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Contents

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Short-term services statistics

Their future use in business cycle analysis

Gunter Schäfer

Common monetary policy of the eleven Member States that together form the euro-zone has strongly increased the need for short-term economic indicators within Europe. This move has been strongly encouraged by the European Central Bank (ECB), whilst financial markets, business leaders and politicians have also shown considerably more interest in these indicators in recent years. As services become increasingly important, the demand for information regarding this sector of the economy also rises. Although there are currently only a few short-term indicators available for market services' activities (outside of distributive trades), this report attempts to outline how they may be used in the future and whether they could provide valuable information for studying the evolution of the business cycle.

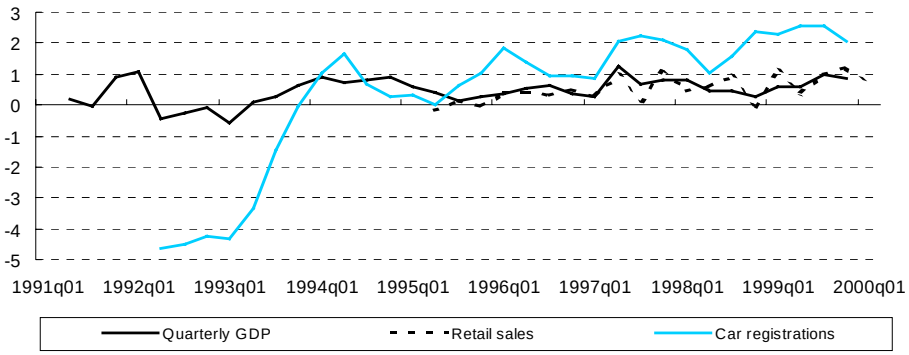

Figure 1: Growth rates of GDP, retail sales and new car registrations in the EU, compared to the previous quarter (1) (%)

(1) The trend cycle is presented for new car registrations, whilst a seasonally adjusted series is provided for GDP and retail sales

Source: Eurostat (EBT, National Accounts)

The aim of this report is to investigate the role that short-term indicators for services may play in the future when studying the business cycle. There is a great deal of interest in these series as short-term indicators are generally available 1-2 months before quarterly GDP data. This interest may be demonstrated by the recent request of the ECOFIN committee in July 1999 for increased efforts to be made with respect to studying and producing short-term indicators for the service sector[1], especially in areas that are cyclically sensitive.

(1) Within the context of the short-term statistics Regulation (STS-R), May 1998. ECOFIN: Meeting of the finance ministers of the European Union.

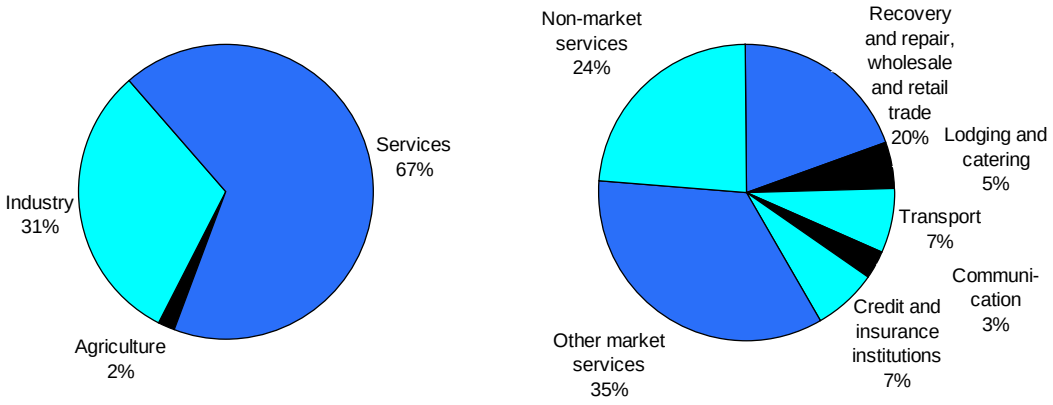

Figure 2: Breakdown of GDP in the EU, 1997

Source: Eurostat (National Accounts)

Figure 2 shows that according to National Accounts data, services accounted for 67.4% of total gross value added in the EU in 1997, whilst industry[2] accounted for just 30.5%. The remaining 2.1% of value added was generated within agriculture. It is interesting that the share of services in the total economy is increasing in almost every Member State. Ever since the 1960s the share of services has been increasing at a rapid pace (see table 1), at the expense of both industry and agriculture.

