here. In particular, these developments are studied on the basis of changes in: the relative variability of each component and GDP, the cyclical synchrony between the two and, lastly, the maximum amplitude and average relative duration of their upturns and downturns. The sub-components of gross fixed capital formation used correspond to the classifications by product type and institutional sector (public, private residential and private non-residential) since real data are available for these categories.

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8. See European Commission (2007). 9. At the beginning of the nineties, the relative weight of construction investment increased, boosted by the notable rise in housing investment in Germany after the reunification process. 10. Given the overlap between the investment classifications by institutional agent and type, developments in the weight of residential investment have been similar, to a certain degree, to those in private residential investment and developments in the weight of equipment investment have been similar to those in private non-residential investment. 11. In recent quarters, however, a notable adjustment has been seen in construction investment especially in residential construction.

The cyclical component of each variable has been extracted using a band-pass filter;<sup>12</sup> and, in order to avoid problems of scale when making comparisons, these components have been normalised by dividing them by their respective trends. Also, in order to identify the turning points of each series between the expansionary and contractionary periods,<sup>13</sup> the Markov regime switching methodology is used.<sup>14</sup> Chart 4 shows the developments in year-on-year rates of growth, the ratio of the cyclical component to the trend and the periods identified as downturns in accordance with the estimates of the Markov models for the main investment items.

#### RELATIVE VARIABILITY

Table 1 shows the standard deviation of each investment component with respect to that of GDP. In the 1991-2008 period, cyclical fluctuations in total gross fixed capital formation have been almost threefold that of GDP. Equipment investment showed the highest variability (especially, investment in transport equipment which is more than sixfold that in GDP), followed by other investment and construction investment. The smaller fluctuations in the construction component are probably related to the longer periods in general between the decision to undertake a project and its completion, as a result of which, faced with a change in the determinants, the project may be delayed or even cancelled. According to the classification by investor sector, the standard deviation of private non-residential investment (which largely includes equipment investment) is more than four times higher than that of GDP, while the fluctuations in public investment and private residential investment are approximately three times those of GDP.

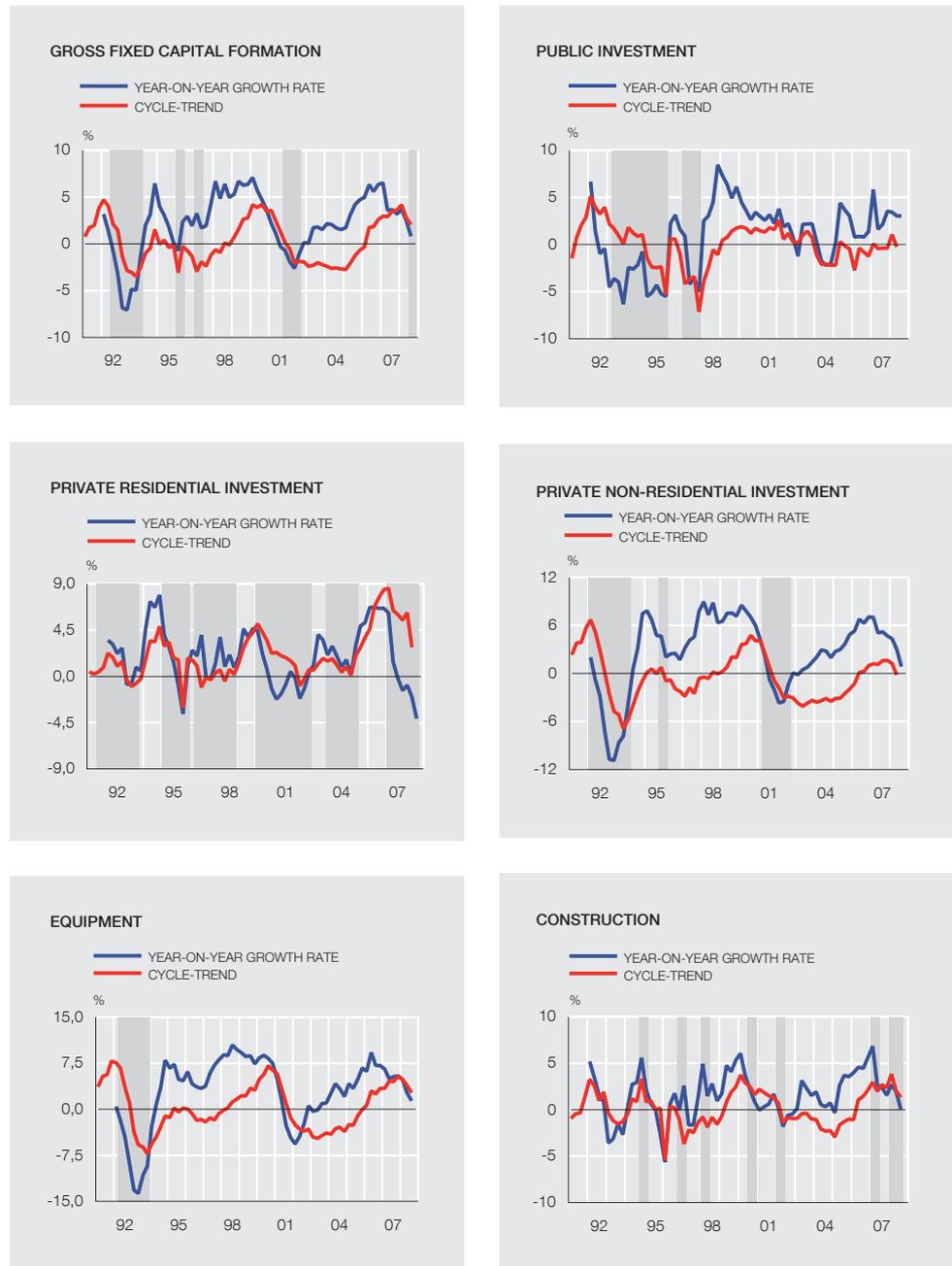
These ratios, however, have not remained constant over time. In fact, if the sample period is divided into two, before and after the introduction of the euro, it can be seen that the relative variability of total gross fixed capital formation and practically all of its components (classified by type or sector) has fallen in the most recent period. In particular, the ratio of the standard deviation of total investment to that of GDP has decreased from 3.29 to 2.53. The most significant reductions were in government investment and investment in transport equipment.

