



## Economic Analysis Papers

### **BUSINESS AND CONSUMER SURVEYS IN THE EUROPEAN UNION: WHAT DO THEY TELL US?**

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# **Business and Consumer Surveys in the European Union: What Do They Tell Us?**

## *Abstract*

The purpose of this paper is to assess the extent to which the Economic Sentiment Indicators (ESI) are well correlated with GDP for each country of the EU, and can be used to forecast economic activity in that country. Second, the paper addresses the question whether all sectors used in the surveys provide useful information for predicting GDP, or should one concentrate on a subset of sectors. The corollary is that it may be possible to reconstruct simpler indices with only a subset of sectors, or questions, which may be more informative than the indices which are published today. The third question is whether the inclusion of information from all countries is necessary for predicting GDP for the EU or the Eurozone. A corollary is that it may be possible to reconstruct a simpler ESI index for the EU with only a subset of countries, which may be more informative than the index which is published at present with all countries included.

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# **Business and Consumer Surveys in the European Union: What Do They Tell Us?**

## **EXECUTIVE SUMMARY**

The use of high frequency survey data for predicting the business cycle turning points is common in most European countries. The data often provides reliable information which can help predict GDP growth and inflation. This information is used both in the financial press and in academic research as input to econometric models. The usage of such information varies from country to country owing to both differences in the quality of these datasets and in differences in the culture of financial journalists and more generally the public.

The aim of this paper is to examine these datasets in more detail across countries, and for Cyprus more specifically, and to draw some conclusions regarding their practical use. This analysis will be useful in the process of analysing the data for Cyprus, and also in providing useful suggestions about how to use it at a practical level for disseminating information to the public.

The key results can be summarised as follows. The aggregate sentiment indicator for the EU and the Eurozone seem to track GDP well. However, looking at the country-specific indicators one can see significant differences in the ability of these series to track GDP well. Given that these composite indicators contain both current and forward looking, or expectation, variables we construct simple current and forward-looking series both at the aggregate and country level. This provides more interesting indicators for analysing the economy, particularly since the forward-looking components appear to have superior leading indicator properties.

By employing cross country regressions we are able to confirm that on average only a handful of variables appear to be statistically significant in tracking GDP. By utilizing only these handful of series we can reconstruct composite, aggregate activity, indicators which, at least visually, appear to be as good as the ESIs. Using fewer indicators is of course more efficient and cheaper. A formal confirmation of this should be undertaken however using statistical techniques. In addition, we find that there are significant differences across countries, in terms of which variables are more informative. Again, this finding allows us to construct alternative aggregate indices by utilizing heterogeneous datasets from each country. Again, this can allow us to improve the quality of the series and lower costs.

This analysis is also repeated by splitting the current and forward looking components. By doing so we find more statistically significant results. This confirms the earlier finding that aggregation of these two frequency dimensions may not be optimal. Instead, any econometric analysis or simple presentation of the data should be conducted on this basis.

## 1. INTRODUCTION

Business and consumer survey data have become an indispensable tool for monitoring the evolution of the European Union (EU) and the euro area economies. These surveys allow for comparisons among different countries' business cycles and price developments, and provide valuable information for forecasting the evolution of the EU economies.

With a single monetary policy conducted by the European Central Bank in Frankfurt, the availability of timely and comparable data across the EU countries is crucial. Fiscal policy coordination further raises the standards needed for data availability and dissemination at the EU level. Business and Consumer Survey data offer highly comparable series, published on a regular basis, with a forward looking element which reflects expectations for a number of key macro variables, such as employment, prices and more importantly GDP.

The surveys include a number of questions for each one of the key sectors of the economy: industry, services, consumer confidence, retail trade and construction. The results are then aggregated for each sector to derive a sectoral index of confidence, and an aggregate Economic Sentiment Indicator (ESI) for the whole economy.<sup>1</sup>

These indicators have an important forward-looking component, and are published on a monthly basis thus providing useful information for the direction of the economy in the present quarter and in the quarters ahead. In this sense the ESI, and the other sectoral indices, should be useful leading indicators for economic activity.

Indeed, given the significant cost of constructing these indices, one would expect that these indices are useful in predicting, at the very least, the turning points of the business cycle, or simply the gross domestic product for each economy.