This trend becomes even clearer when looking at figure 3, which shows the development of GDP and gross value added graphed against the development of gross value added in services, using 1960 as a base year. The figure shows that developments in the service sector have outpaced the developments of the whole economy by a large margin.

	EU				USA				Japan			
	1997	1990	1980	1970	1996	1990	1980	1970	1997	1990	1980	1970
Agriculture	2.1	3.0	4.0	5.6	2.0	2.0	2.5	3.1	1.7	2.4	3.6	5.9
Industry	30.5	34.1	38.7	44.1	24.8	26.1	32.9	32.4	36.0	39.3	40.5	44.9
Services	67.4	62.8	57.3	50.3	73.2	71.8	64.6	64.5	62.3	58.3	55.9	49.2

Table 1: Breakdown of gross value added in the Triad, 1970-1997 (%)

Source: Eurostat (National Accounts)

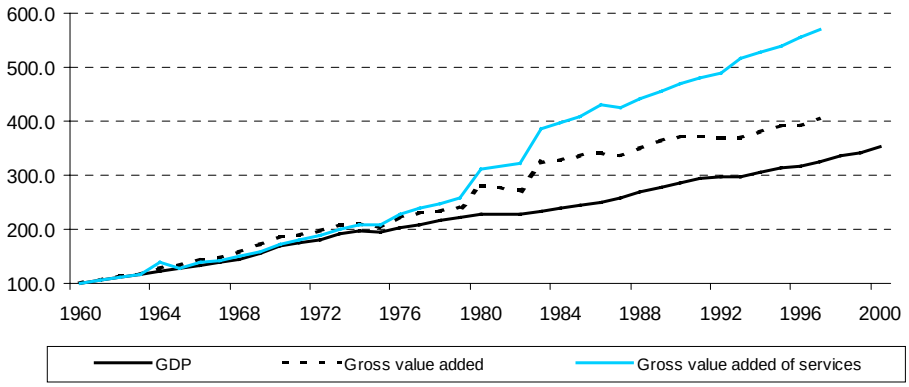

Figure 3: Evolution of the EU service sector compared to the whole economy, 1960-1999 (1960=100)

Source: Eurostat (National Accounts)

National Accounts data shows that almost 35% of services' value added was accounted for by other market services branch in 1997 (largely composed of business services). Non-market services were the second largest branch, with a share of 23.9% (public administration, social security, education and health care). Distributive trades (wholesale and retail trade) followed with a 19.9% share of services' value added.

Historically, a large number of studies have relied on the index of production for total industry to follow the evolution of the business cycle. However, the use of the production index for total industry (or the even narrower definition of manufacturing) may prove to be an out-dated concept as the structure of the economy migrates still further away from industrial activities. As more and more services data becomes available, there is likely to be a rapid increase in the use of these series for studying the business cycle.

(2) In the broad sense of the term, including energy and construction. The share of manufacturing was just less than 20%.

For the purpose of this report, the business cycle is defined as a fluctuation in economic activity (as measured by GDP), characterised by periods of growth and recessions (peaks and troughs). We use the rate of change of GDP (one quarter compared to the previous quarter) as a definition of the business cycle, with peaks or troughs being defined by a period of two consecutive quarters of growth or decline in real GDP.

There is no conclusive explanation of the underlying cause of business cycles. There are however many business cycle sensitive indicators, for example, data ranging from employment and personal incomes to industrial production and capacity utilisation rates, money supply aggregates and the consumer price index. The availability of short-term indicators for services will provide yet more information for further research.