#### CYCLICAL SYNCHRONY: CORRELATION AND THE HARDING AND PAGAN INDEX

Another feature which can be studied in relation to the variables' cycles is their cyclical synchrony, namely, the degree of comovement between them. This section measures synchrony using a cross-correlation of investment (contemporaneous, lagging or leading by several quarters) with GDP and the Harding and Pagan index.

Table 2 shows that between 1991 and 2008 Q3, total gross fixed capital formation displays a high contemporaneous correlation coefficient in respect of GDP, of 0.86 points. Among the investment components, greater synchrony is shown, on the one hand, by contemporaneous construction investment and equipment investment lagged one period (i.e. equipment investment leads GDP) and, on the other, by contemporaneous private non-residential investment and private investment lagged two quarters. Against this, the comovement of other investment and public investment with GDP is considerably lower. Comparing the periods before and after the changeover to the euro, the correlation between the components of gross fixed capital formation and GDP in the euro area has increased, at the same time as a large number of investment items have switched from lagging to leading GDP. Thus, the maximum correlation of total investment rose from 0.80 contemporaneously to 0.96, lagging by two periods. The developments in investment in machinery, transport equipment and residential construction, by type, and those in private non-residential and residential invest-

<sup>12</sup> The method used is that proposed in Gómez (1999 and 2001). In any event, the results of extracting the cyclical component of the series by applying a Hodrick-Prescott filter to the series are very similar. <sup>13</sup> In general, such identification is by means of a monthly frequency indicator which is highly correlated to the variable in question since it allows better capturing of the switches of regime. However, the difficulty of finding indicators with these characteristics for each investment component prevents this methodology from being applied. <sup>14</sup> See Hamilton (1994).



SOURCES: Eurostat and Banco de España.

a. The shaded areas relate to periods identified as contractionary in accordance with the estimates of the Markov regime switching models.

ment by institutional sector were particularly noteworthy. Public investment, however, changed from contemporaneous to following the trajectory of GDP with a lag of four quarters and, moreover, with a higher correlation. In any event, the higher cyclical synchrony and the fact that investment has been leading GDP since the changeover to the euro may be related to the European Central Bank's credibility as a guarantor of price stability in the medium and long term and the achievement in these ten years of a moderate inflation environment. The two factors have enabled agents to better identify the changes in relative prices and, therefore, to assess more accurately current and future general economic conditions when taking their investment decisions, resulting in a more contemporaneous movement with GDP and, more specifically, with future GDP.

