

**The harmonised EU investment survey:
What can it tell us about investment growth in the euro area?**

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- Preliminary draft -

1. Introduction

Business investment is a key component of GDP. Gross fixed capital formation (GFCF) accounts for approximately 20% of euro-area GDP, roughly 90% of which is attributable to private sector investment. Furthermore, since GFCF is considerably more volatile than the relatively smoothly evolving consumer spending, it usually accounts for a significantly larger share of *changes* in domestic demand and, therefore, *GDP growth*. At the same time, investment also has an impact on supply, as it adds to the capital stock and thus is the basis for further growth in the future. Therefore, business investment is a very relevant variable for short- and medium-term economic analysis.

Since 1966 the Commission has been collecting data on annual investment plans in the manufacturing sector within the framework of the Joint Harmonised EU Programme of Business and Consumer Surveys (BCS). Given that the samples are representative, managers' responses can be expected to contain useful information on overall investment in the manufacturing sector. To the extent that the survey data is released before hard statistical data is available for a given period, the results should therefore be very useful for short-term analysis and forecasting purposes.

However, so far only few studies have investigated the potential role of investment-related survey data in forecasting investment growth. Barnes and Ellis (2005) examine the information content of a range of *qualitative* investment indicators and other investment-related survey indicators such as capacity utilisation, profitability and general business optimism. They conclude that several indicators contain information about the path of investment and can usefully supplement official statistical data when interpreting recent movements in investment. Abberger (2005) investigates whether survey-based capacity assessments can be useful for a timely analysis of current investment behaviour and for forecasting investment growth in the short term. He concludes that the surveyed capacity results are a valuable tool for the assessment of investment.

Ferrari (2005) is a rare example of an analysis using aggregate quantitative investment plans resulting from the French survey of investment in the industry sector. He proposes a quarterly indicator based on revisions of firms' investment plans that he finds to be closely correlated with the quarterly evolution of official business investment figures. To our knowledge this the only study that explicitly evaluates the quantitative estimates of investment growth collected through the harmonised EU-wide investment survey.

In this note, we try to assess the information content of the quantitative investment plans and related qualitative indicators collected in the framework of the BCS programme with an eye to current and future developments in investment. The information content is evaluated on the basis of how the survey data relate to actual investment developments. Given the relatively short available data sample and the annual nature of the data, the analysis is mostly confined

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to an in-sample assessment. We focus on aggregate euro-area results, augmented by a partial analysis of some of its large Member States.

The outline is as follows. Sections 2 and 3 provide a brief description of the investment survey and describe the specifics of the collected data and the reference series used. Section 4 provides a descriptive analysis of the surveyed investment plans and their relation to outcomes of investment growth, including a brief revision analysis of the data. The degree of co-movement between the series is assessed, focusing on the evolution for consecutive releases of surveyed investment plans. As a benchmark test, Section 5 investigates whether selected results from the industry survey (capacity utilisation, factors limiting production, etc) can provide comparably useful information on investment growth. Section 6 provides an indicative analysis of the usefulness of investment plans in forecasting investment, limited by the annual frequency and the short available samples of the data. Section 7 concludes and suggests some potential lanes for improving the usefulness of the Investment survey in practice.

2. Overview of the Investment survey

The investment survey is carried out twice a year - in March/April (“spring”) and in October/November (“autumn”) - among companies in the manufacturing industry sector. The spring and autumn surveys have different questionnaires. The spring questionnaire asks for the percentage change in investment of the company from year t-2 to t-1 and from year t-1 to t. The autumn questionnaire asks for the percentage change in investment of the company from year t-1 to t and from year t to t+1. According to this scheme, four consecutive estimates of investment growth are available for each year. The results of the survey carried out in spring are available at the end of June and the results of the autumn survey are available at the end of January of the following year.

As an example, Table 1 shows the calendar of the investment survey for the year 2006 and the corresponding ESTAT gross fixed capital formation (GFCF) data available at the time of publication of the survey results. Annual data for total investment is available with the first release of National Accounts (NA) for the last quarter of the year (Q4), while the breakdown by assets (*equipment, housing, non-residential construction, other*) is released with the *second* NA estimate for Q4, i.e. approximately one month later.

Table 1 Investment Survey calendar for the year 2006

Year	2006			
Date of survey	Oct/Nov 2005	Mar/Apr 2006	Oct/Nov 2006	Mar/Apr 2007
Date of publication of survey results:	end-Jan 2006	end-Jun 2006	end-Jan 2007	end-Jun 2007
	Eurostat data available at the time of survey results publication			
		First estimate 2006Q1	2nd estimate 2006Q3*	2nd estimate 2006Q4**

* 1st estimate available around end-Nov 2006

** 1st estimate available beginning March 2007

Therefore, at the time of the release of the spring survey results for investment growth in the preceding year, corresponding ESTAT estimates for both total and equipment investment growth are already available. At the time of the release of the autumn investment plans for a given year, in January of the following year, ESTAT data on GFCF is available for three quarters of that year.

