Statistics in focus

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When the level of construction activity changes, what is the condition of the rest of the economy?

The construction activity (as defined by NACE Section F) accounted for 5.5 % of gross value added (at basic prices) in the EU-25's economy in the third quarter of 2005 according to national accounts.

Despite this relatively low weight in overall activity, construction plays an important role in economic growth and stimulates demand in many other areas of the economy. Indeed, there are numerous examples of interaction between construction and other activities, such as its demand for intermediate and capital goods in the form of construction materials and machinery. There are also links with services activities, such as architectural and engineering services and the wholesale trade of construction materials and machinery, as well as financial and real estate activities.

This short publication aims to present information on the evolution of construction activity within the EU-25 and to analyse the hypothesis that developments in construction activity reflect more general developments in the economy as a whole. The study shows that there is some evidence to suggest that activity within the construction activity is related to that within the industrial economy, and that the index of production for construction leads the index of production for industry by between one and two quarters (see Figure 1 below).

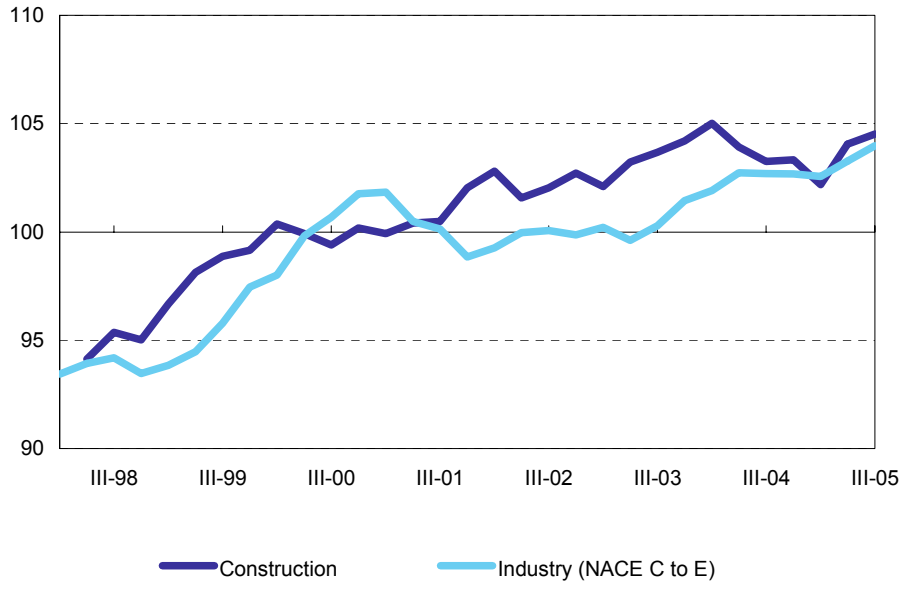

Figure 1: comparison of quarterly production indices for construction and total industry, seasonally adjusted, EU-25 (2000=100); source: Eurostat STS

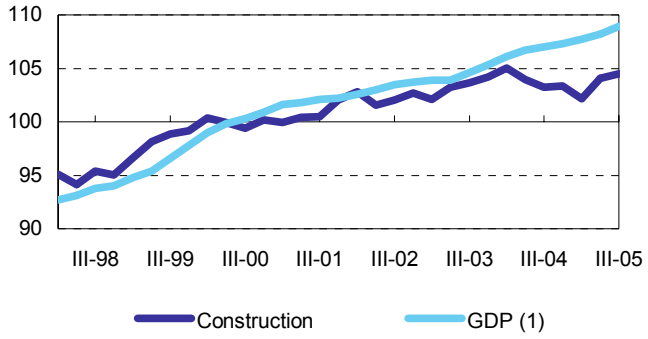

Figure 2: comparison of quarterly production index for construction and GDP, seasonally adjusted, EU-25 (2000=100); source: Eurostat STS and national accounts

(1) Constant prices.