While useful for enabling policymakers and commentators to assess the broad trends of the economy, these series have not been used extensively in formal macroeconomic forecasting. This is due to the mixed evidence concerning the usefulness of these in predicting GDP, and secondly the difficulties in utilizing these

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<sup>1</sup> Web address: [http://ec.europa.eu/economy\\_finance/indicators/businessandconsumersurveys\\_en.htm](http://ec.europa.eu/economy_finance/indicators/businessandconsumersurveys_en.htm).

qualitative indicators in econometric modelling. Bergström (1992), Lindström (2000), Kääntä and Tallbom (1993), Koskinen and Öller (2004), Öller and Tallbom (1996), and Rahiala and Teräsvirta (1993) reveal that only very few business and consumer surveys are useful for macro forecasting, and that the information content in the forward-looking business and consumer survey series is particularly weak. On the other hand, Hansson, Jansson and Löf (2005) provide evidence that the forecasting performance of the business surveys data can be considerably improved if the survey variables are appropriately filtered prior to forecasting.

This can be achieved through the developments in dynamic factor analysis, which have enabled researchers to use several of these survey series to obtain a subset of “informative” summary variables which can be useful in predicting GDP (see Hansson et al., 2005, Bruno and Malgarini, 2002, Cornec and Deperraz, 2005, Gayer and Genet, 2006). This line of research is promising, although the results are still mixed.

The purpose of this paper is to assess the extent to which these indicators are correlated with GDP for each country of the EU, and whether these indicators can be used to forecast economic activity in that country. Second, whether all sectors provide useful information for predicting GDP, or whether one should concentrate on a subset of sectors. The corollary is that it may be possible to reconstruct simpler indices with only a subset of sectors, or questions, which may be more informative than the indices which are published today. The third question is whether including information from all countries is necessary in predicting GDP for the EU or the Eurozone. A corollary is that it may be possible to reconstruct a simpler ESI index for the EU with only a subset of countries, which may be more informative than the index which is published today with all countries included.

## 2. DESCRIPTIVE ANALYSIS

The analysis uses data collected by the European Commission using survey data from the 25 Member States, covering industry, services, construction and retail trade sectors as well as consumer confidence.

For each one of the five sectors, the European Commission produces a sectoral indicator calculated as the simple arithmetic average of the seasonally adjusted net balances (difference between the percentages of positive and negative answers) of answers to specific questions of interest.

In addition, the European Commission produces the Economic Sentiment Indicator (ESI), a composite indicator, which aims to capture the overall economic climate in each country. In total, fifteen questions—covering all sectors of the economy—are used to construct the ESI (three from industry, three from services, four from consumers, two from construction and three from retail trade) and these are weighted according to each sector's share in total value added; a detailed description can be found in the European Commission's User Guide for The Joint Harmonised EU Programme of Business and Consumer Surveys (Web address: [http://ec.europa.eu/economy\\_finance/indicators/business\\_consumer\\_surveys/userguide\\_en.pdf](http://ec.europa.eu/economy_finance/indicators/business_consumer_surveys/userguide_en.pdf)).

The ESI for the European Union (EU25) is plotted against GDP growth rate over the period 1996-2006 in Figure 1. This composite sentiment indicator seems to track GDP reasonably well over the whole period, though it does not seem to have obvious leading indicator properties.

Figure 2 plots two of the individual components of the ESI, namely the current overall order books in the manufacturing sector (OBMS) and the business situation developed over the past three months in the services sector (SS). Again, both components seem to be well correlated with GDP growth. Examination of the sentiment, and sectoral, indicators for individual countries reveals important differences across countries. Some of the series seem to track well GDP developments in a number of countries, whereas others appear less correlated with GDP.

Indeed, the corresponding series for Cyprus do not seem to be very informative as, visually at least, they do not seem to track well GDP developments (Figure 3).