The autumn questionnaire also contains a question on the type of investment (*replacement, extension, technical progress, and others*) planned in years t and t+1 and a question on the factors driving investment (*demand, profitability, technical factors, and others*) in years t and t+1.

DG ECFIN publishes the results in the January and June issues of the Business and Consumer survey press release. The ECB regularly reports on the investment survey in its Monthly Bulletin. In a box regularly published in the March issue, the ECB examines the results of the autumn survey, with an eye both to a structural analysis (main factors driving investment and the structure of investment) and to investment expectations (also breakdown by sector).

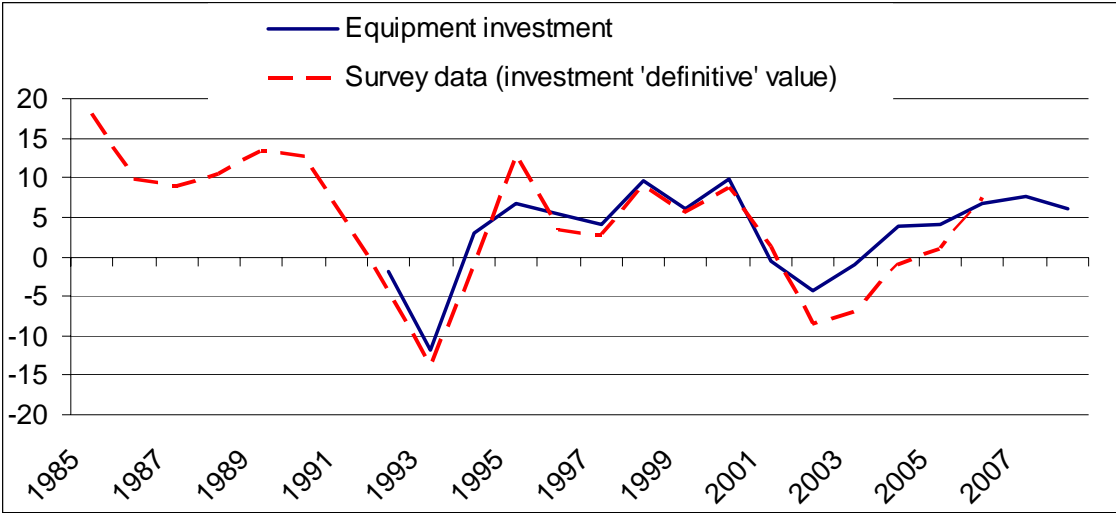
3. The data

The investment survey covers the manufacturing sector only. Since consistent ESTAT breakdowns of investment by branches are only available for relatively short time spans, we choose equipment investment (metal products, machinery and transport) as reference series to approximate investment activity in the manufacturing sector. Equipment accounts for approximately 40% of total investment and is highly correlated with both manufacturing and total business investment. The investment survey asks enterprises for year-on-year percentage changes in investment. From these nominal changes (values), real investment growth (volumes) is also derived by deflating the surveys results with the price deflator for equipment investment. In this note, the focus is on *nominal* investment growth, but similar results are obtained looking at real investment growth.

4. Using investment survey results: descriptive analysis

For a given year, successive surveys provide several estimates of the evolution of investment growth. Graph 1 shows growth in equipment investment along with the "definitive" values from the investment survey, i.e. those surveyed in March/April of year t+1 for year t. Overall, the survey results provide a good reflection of investment growth, showing a coincident behaviour and correctly indicating the turning points. The correlation between the two series is 92%.

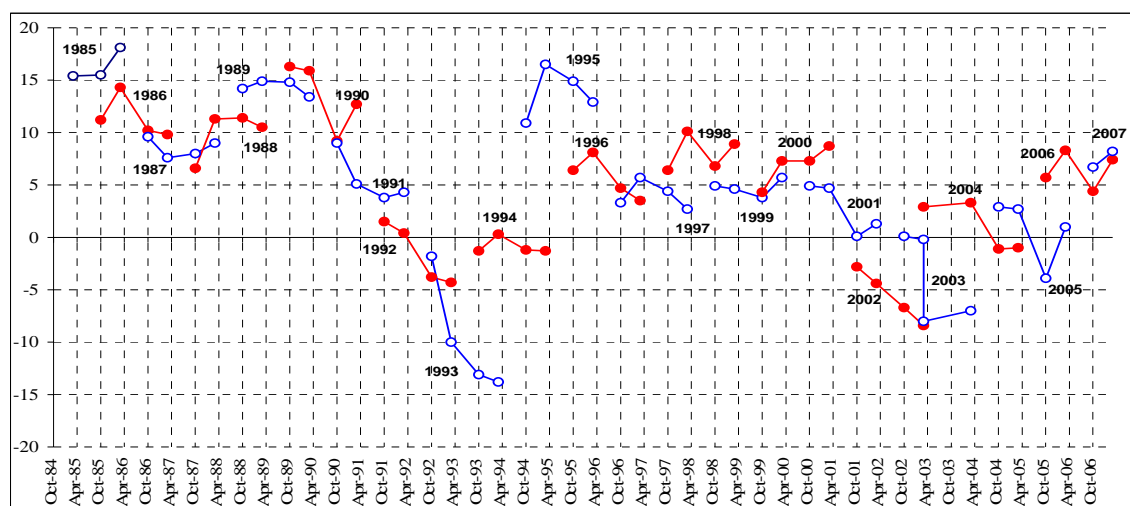
Graph 1 Equipment investment growth and surveyed change of investments in the euro area – nominal value