Weak relationship between GDP and construction output

An initial study was made of the relationship between the index of construction and the index of constant price GDP. Correlation coefficients determine the intensity of a relationship between two variables, with values ranging from -1 to 1: the nearer the coefficient is to these two extremes the stronger the relationship between the two variables, in either a positive or a negative respect. The correlation coefficient between GDP and the index of production for construction during the period 1998 to 2005 was 0.21, showing there was a weak relationship between quarterly growth rates for GDP and quarterly rates of change for the index of production for construction, which is supported when observing Figure 2. While constant price GDP always recorded positive rates of change from one quarter to the next during the period 1998 to 2005, the index of production for construction fell on 10 different occasions during the same period. For comparison, quarterly growth rates for the index of industrial production decreased seven times, although this index registered a correlation coefficient of 0.74 with quarterly GDP growth.

It is important to mention here that exogenous factors (those unrelated to the European economy) influence directly or indirectly construction activity and may play a role in this apparent weak relationship between construction output and GDP. Such factors include national regulations and government incentives for new buildings and renovations (by the way of VAT reductions for instance) or mortgage interest rates. Moreover, contrary to private investors, governments may launch infrastructure projects to provide a counter-cyclical boost to the economy.

Construction leads industrial output

In Figure 3, there is little evidence of any relationship between the indices of production for construction and industry, confirmed by the quarter on quarter growth rates for these two indicators that recorded a correlation coefficient of -0.1. However, further study suggested that the index of production for construction led that for industry, and that if a lag of two quarters was introduced then a higher (although still relatively weak) coefficient was obtained (0.3) – see Figure 4. The same lag also produced the highest correlation coefficient in relation to GDP, as a two quarters lag for construction resulted in a coefficient of 0.37.

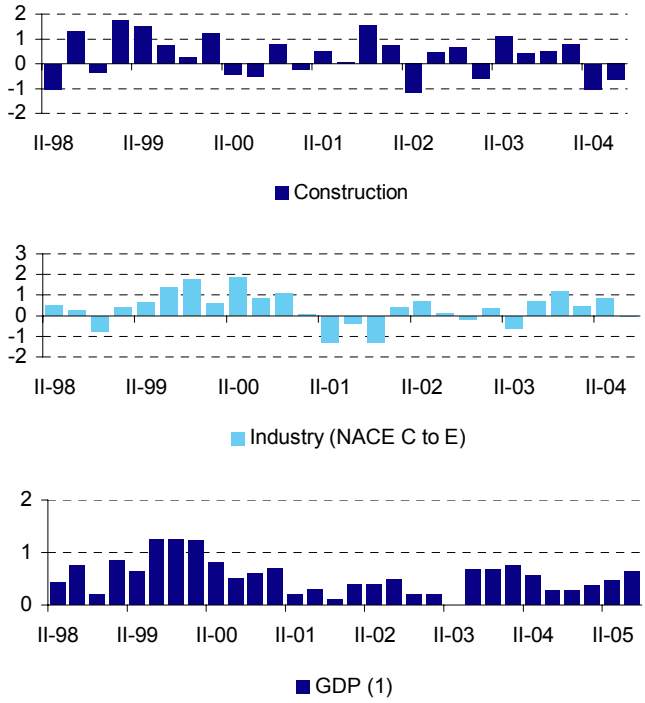

Figure 3: comparison of quarterly growth rates for the index of production for construction and industry with quarterly growth for GDP, seasonally adjusted, EU-25 (2000=100); source: Eurostat STS and national accounts

(1) Constant prices.

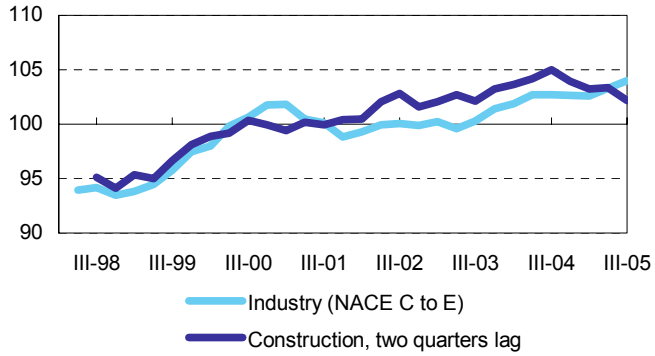

Figure 4: comparison of quarterly production indices for construction and total industry, seasonally adjusted, EU-25 (2000=100); source: Eurostat STS

Building and civil engineering; comparison with selected industrial activities

No relationship between the evolution of civil engineering and GDP

According to the classification of types of construction (CC), construction can be distinguished between building and civil engineering. Performance of civil engineering projects is, at least in part, affected by government spending and decisions on whether or not to launch or postpone infrastructure projects (such as roads, bridges, sewerage systems, power or telecommunications networks) do not necessarily take account of the economic situation, but may instead reflect budgetary and monetary policy, or the desire to stimulate activity within an economy through the creation of demand and jobs. On the other hand, building work is likely to more closely reflect overall economic conditions, as in most European countries the majority of expenditure on these projects comes from the private sector, and hence, building projects are more likely to be launched when the economy is doing or expected to do well.