Figure 1: ESI and % Change in GDP for EU25

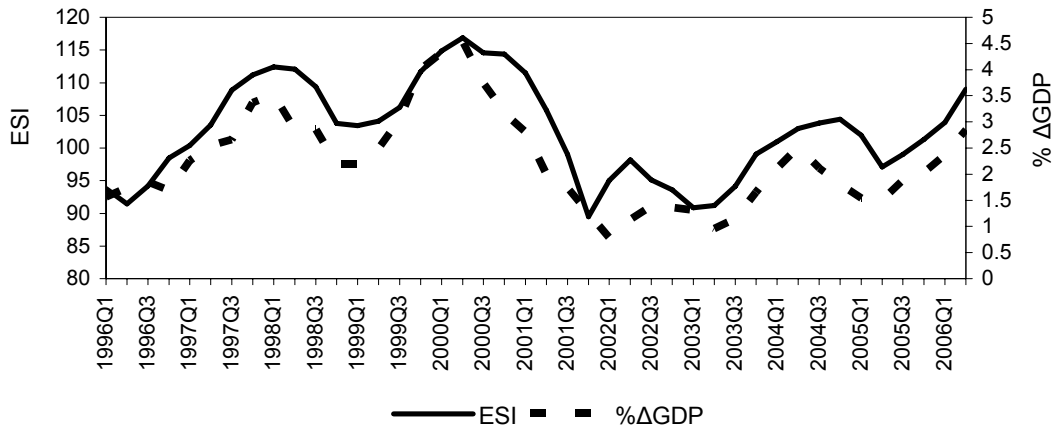


Figure 2: Order of Books in Manufacturing Sector, Services Sector and % Change in GDP for EU25

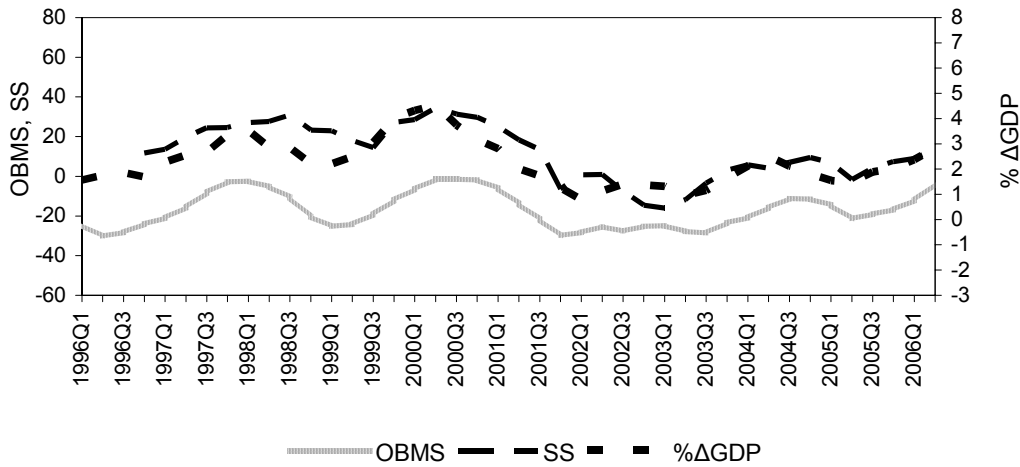
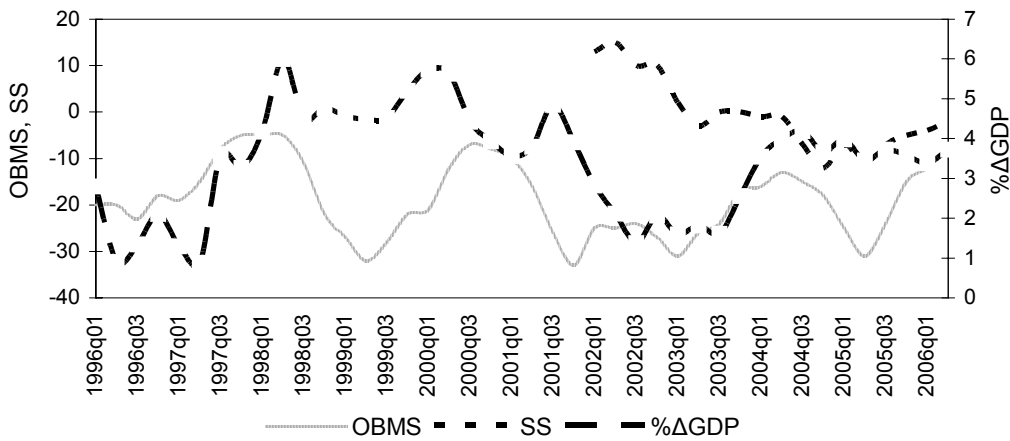


Figure 3: Order of Books in Manufacturing Sector, Services Sector and % Change in GDP for Cyprus