	MAR 91 - SEP 08	MAR 91 - DEC 98	MAR 99 - SEP 08
TOTAL GFCF	2.77	3.29	2.53
INVESTMENT BY TYPE			
Equipment	4.47	6.08	3.78
<i>Machinery</i>	4.15	5.17	3.74
<i>Transport</i>	6.21	9.50	4.63
Construction	2.22	2.89	1.88
<i>Residential</i>	2.39	2.94	2.09
<i>Other construction</i>	2.66	3.73	2.15
Other GFCF	2.38	3.31	1.92
<i>Agriculture</i>	14.87	25.62	6.21
<i>Other</i>	2.41	3.26	1.95
INVESTMENT BY SECTOR			
Public	3.18	4.63	1.84
Private residential	3.42	2.56	3.37
Private non-residential	4.25	5.19	3.66

SOURCES: Eurostat and OECD.

a. Ratio of the standard deviation of the respective normalised cyclical components.

Another complementary measure of the level of synchrony of the developments in two variables' cycles is the Harding and Pagan concordance index,<sup>15</sup> which is defined as the number of periods in which two variables (x and y) are at the same time expanding and contracting, divided by the number of total periods:

$$C_{x,y} = \frac{\text{no. } t(x, y = \text{expansion}) + \text{no. } t(x, y = \text{contraction})}{n} \quad [1]$$

Since 1991, the expansionary or contractionary state of the cyclical component of GDP has coincided in almost 84% of the quarters with that of investment and, most notably, with equipment investment and private non-residential investment (see the lower part of Table 2). If the calculations are made for the period before and after the changeover to the euro, a fall can be seen in the concordance indices over time for a large number of investment subcomponents since, although their correlation with GDP has increased, these variables have changed from moving contemporaneously with GDP to leading it.

#### AVERAGE DURATION AND AMPLITUDE OF COMPLETE EXPANSIONARY AND CONTRACTIONARY CYCLES

Lastly, Table 3 includes information on the average duration and maximum amplitude of the expansions and contractions of each variable, in which the dates of the turning points between these phases come from an estimated Markov regime switching model.<sup>16</sup>

On average, GDP and all the subaggregates of gross fixed capital formation (except for public and private residential investment) have spent a considerably higher number of quarters in an

<sup>15</sup>. See Harding and Pagan (1999). <sup>16</sup>. The fact that only complete upturns or downturns are used implies that the quarters detected in the first and last phase have been removed from these calculations.