Given the relatively weak relationship between the index of production for construction as a whole and GDP, the next line of study was to look in more detail at the construction activity to see if any differences were evident for building and civil engineering – see Figure 5. There was a quite different evolution to the output related to these two types of construction, with the index of production for building more closely related to that of GDP, while there was no evidence of any relationship between civil engineering output and GDP. Note that the relationship between building and GDP was no stronger than that observed for the whole of construction.

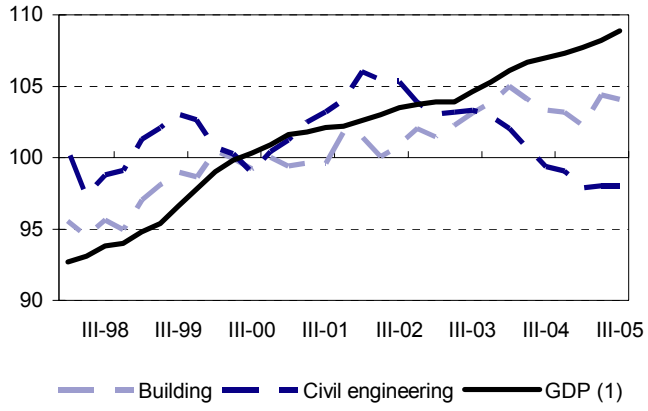

Figure 5: comparison of quarterly production index for the two types of construction and GDP, seasonally adjusted, EU-25 (2000=100); source: Eurostat STS and national accounts

(1) Constant prices.

Construction leads capital and intermediate goods

The next line of investigation was to look in more detail at the various downstream and upstream activities that are associated with construction. As such, the analysis continued by studying the relationship between construction, capital and intermediate goods (see Figures 6 and 7). As with the more aggregated series, the evolution of output within industrial activities tended to be led by construction activity. This phenomenon was most pronounced for capital goods, which appeared to lag construction output by as much as four quarters, while the highest correlation coefficients for the remaining Main Industrial Groupings (MIGs) were recorded with lags of either one or two quarters. Note that none of the coefficients between construction activity and the indices of production for the MIGs were particularly strong, as the highest correlations for each of the MIGs were recorded within the range 0.23 to 0.38.

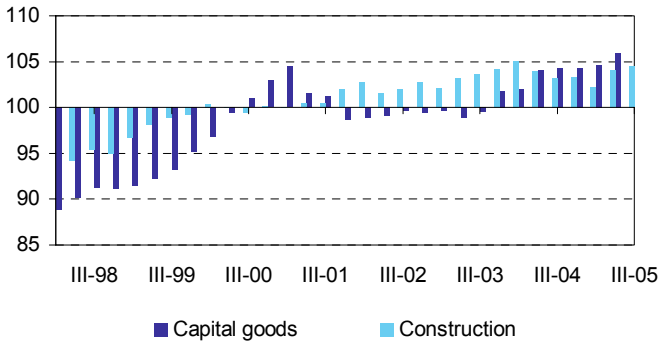

Figure 6: comparison of quarterly growth rates for the index of production for construction with capital goods, seasonally adjusted, EU-25 (2000=100); source: Eurostat STS

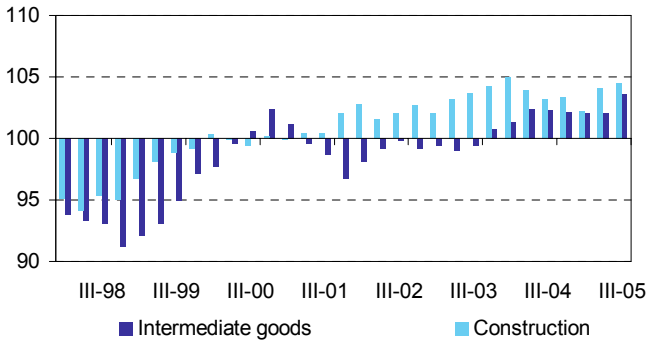

Figure 7: comparison of quarterly growth rates for the index of production for construction with intermediate goods, seasonally adjusted, EU-25 (2000=100); source: Eurostat STS