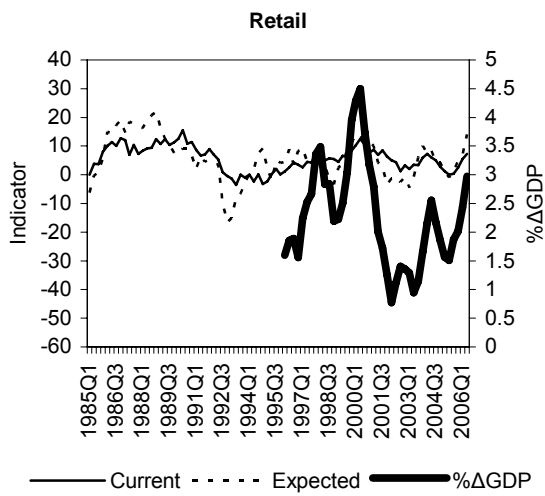
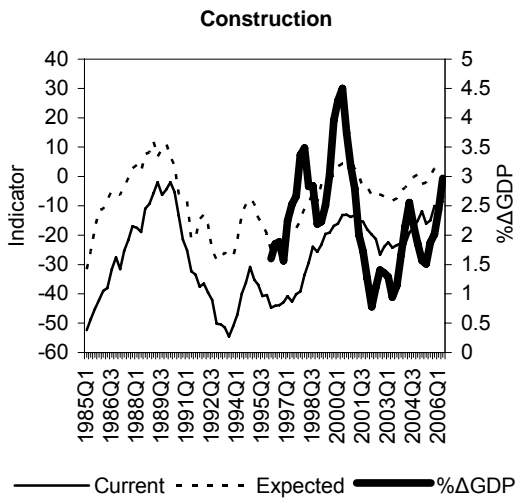
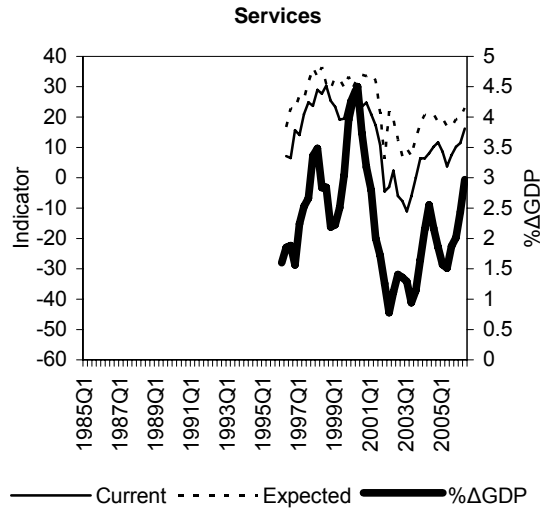
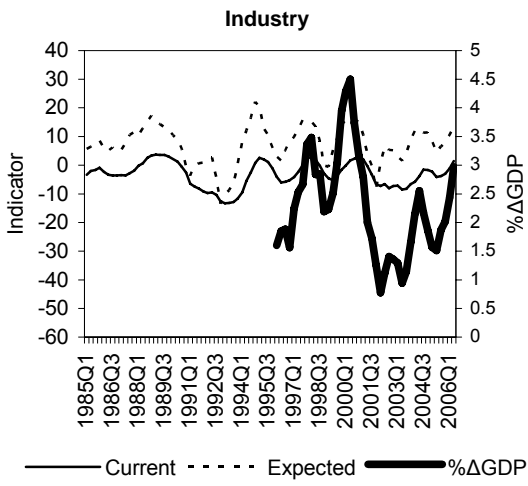


The surveys published by the European Union contain important information which can be used to assess cyclical developments in each country. Importantly, they contain contemporaneous, or current-climate variables as well as forward-looking variables which may have to be split and assessed separately. The latter presumably should have leading indicator properties, while the former should be useful in tracking current GDP which is especially useful since GDP figures are usually published with a significant lag. Indeed, separating current-climate and forward-looking variables reveals important differences in the properties of these series to track and predict GDP. As with the aggregate sentiment series the quality of these indicators varies significantly across countries. Overall, the forward-looking indicators—although they appear generally excessively volatile—seem to track well some of the turning points in a number of countries; the data is plotted in Appendix 2, Figures A2.1 and A2.2.

Figure 4 plots the confidence indicators by sector for the EU. In each figure we plot the corresponding current-climate and forward-looking components separately. Again, these reveal that the forward-looking variables generally turn prior to the ones capturing the current climate. The former are also more volatile compared to the latter.