Sources: AMECO db and DG ECFIN investment survey.

However, as discussed in Section 2, when the 'definitive' survey investment data become available (end-June t+1), the 'hard' data for year t has already been published by Eurostat. The question is therefore, whether earlier estimates can be used for forecasting. The most natural manner to use these early estimates is to assume that firms' forecasts correspond to the outcomes as reflected in the (later) national accounts. Graph 2 shows that the consecutive estimates are revised according to a relatively stable pattern.

Graph 2 Investment reported in each survey for the euro area – nominal value



Source: DG ECFIN investment survey.

Looking at the euro area aggregate, we notice that, in most of the cases, managers revise downwards their investment estimate for year t in the third survey (the one conducted in Oct/Nov of year t) compared with the second survey (Mar/Apr of year t). The 'definitive' figure (the estimate surveyed in Mar/Apr of year $t+1$) is then generally slightly higher than the third.

On average over the period 1992 to 2006, the euro area definitive estimation (Mar/Apr $t+1$) was revised downwards by 2.1 percentage points compared with the first estimation (Oct/Nov $t-1$) and by 2.7 pp compared with the second estimation (Mar/Apr t). By contrast, the definitive estimation has been revised upwards by on average 0.5 pp compared with the third estimation (Oct/Nov t).

Table 2 below summarises the average revisions vis-à-vis the definitive estimates in the euro area and the four large euro-area countries. The investment growth 'definitive' estimation is reported in the first column, while the differences between the 'definitive' estimate and the earlier estimates are shown in the following columns. For example, we see that, on average, the 'definitive' estimation for Italy, has been revised upwards by 5.3 pp compared with the first estimation, which was 1.4%. Apart from Italy, where the final estimation is on average higher than all previous estimations, we see that in general the managers in the industry sector are somewhat over-optimistic in the first two surveys (Oct/Nov of year $t-1$ and Mar/Apr of year t). The average revision pattern becomes different across countries thereafter.

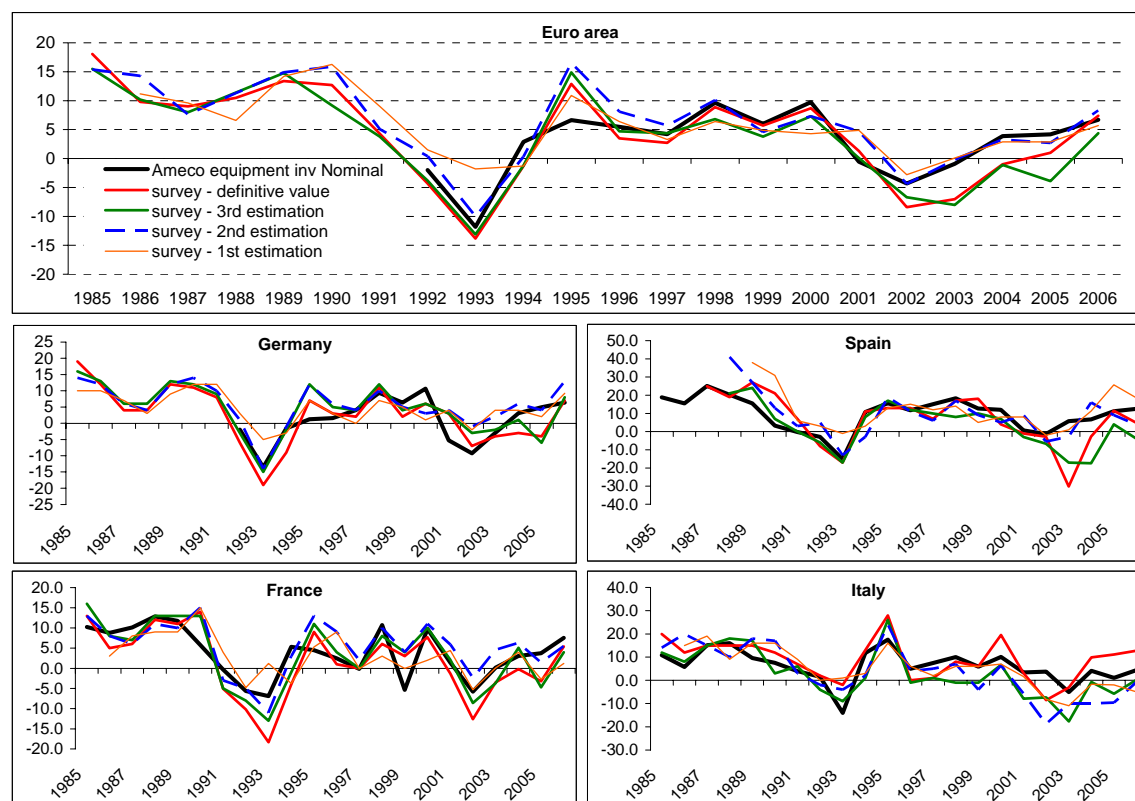
Table 2 Average revisions vis-à-vis the definitive survey estimate - 1992 to 2006