Construction, comparison with selected industrial activities

The analysis then went into more detail, in particular paying special attention to those industrial activities (as defined by NACE Rev. 1.1) that supply the construction activity with materials. The first step was to identify a set of activities, which included:

- quarrying of sand and clay (NACE Group 14.2);

- the manufacture of wood (NACE Division 20), and in particular builder's carpentry and joinery (NACE Group 20.3);

- the manufacture of non-metallic mineral products (NACE Division 26), and in particular, cement, lime and plaster (NACE Group 26.5).

Of the activities listed above, at the level of NACE divisions, the strongest relationship with construction activity was observed for the manufacture of non-metallic mineral products (see Figure 8), as shown by a correlation coefficient of 0.5, and for the manufacture of wood and wood products (0.37).

At a more detailed level (NACE Groups), the strongest relationships with construction activity were observed for the manufacture of cement, lime and plaster (see Figure 9), where a correlation coefficient of 0.45 was recorded, and for the quarrying of sand and clay with a correlation coefficient of 0.44. None of the remaining industrial activities listed above recorded a correlation coefficient higher than 0.35 (the manufacture of bricks, tiles and construction products, in baked clay).

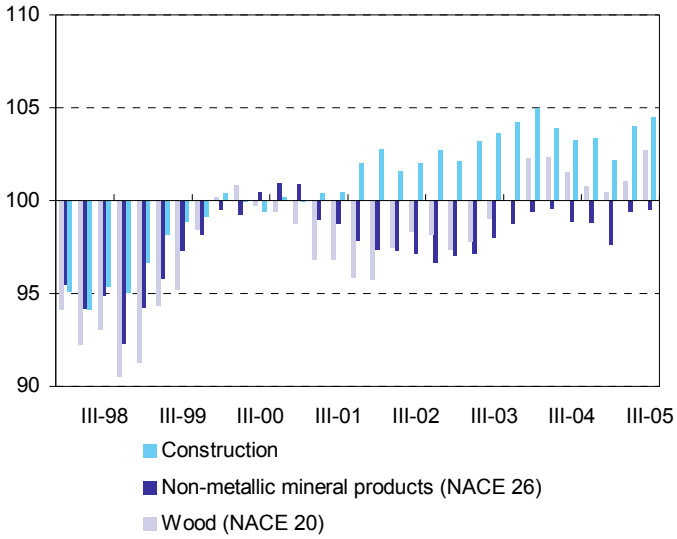

Figure 8: comparison of quarterly production index for construction and selected industrial activities at the level of NACE Divisions, seasonally adjusted, EU-25 (2000=100); source: Eurostat STS

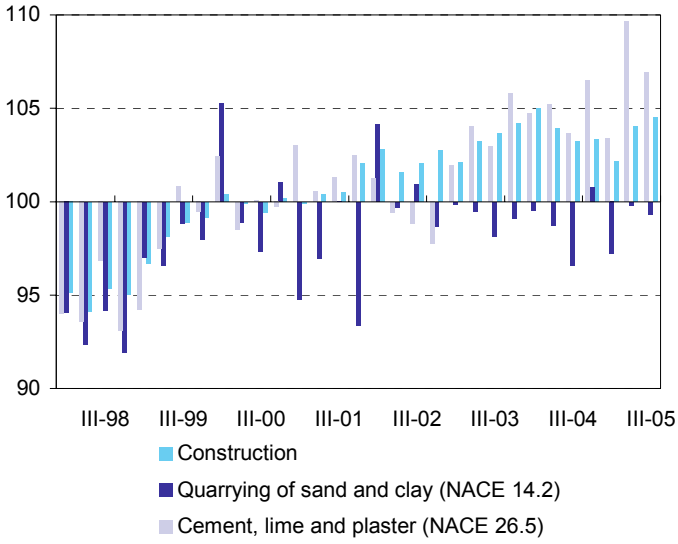

Figure 9: comparison of quarterly production index for construction and selected industrial activities at the level of NACE Groups, seasonally adjusted, EU-25 (2000=100); source: Eurostat STS

Comparison with selected service activities; developments within the Member States

No clear relationship between the evolution of construction and services activities

In a similar vein the study then moved on to look at the evolution of the index of production for construction and to compare this with the evolution of the index of turnover for various services, including: motor trades, wholesale trade, retail trade, hotels and restaurants, transport services and business services.