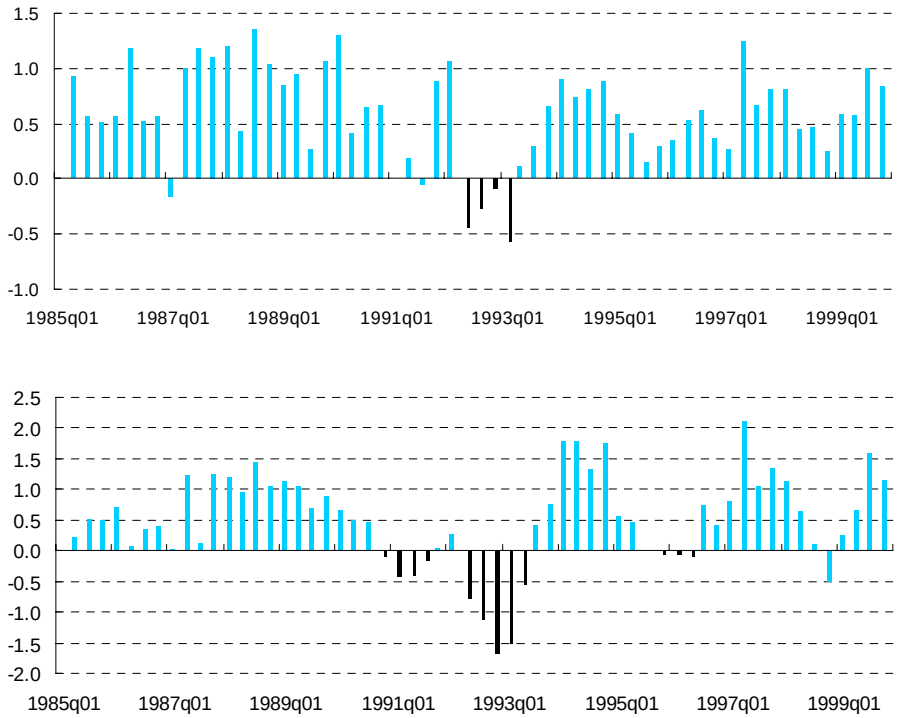

Figure 4: Growth rates of GDP and the industrial production index, one quarter compared to the previous quarter (1) (%)

(1) Dark shading indicates a period of recession.

Source: Eurostat (EBT, National Accounts)

Evolution of GDP and industrial production in the EU

Traditionally one of the main series for tracking the development of the business cycle has been the index of production for total industry. This indicator is available within Eurostat's EBT database. Industrial production and GDP series are available in a seasonally adjusted for the period 1991 to 2000. GDP in constant prices registered just one period of recession, from the first quarter of 1992 until the first quarter of 1993. Subsequently there has not been a single quarter when real GDP contracted within the EU. The evolution of GDP was smoother than that of industrial production over the period considered. In other words, the growth rates for the production index had a higher standard deviation than the evolution of GDP (0.92 compared to 0.62).

It is possible to note (see figure 4) that there were more recessionary periods for industrial production, in other words, there were more peaks and troughs. Apart from the period in 1992 (common with GDP), there was also a contraction in industrial output from the third quarter of 1990 until the third quarter of 1991 and from the third quarter of 1995 until the second quarter of 1996. The correlation coefficient[3] of the two growth rate series was 0.85.

(3) The correlation of two data sets is defined as the covariance of these sets divided by the product of their standard deviations; it is used to determine whether two ranges of data move together - in other words, whether large values of one set are associated with large values of the other (positive correlation), whether small values of one set are associated with large values of the other (negative correlation), or whether values in both sets are unrelated (correlation near zero). The range of values for this measure is between -1 and 1.

Evolution of the service sector with respect to GDP

One possible source of data for studying the evolution of services with respect to GDP is National Accounts data. Quarterly data exist for some Member States for gross value added for four branches of the economy in Eurostat's SEC2 database.

The correlation coefficient between quarterly growth rates of GDP and gross value added we find that total industry had the highest correlation coefficient (see table 2). In most countries the correlation coefficients between GDP and total industry were either the highest or second highest. Within services, the branch of distributive trades, hotels and restaurants and transport services was most closely correlated with GDP. This was especially the case in Germany and the United Kingdom.

The correlation coefficient shows whether two series are closely related or not. However, it shows very little about the size of the fluctuations within each series. One means of doing this is to look at the standard deviation of each series. The standard deviation is a measure of how widely values are dispersed from the average value (the mean). The higher the standard deviation, the more a series fluctuates around its average. The calculated standard deviations of the quarterly growth rates of GDP, industry and three services series (see table 3) show that total industry generally has a higher standard deviation than GDP. In other words, the total industry series fluctuates more than GDP. Total value added for industry also tends to fluctuate more than the growth rates for service sectors of the EU economy. The lowest standard deviations are found in non-market services, often with less variation than GDP, which is not surprising as this branch of the economy is made up of government and public sector activities, areas which are generally less prone to fluctuations in output.

	B	DK	D	E	F	I	A	FIN	UK
Total industry	0.78	0.55	0.86	0.72	0.69	0.85	0.26	0.80	0.74
Distributive trades and hotels and restaurants and transport services	0.61	0.32	0.90	0.47	0.60	0.71	0.49	0.68	0.77
Financial and business services	0.67	0.33	0.04	0.25	0.60	0.45	0.09	0.23	0.66
Non market services	0.48	0.40	0.20	-0.34	0.10	0.35	0.57	0.34	-0.09

Table 2: Correlation coefficients between quarterly growth rates of GDP and different branches of the economy, 1985-1999 (1)

(1) FIN and UK (1988-1999); D (1991-1999); E (1995-1999); all other countries not available.