	definitive value Mar/Apr $t+1$	Difference vis-à-vis definitive value		
		3rd estimation Oct/Nov t	2nd estimation Mar/Apr t	1st estimation Oct/Nov $t-1$
		Euro area	1.1	0.5
Germany	-0.7	-2.3	-4.3	-3.3
Spain	2.5	2.2	-3.2	-6.5
France	-1.4	-2.0	-5.2	-2.3
Italy	6.7	8.1	7.8	5.3

Source: DG ECFIN investment survey.

Graph 3 displays the investment plans reported in the four consecutive surveys for each year for the euro area and the four larger EA countries, together with the actual growth in equipment investment.

Graph 3 Growth in equipment investment and surveyed change of investment in the euro area – nominal value



Sources: AMECO db and DG ECFIN investment survey

The graph suggests that the definitive estimates are not always the closest to the National Account outcomes. Looking at the revisions vis-à-vis the actual outcomes, see Table 3, we observe that euro-area investment growth is on average over-estimated in the first survey. The over-estimation increases further in the second survey before turning into a severe under-estimation in the third survey. The definitive estimates still display a negative bias of 1.6 percentage points vis-à-vis the outcomes. Surprisingly, in terms of average revisions, the estimation closest to the actual outcomes is the first one.

Table 3 Average differences vis-à-vis actual investment in equipment growth (National Accounts) - 1992 to 2006

		Difference vis-à-vis actual outcomes			
Nat. Account		definitive estim	3rd estimation	2nd estimation	1st estimation
Outcomes		Mar/Apr t+1	Oct/Nov t	Mar/Apr t	Oct/Nov t-1
Euro area	2.7	1.6	2.1	-1.2	-0.6
Germany	0.9	1.6	-0.7	-2.7	-1.7
Spain	7.6	5.1	7.2	1.9	-1.4
France	1.7	3.1	1.1	-2.2	0.8
Italy	4.5	-2.3	5.8	5.6	3.1

The mismatch between estimates and outcomes can be partly due to the different coverage of the survey (investment in the manufacturing industry) and the reference series (total equipment investment). In addition, it has to be noted that the National Account data are also revised over time. In the tables and graphs of this note, we report the latest available, i.e. revised data. Results are likely to look different if real time data were used. Revisions of first investment figures can sometimes be quite important. As an example, the 2003 figure for total investments in nominal terms has been revised upwards by more than two percentage points between the first publication in March 2004 (which reported a 0.3% growth in investment) and the figure reported in June 2007 (which was 2.4%). Over the period from 2000 to 2006, the mean absolute revision error is 0.68 pp and the root mean squared revision error is 0.91 pp.² It has to be pointed out that in the period 2000 – 2006 the first releases have always been revised upwards in subsequent releases. The negative bias amounts to -0.68 (mean revision error).

Investment plans from the investment survey are nevertheless correctly indicating the cyclical development in equipment investment. In 80% of the cases, the direction of change indicated by the definitive estimation for the euro area was correct over the period 1992 to 2006. Table 4 shows the percentage of cases where the surveys indicated the correct sign of investment growth. The period taken into consideration varies across countries depending on data availability (from 1992 for euro area and Germany, from 1988 for Spain and 1985 for France and Italy).

Table 4 Percentage of correct directional changes indicated in the survey

	Survey data			
	definitive value	3rd estimation	2nd estimation	1st estimation
	Mar/Apr t+1	Oct/Nov t	Mar/Apr t	Oct/Nov t-1
Euro area	0.80	0.73	0.87	0.73
Germany	0.80	0.87	0.80	0.80
Spain	0.80	0.74	0.79	0.89
France	0.68	0.77	0.91	0.73
Italy	0.95	0.64	0.68	0.76

The correlation coefficients between actual growth in investment in equipment and consecutive estimates from the investment survey are reported in Table 5. For the euro area, the correlation coefficient between survey data and national account data is around 0.85 in both the second and the third estimates of the year and then increases to 0.92 with the 'definitive' survey estimate. At the country level, the correlation coefficients are 0.5 to 0.6 for the first estimates, rising to levels between 0.7 and 0.8 for the three subsequent surveys. With the exception of Italy, the level of correlation remains relatively stable between the second and the 'definitive' estimates. For Italy and Spain, the National Account investment series is better correlated with the third estimate than with the 'definitive' one.