It should be noted that the production index is a volume index, whereas the turnover index is a value index, and the latter therefore reflects price changes as well as changes in the level of activity. In addition, it is currently not possible to go into any more detail than that provided, as EU aggregates do not generally exist at the NACE Group level within services.

Any relation between construction activity and the services economy was less evident than that for the industrial economy. Figure 10 shows that the evolution of turnover for hotels and restaurants most closely resembled the evolution of the index of production for construction. The similarities observed for these two indices may reflect more general cyclical economic developments, for example, higher business and consumer confidence, resulting in increased demand for construction activity and hotel and restaurant services.

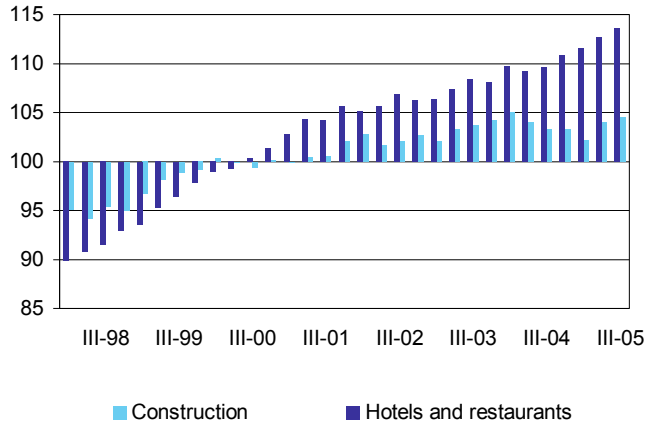

Figure 10: comparison of quarterly production index for construction and quarterly turnover index for hotels and restaurants, seasonally adjusted, EU-25 (2000=100); source: Eurostat STS

Developments within the Member States

A similar pattern of investigation to that used for the EU-25 was carried out for the Member States, starting with an analysis of the relationship between the average growth rates during the period from 2000 to 2005 for the index of production for construction and GDP. In a large majority of the Member States for which data is available, construction output and GDP evolved in a similar direction – see Figure 11 (on the next page).

The study then compared the average growth rates for the index of production for construction with a selection of short-term indices for other industrial activities already identified when studying the EU-25. An example is shown for the five largest European economies (namely Germany, Spain, France, Italy and the United Kingdom) in Figure 12. The fastest growth of construction activity was recorded in the Baltic Member States, see Figure 13. Note that not only did construction activity register dynamic growth but that growth was also rapid for the other activities that are presented. Figure 14 shows a similar set of information for those Member States which recorded a negative evolution for their respective indices of production for construction, namely Denmark, the Netherlands, Belgium, Portugal and Poland (note that Germany is not included in this figure, as it is already shown in Figure 12).

At a more detailed level, a selection of industrial activities were studied for the five largest European economies over the period 1998 to 2005 – see Figures 15 and 16 (overleaf). The results typically showed relatively high correlation coefficients. For example, there was a clear relationship between the evolution of the indices of production for non-metallic mineral products and construction in Germany (supported by correlation coefficient of 0.66). More specifically, the evolution of the index of production for cement, lime and plaster showed the highest correlation with that for construction in Germany, France, and Italy. Developments for quarrying of sand and clay were also well correlated with the index of production for construction in Germany and France, as was the index of production for wood and wood products in France.

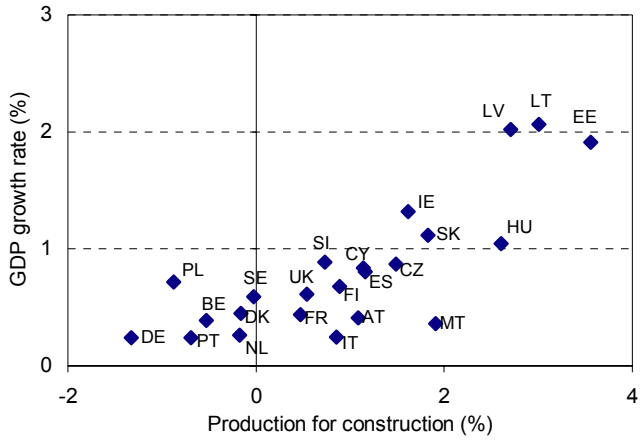

Figure 11: evolution of the index of production for construction and GDP, average quarter on quarter growth rates, Q1-2000 to Q3-2005; source: Eurostat STS and national accounts