		GFCF			INVESTMENT BY TYPE						INVESTMENT BY SECTOR			
		Equipment	Machinery	Transport	Construction	Residential	Other constr.	Other GFCF	Agriculture	Other	Public	Private residential	Private non residential	
CORRELATION INDICES (b) (c)														
MAR 91-SEP 08														
Lagging investment	T+4	0.10	0.04	0.13	-0.17	0.14	-0.15	0.39	0.13	-0.25	0.14	0.27	-0.27	0.01
	T+3	0.34	0.28	0.37	0.05	0.34	0.04	0.54	0.24	-0.21	0.26	0.29	-0.08	0.26
	T+2	0.56	0.49	0.58	0.24	0.52	0.24	0.66	0.37	-0.07	0.38	0.28	0.13	0.50
	T+1	0.74	0.66	0.74	0.40	0.68	0.45	0.74	0.47	0.04	0.46	0.29	0.34	0.66
	T	<b>0.86</b>	0.76	0.82	0.52	<b>0.81</b>	0.63	<b>0.78</b>	0.52	0.10	0.51	<b>0.33</b>	0.53	<b>0.75</b>
Leading investment	T-1	0.86	<b>0.77</b>	<b>0.83</b>	0.56	0.78	0.69	0.68	<b>0.54</b>	<b>0.11</b>	<b>0.53</b>	0.28	0.59	0.71
	T-2	0.80	0.72	0.74	<b>0.57</b>	0.72	<b>0.73</b>	0.55	0.53	0.04	0.53	0.28	<b>0.63</b>	0.61
	T-3	0.68	0.61	0.61	0.52	0.59	0.68	0.36	0.50	-0.01	0.52	0.24	0.60	0.45
	T-4	0.54	0.48	0.46	0.43	0.45	0.62	0.17	0.48	-0.01	0.52	0.20	0.54	0.27
	T	<b>0.80</b>	<b>0.65</b>	<b>0.67</b>	<b>0.58</b>	<b>0.71</b>	<b>0.49</b>	<b>0.70</b>	0.32	0.00	0.26	<b>0.31</b>	<b>0.64</b>	<b>0.69</b>
Lagging investment	T+4	-0.16	-0.11	-0.10	-0.11	-0.18	-0.36	0.00	0.19	-0.18	0.18	0.17	-0.44	-0.05
	T+3	0.18	0.20	0.21	0.18	0.08	-0.13	0.22	0.26	-0.22	0.27	0.22	-0.16	0.26
	T+2	0.48	0.45	0.48	0.39	0.32	0.10	0.42	0.37	-0.09	0.35	0.23	0.14	0.52
	T+1	0.70	0.62	0.66	0.53	0.55	0.32	0.59	<b>0.43</b>	<b>0.01</b>	<b>0.38</b>	0.26	0.42	0.67
	T	<b>0.80</b>	<b>0.65</b>	<b>0.67</b>	<b>0.58</b>	<b>0.71</b>	<b>0.49</b>	<b>0.70</b>	0.32	0.00	0.26	<b>0.31</b>	<b>0.64</b>	<b>0.69</b>
Leading investment	T-1	0.67	0.59	0.60	0.55	0.53	0.39	0.51	0.24	-0.10	0.21	0.24	0.55	0.57
	T-2	0.47	0.41	0.38	0.45	0.37	0.34	0.30	0.08	-0.30	0.09	0.24	0.48	0.36
	T-3	0.17	0.16	0.12	0.22	0.12	0.18	0.04	-0.08	-0.45	-0.02	0.18	0.26	0.07
	T-4	-0.10	-0.12	-0.13	-0.10	-0.04	0.13	-0.16	-0.17	-0.43	-0.10	0.13	0.13	-0.22
	T	<b>0.80</b>	<b>0.65</b>	<b>0.67</b>	<b>0.58</b>	<b>0.71</b>	<b>0.49</b>	<b>0.70</b>	0.32	0.00	0.26	<b>0.31</b>	<b>0.64</b>	<b>0.69</b>
MAR 99-SEP 08														
Lagging investment	T+4	0.26	0.14	0.26	-0.18	0.38	-0.02	0.69	0.20	-0.38	0.22	<b>0.61</b>	-0.25	0.13
	T+3	0.46	0.36	0.47	0.04	0.52	0.14	0.78	0.35	-0.27	0.37	0.53	-0.10	0.35
	T+2	0.62	0.56	0.65	0.23	0.65	0.31	0.85	0.48	-0.14	0.49	0.45	0.08	0.54
	T+1	0.77	0.72	0.80	0.40	0.77	0.49	<b>0.87</b>	0.57	0.02	0.57	0.40	0.27	0.70
	T	0.89	0.84	0.90	0.53	0.88	0.69	0.87	0.65	0.17	0.65	0.40	0.47	0.83
Leading investment	T-1	0.95	0.92	<b>0.95</b>	0.66	<b>0.91</b>	0.84	0.81	0.76	0.30	0.75	0.37	0.59	0.90
	T-2	<b>0.96</b>	<b>0.94</b>	0.94	0.77	0.90	0.92	0.72	0.85	0.36	0.84	0.36	0.69	<b>0.92</b>
	T-3	0.92	0.91	0.88	<b>0.82</b>	0.84	<b>0.92</b>	0.57	0.89	<b>0.36</b>	0.88	0.30	<b>0.72</b>	0.86
	T-4	0.83	0.84	0.77	0.84	0.71	0.86	0.38	<b>0.91</b>	0.34	<b>0.90</b>	0.19	0.69	0.75
	T	<b>0.96</b>	<b>0.94</b>	<b>0.95</b>	<b>0.82</b>	<b>0.91</b>	<b>0.92</b>	<b>0.87</b>	<b>0.89</b>	<b>0.36</b>	<b>0.90</b>	<b>0.31</b>	<b>0.64</b>	<b>0.69</b>
HARDING AND PAGAN INDICES														
MAR 91-SEP 08		0.84	0.78	0.83	0.84	0.65	0.67	0.74	0.48	0.68	0.48	0.60	0.53	0.88
MAR 91-DEC 98		0.90	0.90	0.90	0.90	0.60	0.60	0.80	0.53	0.67	0.53	0.47	0.53	0.97
MAR 99-SEP 08		0.79	0.69	0.77	0.79	0.69	0.72	0.69	0.44	0.69	0.44	0.71	0.53	0.82

SOURCES: Eurostat and OECD.

a. Correlation between the standardised cyclical components of GDP and investment items.

b. The figures in bold indicate the maximum correlation.

c. The second column refers to periods in which investment is leading or lagging GDP in the calculation of the correlation.

upturn rather than in a downturn. For example, expansions of GDP have been twice as long as contractions, while for investment the proportion is even higher, of almost five to one. This ratio varies considerably among the various components of gross fixed capital formation, although the high proportion is worth underlining in the cases of construction (in particular residential construction), transport equipment and private non-residential investment.