² These results were calculated using a real-time data set collected by the ECB, covering monthly investment releases from April 2001 onwards.

Table 5 Correlation between survey data and actual growth in equipment investment—nominal terms

	Survey data			
	definitive value	3rd estimation	2nd estimation	1st estimation
	Mar/Apr t+1	Oct/Nov t	Mar/Apr t	Oct/Nov t-1
Euro area	0.92	0.85	0.86	0.72
Germany	0.78	0.71	0.73	0.59
Spain	0.68	0.73	0.69	0.49
France	0.82	0.82	0.78	0.54
Italy	0.71	0.81	0.63	0.61

Sources: DG ECFIN investment survey and AMECO database.

Note: The period taken into consideration varies across countries depending on data availability (from 1992 for euro area and Germany, from 1988 for Spain and 1985 for France and Italy).

5. Alternative survey indicators for investment

In addition to the investment survey, which asks the participating enterprises directly about investment their plans, there are some other questions in the BCS programme that can contain useful information about investment activity. In particular, among the questions that are asked quarterly in the industry survey there are three questions which can be linked to investment growth. As a benchmark for the above results we checked the correlations between these series and investment in equipment. The three questions taken into consideration are the ones inquiring *factors limiting the production, assessment of production capacity and capacity utilisation*.

The first question asks enterprises which main factors are currently limiting their production. Respondents can choose one or several answers from the following options: “none”, “insufficient demand”, “shortage of labour force”, “shortage of material and/or equipment”, “financial constraints” and “others”. The answers reflect limits to production through either the demand or the supply side. They are reported as a percentage of the total responses, and thus should add up to 100% in case all respondents chose one single option.

The second question asks "considering your current order books and the expected change in demand over the coming month, how do you assess your current production capacity". Respondents can answer "more than sufficient", "sufficient" or "not sufficient". The indicator used here is then calculated as a balance statistic.

Finally, the third question asks enterprises at what capacity their company is currently operating. Respondents give a quantitative estimate reporting the percentage of full capacity utilisation.

These questions are asked in January, April, July and October. In order to compare the results with the second and third estimate of the investment survey (which, as seen before, can be considered the most "useful" estimates), we compute the correlation coefficients between growth in equipment investment and the results obtained in the April, July and October industry surveys.

In general, the sign of the correlation coefficients are in line with intuition. Investment growth is negatively correlated with the percentage of respondents reporting "insufficient demand" as limiting their production and with the second question (if capacity is assessed to be more than sufficient, investments should decrease). The correlation is positive for the answers to the

capacity rate question and for the percentages of respondents reporting equipment or labour to limit their production.

Tables 6 and 7 report the correlation coefficients between actual growth in equipment investment and data from the quarterly industry survey conducted in October and in July (the answer categories “none”, “shortage of labour force”, “financial constraints” and “others” for the question on factors limiting production are not reported as the correlations coefficients are in general low).

Table 6 Correlation between actual growth in equipment investment and data from the industry survey conducted in October

	October Industry Survey			
	Capacity utilisation	Assesment of capacity	Demand limiting production	Equipment limiting production
Euro area	0.83	-0.83	-0.87	0.62
Germany	0.76	-0.74	-0.87	0.48
Spain	0.58	-0.65	-0.69	0.69
France	0.37	-0.49	0.22	0.33
Italy	0.57	-0.58	-0.33	0.48

Sources: DG ECFIN industry survey and AMECO database.

Note: The period taken into consideration varies across countries depending on data availability (from 1992 for euro area and Germany, from 1988 for Spain and 1985 for France and Italy).

Table 7 Correlation between actual growth in equipment investment and data from the industry survey conducted in July

	July Industry Survey			
	Capacity utilisation	Assesment of capacity	Demand limiting production	Equipment limiting production
Euro area	0.80	-0.84	-0.81	0.72
Germany	0.81	-0.80	-0.77	0.56
Spain	0.48	-0.66	-0.72	0.74
France	0.21	-0.28	0.19	0.29
Italy	0.55	-0.58	-0.33	0.61

Sources: DG ECFIN industry survey and AMECO database.

Note: The period taken into consideration varies across countries depending on data availability (from 1992 for euro area and Germany, from 1988 for Spain and 1985 for France and Italy).