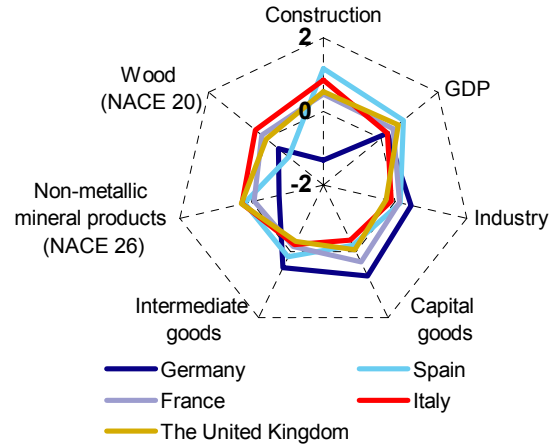

Figure 12: evolution of the index of production for construction, selected industrial activities and GDP average quarter on quarter growth rates, Q1-2000 to Q3-2005 (%); source: Eurostat STS and national accounts

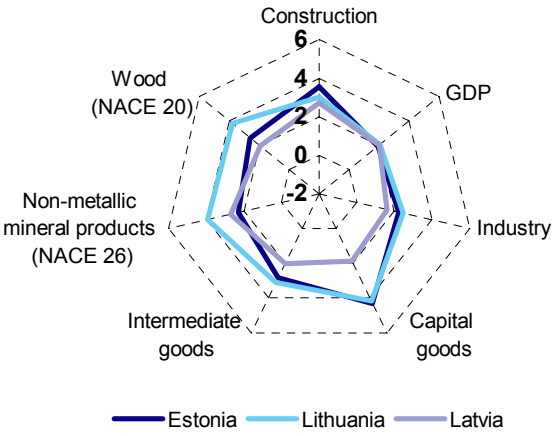

Figure 13: evolution of the index of production for construction, selected industrial activities and GDP, average quarter on quarter growth rates, Q1-2000 to Q3-2005 (%); source: Eurostat STS and national accounts

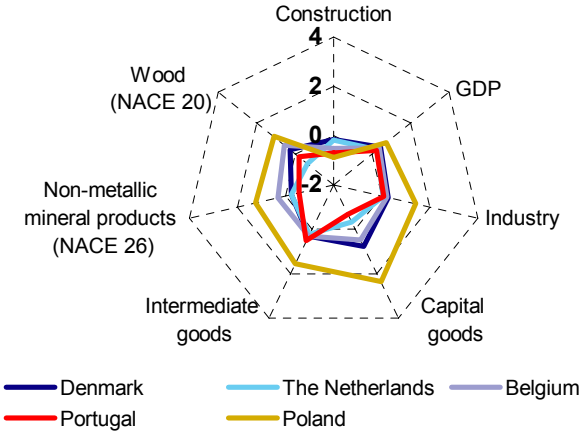

Figure 14: evolution of the index of production for construction, selected industrial activities and GDP, average quarter on quarter growth rates, Q1-2000 to Q3-2005 (%); source: Eurostat STS and national accounts

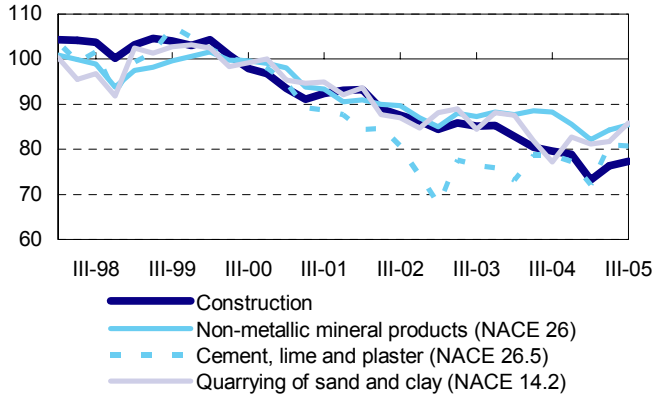

Figure 15: comparison of quarterly production index for construction and selected industrial activities, seasonally adjusted, Germany (2000=100); source: Eurostat STS