Source: Eurostat (National Accounts)

	B	DK	D	E	F	I	A	FIN	UK
GDP	0.8	1.2	0.7	0.3	0.5	0.6	0.7	1.3	0.6
Total industry	1.3	3.2	1.5	0.7	1.0	1.5	1.3	2.1	0.8
Distributive trades and hotels and restaurants and transport services	1.2	2.6	1.1	0.5	1.0	0.8	0.2	1.8	0.8
Financial and business services	1.2	2.1	0.4	0.9	0.6	0.6	2.5	2.0	0.9
Non market services	0.6	2.1	0.5	0.4	0.4	0.4	1.5	0.9	0.3

Table 3: Standard deviation of quarterly growth rates, 1985-1999 (1)

(1) FIN and UK (1988-1999); D (1991-1999); E (1995-1999); all other countries not available.

Source: Eurostat (National Accounts)

Short-term statistics for services

Eurostat produces short-term business statistics whose principal aim is to assist in the analysis of the business cycle. These are stored in the EBT database (European Business Trends). For this section monthly data was extracted for deflated turnover for motor, wholesale and retail trade, as well as for new car registrations.

In most Member States, there was a fairly low degree of correlation between GDP and distributive trades or new car registrations. Whilst the correlation coefficients varied considerably between Member States, the EU aggregate reported a relatively high degree of correlation for retail trade (NACE Rev. 1 52) and wholesale trade (NACE Rev. 1 51).

The standard deviation of the growth rates for retail trade fluctuated less than those for GDP (see table 5). Motor trade and new car registrations on the other hand showed a very volatile pattern. One means of "normalising" series to allow comparison between different indicators is to divide the growth rates for each period by the standard deviation[4]. As such this allows us to compare series that show little fluctuation with those that have a large degree of variation.

For the EU there is a high degree of correlation between the data for retail sales volumes and GDP. At the level of the individual Member State the results are less conclusive, although normally there is a higher degree of correlation between the GDP and retail sales index than between GDP and new car registrations. It is important to note that these comparisons are based upon data from the start of 1995 to the end of 1999. During this period there was not a single recession within the EU.

(4) To interpret the results: if growth is larger than σ (the standard deviation) or the decline is in excess of $-\sigma$, the growth or decline may be termed large; if between -0.3σ and $-\sigma$ or between 0.3σ and σ then we consider the growth or decline as modest; and if between -0.3σ and 0.3σ then we consider that there was no discernible growth or decline for the given period.

	EU-15	EUR-11	B	DK	D	E	F	I	NL	A	FIN	S	UK
Retail trade	0.69	0.60	-0.02	0.24	0.44	0.34	0.30	0.24	0.14	0.09	0.30	0.17	0.61
Wholesale trade	0.76	0.76	:	:	0.67	:	:	:	:	0.19	0.09	:	:
Motor trade	:	:	:	:	:	:	0.42	:	:	0.18	-0.28	:	:
New car registrations	0.13	:	:	0.42	0.29	0.35	0.37	0.39	-0.17	0.22	0.06	0.02	0.24

Table 4: Correlation coefficients between quarterly growth rates of GDP and different service activities, 1995-1999 (1)

(1) :, not available; all other countries not available.

Source: Eurostat (EBT)

	EU-15	EUR-11	B	DK	D	E	F	I	NL	A	FIN	S	UK
GDP	0.41	0.49	0.84	1.20	0.69	0.31	0.46	0.60	0.51	0.69	1.30	0.36	0.58
Retail trade	0.29	0.34	1.42	1.09	1.32	1.07	1.11	0.69	0.44	1.14	2.10	1.69	0.70
Wholesale trade	0.76	:	:	0.92	0.92	:	:	:	:	1.68	1.33	:	:
Motor trade	:	:	:	:	:	:	4.35	:	:	5.62	3.44	:	:
New car registrations	3.89	0.76	7.43	10.71	5.00	7.82	10.70	6.30	20.21	8.91	8.89	8.47	18.93

Table 5: Standard deviation of quarterly growth rates, 1995-1999 (1)

(1) :, not available; all other countries not available.