For the euro area, correlation coefficients are high between investment in equipment and results coming from the October survey in the manufacturing industry. The correlation coefficient is 0.83 for capacity utilisation, -0.83 for the assessment of the production capacity and 0.87 for the percentage of respondents identifying "demand" as a limiting factor for production. As shown by Table 7, the coefficients are already at a level of 0.8 or higher when correlations are computed with the July industry survey results.

Also for Germany, the correlation coefficients are high between investment in equipment and capacity utilisation as reported in the July (0.81) and in the October (0.76) industry surveys. The correlation coefficients are higher than the ones obtained with the investment survey also when the assessment of the production capacity or the answer "demand" as a factor limiting the production are taken into consideration. The latter has a correlation coefficient of -0.87 in the October survey.

For Spain, the correlation coefficients are in general lower than the ones obtained from the investment survey apart from when the factors "demand" and "shortage of material and/or

equipment" are taken into consideration. In this case the coefficients with the July industry survey are -0.72 and 0.74, respectively.

On the other hand, in the case of France and Italy we did not find correlation coefficients of comparable magnitude to the ones reported earlier for the investment survey results.

Notwithstanding the fact that the investment survey contain quite useful information namely for structural analysis (using the Oct/Nov additional questions), the above results shows that for the euro area as a whole and Germany, correlation coefficients obtained using data from the industry survey can be as good as or higher than the ones obtained from the second or third investment plans. In addition, the relevant data from the industry survey are published three to six months before the investment survey results. However, the correlation coefficients for France and Italy are clearly higher in the investment survey, indicating that there is a value added in the specific questions on quantitative investment plans compared to broader questions and assessments that may indirectly be related to firms' investment plans.

6. Usefulness in forecasting (explanatory power)

The above findings show that the results of the Investment Survey can be used to get insights into the current and future course of investment activity, with respect to turning points, accelerations or decelerations. This section investigates whether the individual vintages of investment survey results can even be useful for forecasting actual investment growth (despite their apparent bias). The overview of the investment survey calendar and the related ESTAT releases of investment data in Table 1 showed that the first, second and third publications of investment plans might be useful in principle for forecasting,³ while at the time of the release of the "definitive" investment survey figures, ESTAT releases of GFCF including equipment investment are already available.

To map from the survey results to investment growth we use basic regression methods, allowing for any bias by including a constant. The usual approach to gauge the explanatory power of a potential indicator is to augment an AR model for the target variable with the indicator and to assess the degree of improvement of fit. The indicator is considered as useful if the model fit is improved significantly.

Table 8 In-sample statistics, euro area

	adj. R ²	const.	p-value	invest. plan	p-value
AR(1)	0.11				
1st plan	0.47	-0.81	0.606	1.24	0.0084
2nd plan	0.71	-0.07	0.939	0.80	0.0002
3rd plan	0.67	2.44	0.029	0.69	0.0006
definitive	0.83	2.18	0.010	0.77	0.0000

N=15

Table 8 contains the adjusted R² of the univariate AR(1) model for annual investment growth in the euro area.⁴ To analyse whether the individual results from the advancing investment survey can improve the fit of the AR model, lags and contemporaneous values of the survey

³ All survey results concerning investment in year t are only published in year t (January and June), or even t+1 (January and June). Technically, the first two estimates are therefore nowcasts, while the latter two are backcasts. However, given that first ESTAT annual investment figures are only available in March/April of t+1, the first three survey releases (up to January t+1) will be called forecasts with a view to their earlier availability.

⁴ In all cases, the AR(1) model has been chosen on the basis of the information criteria SIC.

results were added to the model. As expected, only contemporaneous values, i.e. plans referring to investment in year t, were significant.

As can be seen from Table 8, adding the first investment plans from October/November t-1 to the AR model for investment growth in t leads to an improvement of R^2 from 0.11 to 0.47. Including the second estimate (from March/April of year t) raises R^2 to 0.71. Interestingly, the improvement due to the inclusion of the third estimate is somewhat smaller, with R^2 rising to 0.67 only.⁵ Including the fourth "definitive" estimate, i.e. the one surveyed in March/April of year t+1 leads to an R^2 of 0.83. Table x also contains the regression coefficients of the constant term and the investment plan variable, including their respective p-values. In all cases, the null hypothesis that there is no instantaneous Granger causality from the survey results to investment growth can be clearly rejected, implying the usefulness of the investment plans for forecasting. As indicated by the high and positive coefficient estimates for the constant term in the cases of the last two investment survey releases,⁶ there is a significant under-estimation of investment growth in year t in the January and June releases of year t+1.⁷

It has to be stressed that the above regressions are based on 15 yearly observations only (due to the German reference series beginning in 1992 only). Therefore, the results have to be interpreted with great caution and should be seen as purely indicative. Slightly more observations for the reference series are available for many euro-area Member States. Table 9 shows the goodness of fit statistics for analogous regressions for France and Italy, based on 22 yearly observations.