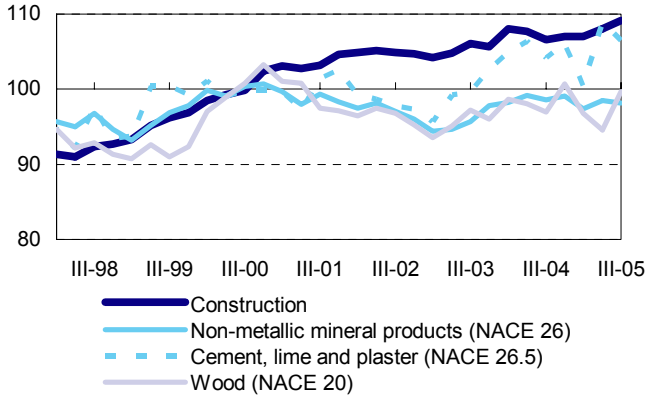

Figure 16: comparison of quarterly production index for construction and selected industrial activities, seasonally adjusted, France (2000=100); source: Eurostat STS

➢ ESSENTIAL INFORMATION – METHODOLOGICAL NOTES

The production index for construction

The production index for construction shows output volume at constant prices.
Building and civil engineering are the two main sections in the classification of types of construction (CC).

The industrial production index

The ***industrial production index*** is an important business cycle indicator which shows the monthly activity of industrial activities, which is one of the most volatile components of the economy. Note that for the purpose of this study, a quarterly industrial production index has been used.

The coverage of the industrial production index according to the STS-R includes all activities listed in Sections C to E (mining and quarrying, manufacturing, and electricity, gas and water supply) of the NACE Rev. 1.1[1] classification.

As specified in the STS-R, and in line with traditional practice in business statistics, ***the production index should show the evolution of value added at factor cost***, at constant prices. Value added at factor cost can be calculated from turnover (excluding VAT), plus capitalised production, plus other operating income, plus or minus the changes in stocks, minus the purchases of goods and services, minus other taxes on products and taxes linked to production.

The turnover index for services

The objective of the turnover index is to show the evolution of the market for goods and services. Turnover comprises the totals invoiced by the observation unit during the reference period. This corresponds to market sales of goods or services supplied to third parties. It includes all duties and taxes on the goods or services invoiced by the unit with the exception of the VAT invoiced by the unit vis-à-vis its customer and other similar deductible taxes directly linked to turnover.

Seasonal adjustment

Seasonal adjustment is a statistical technique to remove the effects of seasonal influences within a series. Seasonal effects usually reflect the influence of the seasons themselves either directly or through production series related to them, or social conventions. Other types of calendar variation occur as a result of influences such as number of days in the calendar period, the accounting or recording practices adopted or the incidence of moving holidays (such as Easter), and these are treated by working day adjustment, normally before seasonal adjustment.

Eurostat calculates the adjustment only if nationally adjusted data are not available. Eurostat aggregates gross or working day adjusted data from the Member States in order to compile the euro-zone and EU-25 series. These are then seasonally adjusted using TRAMO/SEATS. Missing components for these aggregates are estimated using an ARIMA method.

The weights used for aggregations are based on information from the Structural Business Statistics database or on information coming directly from the Member States. Weights and the base year are revised every five years. The current base year is 2000.

Correlation coefficient

When used in this publication, the ***correlation coefficient*** is a Pearson's correlation coefficient and gives a measure of the strength of the relationship between two sets of data (with the same number of observations). Values are ranged between +1 (which indicates perfect correlation) and -1 (which indicates perfect inverse correlation); a value of 0 indicates no correlation

Dissemination

Eurostat publishes detailed data and time series in the Industry, trade and services theme on the Eurostat Internet site.

Further information

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[1] *Commission Regulation (EC) No 29/2002 of 19 December 2001 amending Council Regulation (EEC) No 3037/90 on the statistical classification of economic activities in the European Community.*

Further information:

Data: EUROSTAT Website/Home page/Industry, trade and services/Data

Industry, trade and services

Industry, trade and services - horizontal view

Short-term Business Statistics - Monthly and Quarterly (Industry, Construction, Retail Trade and Other Services)

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