Source: Eurostat (EBT)

Non-deflated short-term indicators for services

In the analysis so far only data from distributive trades (Section G of NACE Rev. 1) has been presented. The EBT database also contains some information on service sectors outside of distributive trades. There are monthly series for a variety of different services activities, from hotels and restaurants, through transport activities to business services. Data for five of the Member States existed (D, F, FIN, S and UK, although not all activities were available for each country). Unfortunately, the figures available were turnover value indices, in other words they were not corrected for price effects.

Services data within the EBT database generally reported rapidly increasing turnover during the period studied, especially for computer services. There was little discernible pattern for transport services, whilst business services tended to follow a more cyclical evolution.

Table 6 gives an overview of the expected behaviour of services series with respect to cyclical movements and their correlation with GDP. Table 7 then provides observations of the behaviour of market services' series for the four countries for which most data were available (F, FIN, S and UK), based on non-deflated turnover series.

NACE Rev. 1	Expected business cycle observation
Section G	Distributive trades are likely to be sensitive to the business cycle. Motor trade probably reacts most to cyclical fluctuations, whilst wholesale and retail trade are more likely to react in a smoother way.
Section H	Turnover of hotels and restaurants is expected to rise as the economy does, due to more consumer spending and because businesses are more likely to send staff to visit clients, attend conferences and trade fairs and so on. In times of recession, turnover of hotels and restaurants will probably contract as well.
Section I	Transport activities are likely to be connected to the business cycle. Air travel will be cyclical due to business demand rising and due to consumer spending rising in periods of growth. Postal activities however are probably only marginally cyclical sensitive and telecommunications are more technology driven than business cycle dependent.
Section J	During expansions there will be more activity for banks in terms of mergers and acquisitions, flotations, loans or new and expanding businesses as well as for consumers. Insurance is expected to be less cyclical and pension funding activity even more stable as the demand for retirement programmes is based on longer term decision making.
Section K	The sensitivity of real estate activities varies greatly between Member States because of the different housing ownership patterns. R & D is not believed to be very sensitive. Computer activities are likely to be business cycle sensitive, but at the same time these activities are heavily driven by technological developments such that the business cycle component may be hard to discern. The heterogeneous "other business activities" can be expected to react strongly to the business cycle.

Table 6: Expected business cycle behaviour of some services activities

NACE Rev. 1	Observed information based on a limited number of countries
Section G	Motor trade showed strong cyclical movements, with apparent correlation with GDP for S and UK, but hardly any for F and FIN. Smoother developments were observed in wholesale trade, with cycles resembling GDP for most of the series in the four countries. Smooth retail series in FIN, but fluctuating series in the other three Member States; apparent correlation with GDP for FIN, S and UK, less so for F.
Section H	Hotels and restaurants showed fluctuating series in F and FIN, although tied to GDP in both cases. Smooth series in S and UK, but seemingly less correlated with GDP.
Section I	Very strong cyclical movements for all transport and storage series in F and FIN, especially for water transport in F and for air transport in both countries (no data for S and UK). A correlation with GDP is hard to observe, although the general trend of GDP is matched. Unfortunately, no telecommunication series are available, and only one series (FIN) for post and courrier activities which is strongly fluctuating and on an upward path, which is the only resemblance to GDP.
Section J	No data available.
Section K	Computer activities showed a strong cyclical pattern in three of the four countries, F, FIN and S. Except for FIN, the series was increasing much faster than GDP. Miscellaneous business activities n.e.c., the only other series in this NACE Rev. 1 Section for which data are available, showed a cyclical pattern in three of the four countries, the series in the UK being quite smooth. However, there seemed to be a reasonable correlation with GDP in all countries, especially in the UK.

Table 7: Observed behaviour of selected, non-deflated service activities for a limited number of countries

Conclusion

The data studied during the compilation of this report has presented some initial studies into the relationship between service sector indicators and the evolution of GDP. Whilst there would appear to be stronger correlation between GDP and industrial production, there are areas of the services economy (retail trade and business services) which could possibly be used as business cycle indicators in the future - based on the initial first results of this study. It is hoped that the Member States will start to send these data on a regular basis for a wide cross-section of service sectors. Whilst the collection of these series is still in its infancy, it can be hoped that the collection of data will eventually lead to a Europe-wide composite index for services.

Further information:

➢ **Reference publications**

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For information on methodology

GUNTER SCHÄFER, Eurostat/D3, L-2920 Luxembourg , Tel.(352) 4301-33566 , Fax (352) 4301-34359,
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