Table 9 In-sample fit, France and Italy

adj. R^2	France	Italy
AR(1)	0.06	0.05
1st plan	0.23	0.31
2nd plan	0.51	0.33
3rd plan	0.66	0.61
definitive	0.67	0.47

N=22

As can be seen, the degree of goodness of fit increases monotonously with the maturity of the investment plans. The "definitive" investment figures surveyed in t+1 do, however, not seem to carry more information than the plans surveyed in October/November of year t; for Italy, the explanation of investment outcomes becomes even worse. Nonetheless, the improvement of fit over autoregressive lags is significant in all cases.

Assessing the usefulness of an indicator for forecasting on the basis of in-sample statistics is problematic, as it usually overstates the forecasting power. At the same time, the euro-area time series are too short for an out-of-sample assessment, based on the division of the sample into an estimation and evaluation part. To nevertheless give a flavour of the potential usefulness of the survey data in forecasting investment, some out-of sample results are reported below for France and Italy, for which 23 annual observations are available starting in 1985. The sample is divided into an initial estimation part covering 1985-2000 (16 obs.)

⁵ This is in line with the slightly lower correlation of the third compared to the second surveyed investment plans with growth in equipment investment (Table 5).

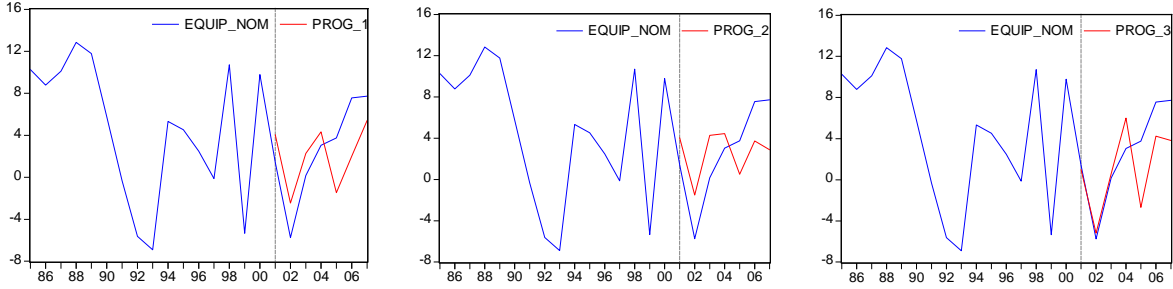
⁶ Both coefficients are significant at the 5% level.

⁷ This under-estimation is with respect to the final investment figures. The revision analysis in the previous section showed that, for the period 2000-2006, the systematic underestimation of final figures is also a feature of the first statistical releases.

producing a first forecast for 2001.⁸ Using a recursive design, the sample is then continuously extended until 2006 (22 obs.), producing a final forecast for 2007. In this way, seven forecasts for the period 2001-07 are generated. The forecasts are compared to the realisations by calculating the root mean squared error (RMSE), reflecting the uncertainty surrounding the forecast over the past seven years.

Since the out-of-sample period is too short for a formal comparison of the RMSEs with those of autoregressive benchmark models, we simply present graphs of the out-of-sample forecasts along with tables containing the corresponding RMSEs.

GRAPH 4 Out-of-sample forecast for France (based on first to third investment plans)



GRAPH 5 Out-of-sample forecast for Italy (based on first to third investment plans)

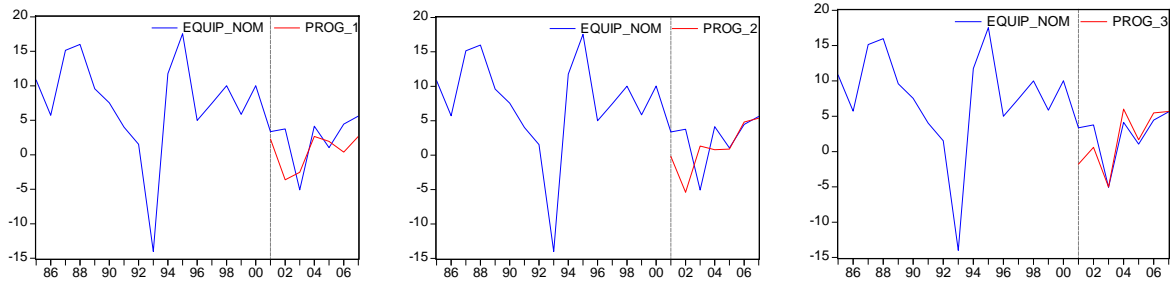


Table 10 RMSEs for France and Italy

RMSE	France	Italy
1st plan	3.53	3.60
2nd plan	3.63	4.62
3rd plan	3.32	2.43

N=7

Generally, in interpreting the size of the RMSEs, one has to bear in mind that they are computed on the basis of final, revised investment data. As was analysed in section 4, the first estimates of (*total business*) investment have a significant RMSE themselves compared to the final, revised figures. In the case of the euro area aggregate, the RMSE was 0.91 over the period 2000-2006, very likely representing a lower limit for the individual national data releases.