Also, the average maximum amplitude of GDP, total investment and several of its components (including most notably residential construction investment) has been higher in expansions than in contractions, i.e. these variables have tended to grow more sharply in boom periods than the amount by which they slowed in downturns. Against this, other subaggregates (like investment in machinery or public investment) have shown a higher maximum fluctuation during contractions than expansions. Finally, the last two columns of the table show the ratio between the maximum amplitude of each variable and that of GDP. Thus, it can be seen that this proportion is higher than unity in most cases both in expansionary and contractionary

	AVERAGE DURATION		MAXIMUM AMPLITUDE		MAXIMUM AMPLITUDE RELATIVE TO GDP	
	Expansions	Contractions	Expansions	Contractions	Expansions	Contractions
GDP	12.00	6.00	2.20	-1.96	—	—
TOTAL GFCF	13.25	2.75	5.48	-3.05	2.49	1.56
INVESTMENT BY TYPE						
Equipment (c)	—	6.00	—	-13.97	—	7.14
<i>Machinery</i>	9.25	3.00	3.77	-5.02	1.72	2.56
<i>Transport</i>	15.00	4.00	11.02	-11.65	5.02	5.96
Construction	7.83	1.00	4.14	-0.15	1.89	0.08
<i>Residential</i>	7.83	1.00	4.06	-1.91	1.85	0.97
<i>Other construction</i>	2.50	1.80	2.76	-3.29	1.26	1.68
Other GFCF	4.67	1.50	3.62	-1.65	1.65	0.84
INVESTMENT BY SECTOR						
Public	2.00	5.00	3.07	-4.80	1.40	2.46
Private residential	3.71	5.83	3.98	-3.77	1.81	1.93
Private non-residential	14.50	4.00	7.67	-6.93	3.49	3.55

SOURCES: Eurostat, OECD and Banco de España.

a. The expansions and contractions are defined based on the estimates of Markov regime switching models.

b. The maximum amplitude is calculated on the standardised cyclical components.

c. For equipment investment, the expansive periods detected were at the beginning and the end of the sample. Consequently, no data are available for complete cycles.

periods, that is, the cyclical components of the investment items increase more than those of GDP in upturns and fall to a greater degree in downswings, in line with the results on relative variability. The higher fluctuations in investment in transport equipment and private non-residential investment are worth noting, which are more than five and three times higher than those in output. Total investment, residential construction and other investment exceed the cyclical developments in GDP to a greater degree during upturns than in downturns, while the opposite occurs for the other components and, especially, for investment in machinery and public investment.

## Conclusions

This article has reviewed the recent cyclical developments in gross fixed capital formation in relation to that of GDP in the euro area from a disaggregated point of view, by purpose, the agent making the investment and the type of investment. Thus, available statistical information indicates that approximately 65% of total investment is used to replace the capital stock, that private investment represents almost 90% of the total and that, by asset type, construction and equipment investment account for around 50% and 40%, respectively. Furthermore, these proportions have hardly undergone any significant changes since the nineties.

The importance of investment lies in its role as a driver of growth and of the cyclical fluctuations in GDP. In fact, the indicators calculated to characterise the cyclical component of gross fixed capital formation and its subaggregates in relation to that of GDP corroborate, on the one hand, the procyclicality of investment and, on the other, its greater cyclical fluctuation with respect to that of GDP. Firstly, the variability of the cyclical component of GDP is nearly three times lower than that of total gross fixed capital formation. Among its components, this proportion is even higher in the case of private non-residential investment and investment in equipment and, to a lesser degree, in public investment and construction investment, in which

budgetary restrictions, in the case of the former, and long lead times, in the case of the latter, could have played an important role. Secondly, the correlation between the cyclical component of GDP and those of the rest of the investment series (except for government investment and other investment) is considerably high and, in general, indicates contemporaneousness. Finally, the average maximum variation of the cyclical components of most of the investment series is higher than that of GDP, with investment in transport equipment and private non-residential investment proving especially notable.

The cyclical analysis distinguishing between the period before and after the changeover to the euro shows that for most of the investment components, in the most recent stage, the relative variability has fallen, the correlation with GDP has intensified, i.e. investment behaviour in recent years has been more in line with the related demand, and it has tended to lead that of GDP. Albeit only tentatively, given the absence of a causality analysis, these results could be related to the achievements of the common monetary policy over these ten years which, by ensuring a low inflation environment, has enabled agents to assess more clearly the movements in relative prices, promoting a better evaluation of the general economic situation and, consequently, allowing decisions more consistent with the current and expected developments in GDP to be taken. This would result in lower relative variability of investment and a higher correlation and greater lead to GDP.

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