Looking at the development of the RMSEs over time, there is, in contrast to the in-sample results of Table 9, no monotonous improvement. The second investment plans, surveyed in March/April of year t, provide worse forecasting results than the first plans, surveyed in late t-1 for the two countries under focus.

⁸ It has to be noted that the model uncertainty introduced by estimating the models with that few observations is large, leading to excessive forecast variation. So while the in-sample results likely overstate the true forecasting performance of the models, the out-of-sample results will tend to understate it.

However, the results confirm the superiority of the third investment plans over the first two in terms of forecasting, with the RMSE dropping considerably for both countries, particularly for Italy. Looking at the graphs, both the profile and the magnitude of investment growth is well captured by the forecasts based on the 3rd investment plans, surveyed in October/November and released in January.

To be able to gauge the significance of the RMSEs, a reasonable benchmark has to be found. In its annual Autumn Forecast, usually released in early November, the Commission includes forecasts of the growth of *real* investment in equipment in the year ahead. The RMSE of these annual predictions over the period 2001-2007 is 3.57 for the euro area, 2.81 for France and 4.89 for Italy.⁹ Though not perfectly comparable since we focus our attention to *nominal* investment growth, the comparison seems to indicate that the simplistic autoregression model augmented by investment survey data can produce forecasts of comparable or even superior accuracy relative to the iterative-analytic approach underlying the Commission's macroeconomic forecast. However, it has to be noted that the release of the third investment plans, though surveyed at the time of the Commission's forecast production, comes almost three months after that of the Autumn Forecast.

All in all, the evidence for the usefulness of the investment plans in forecasting investment growth is mixed. Reflecting the correlation results, the in-sample explanatory power of the investment plans available in June t and January $t+1$ is relatively high. On the other hand, the benchmark of using only autoregressive information on past investment is relatively low. Many other macroeconomic and survey variables (interest rates, profits, general business conditions and expectations...) contain information related to future investment that might fully or partially encompass the information contained in the investment survey results. Not much can be said about the out-of-sample forecasting performance due to the short data samples. However, for two important euro-area countries (France and Italy), the 3rd investment plans, surveyed in October/November and released in January, can be translated into reasonable forecasts of investment growth over the period 2001 to 2007. The tentative comparison with the Commission's Autumn Forecast indicates that the investment plans surveyed at the time of the production of the forecast might be useful for forecasting investment growth. However, the surveyed information would have to be made available earlier.

7. Conclusions

From the above analysis, it emerges that the harmonised investment survey provides useful information on actual growth in equipment investment. The analysis of the explanatory power of the investment plans in- and out-of-sample suggested that the results from the survey can be valuable in short-term forecasting exercises.

There are, however, three factors diminishing the usefulness of the survey and which should be improved in order to increase the value added of this survey. First, data are available only two months after they are collected and thus survey data become available when National Account data are already published. This is particularly the case for the last evaluation of

⁹ Own calculations based on consecutive releases of the Commission's Economic forecasts, available on http://ec.europa.eu/economy_finance/publications/european_economy/forecasts_en.htm. The Commission's forecasts are not based on a centralised econometric model, but are iterative-analytic. They result from the analysis made by country desks, each of which uses statistical methods to varying degrees. For a detailed analysis of the track record of the Commission's Economic forecasts (including investment growth), see Melander, Sismanidis and Grenouilleau (2007). The RMSE in forecasting *total real* investment growth over the sample 1970-2005 is 2.52 and 3.75 for France and Italy, respectively. It is 2.72 for the euro area (1999-2005).

investment for a given year, which is highly correlated with the actual outcome but becomes obsolete because of its late publication. Second, the coverage of the survey is limited to the manufacturing industry and therefore it is useful only for a part (around 40%) of total investment. Finally, for some countries and for the euro area as a whole, there are alternative survey indicators performing as well as or even better than the investment survey data. These indicators are namely capacity utilisation, assessment of capacity and factors limiting the production which are collected quarterly in the framework of the Industry survey and which are available 3 to 6 months before the investment survey data.

In conclusion, to increase the practical usefulness of the results, the surveyed information would have to be made available earlier, i.e. at the end of April and November, respectively. Furthermore, a broader sectoral coverage of the investment survey, i.e. including the services sector, would increase the reliability of the surveyed investment intentions for developments in total business investment. Lastly, as such, the investment survey can only be used for analysing and predicting annual investment growth. A quarterly design of the survey might be helpful also for forecasting quarterly growth in investment, as suggested by the paper by Ferrari (2005) who constructs a revision indicator exploiting the quarterly frequency of the French investment survey.

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