Overall, the visual analysis of the series, by country and by sector reveal differences in the ability to track GDP across countries. These differences may reflect differences in the quality across countries, or aggregation problems, to the extent that the common approach used to aggregate the series does not take into account differences in the ability of each sector, in each country, to track or forecast GDP. In the remainder of the paper we will make a first attempt to uncover some of these underlying country differences. The results of this analysis may help us improve upon the aggregation of the series as well as the presentation and analysis of the underlying trends in the real economy.

Figure 4: Confidence Indicators by Sector, EU25



### 3. ECONOMETRIC RESULTS

The starting point of the analysis is to assess the extent to which these individual series are correlated with, and are good predictors of, GDP growth. The answers collected contain both current- and forward-looking information and should generally be good predictors of GDP growth one quarter ahead. The variables, which are introduced as net balances of positive and negative answers, should capture the change in the sentiment across the various sectors of the economy, both by utilizing information regarding the current and past performance of individual businesses, but also by including indications about the expectations of firms and individuals for the immediate future.

The analysis begins with a general, cross-country regression:

$$\Delta GDP_{j,t} = c_j D_j + A' X_{j,t-1} + \varepsilon_{j,t} \quad (1)$$

where  $\Delta GDP_{j,t}$  includes the quarterly year-on-year growth of GDP for each EU country and  $X_{j,t-1}$  is a vector of the lagged variables used for the construction of the ESI index for EU25 (shown in detail in Appendix 1),  $D_j$  is a dummy variable for each country in the sample and the subscript  $j$  and refers to country  $j$ .<sup>2,3</sup> The estimation is carried out for the period 1985Q1-2006Q2, although sample periods vary across countries and consequently an unbalanced panel is used for the estimation.<sup>4</sup> The equation examines whether there is a systematic relationship between the perceptions of business or consumers and GDP.

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<sup>2</sup> The results are similar when contemporaneous right hand side variables are included. Intuitively, though, one would expect that these variables would lead GDP growth and therefore be useful for predicting economic activity. Consequently, in the remainder of the paper we report results based on regressions which include lagged explanatory variables.

<sup>3</sup> Austria, Belgium, Cyprus, Czech Republic, Germany, Denmark, Estonia, Spain, France, Greece, Hungary, Ireland, Italy, Lithuania, Netherlands, Poland, Portugal, Sweden, Slovenia, Slovak Republic, United Kingdom and Finland (Latvia has been dropped as one dummy automatically drops). Luxemburg and Malta were excluded from the analysis as the Services and Retail Survey are not conducted. Additionally the Construction Survey is not carried out in Malta.

<sup>4</sup> A total of 1978 observations are used in the analysis. After removing missing values, the sample reduces to 1621 observations. Inevitably, more observations are included for the older EU member states, in some instances beginning as early as 1985. For the newer member states, data typically exists since 1995.

Table 1: Assessing the Usefulness of Individual Questions

Variable	Coefficient	Std. Err.	p-value
IND2	0.024**	0.007	0.001
IND4	0.003	0.011	0.795
IND5	0.013	0.008	0.106
SERV1	0.004	0.003	0.224
SERV2	0.012**	0.003	0.001
SERV3	-0.001	0.004	0.746
CNS2	-0.007	0.018	0.675
CNS4	0.018	0.012	0.139
CNS7	-0.006	0.007	0.407
CNS11	-0.029**	0.011	0.006
CNSTR3	0.014**	0.006	0.016
CNSTR4	-0.004	0.005	0.482
RT1	0.008*	0.005	0.085
RT2	-0.008	0.010	0.411
RT4	0.004	0.005	0.483

Reduced Model			
Variable	Coefficient	Std. Err.	p-value
IND2	0.036**	0.007	0.000
SERV2	0.014**	0.004	0.000
CNS11	-0.023**	0.010	0.023
CNSTR3	0.014**	0.005	0.009
RT1	0.013**	0.005	0.005

The estimation begins with a general model which includes all 15 variables regressed on national GDP growth series. The results, shown in Table 1, reveal that only a few variables are statistically significant, which is quite surprising since one would expect that the majority of these series would be highly correlated with future GDP; the stars indicate whether a variable is statistically significant at 5% (\*\*), or 10% (\*) level.<sup>5</sup> Interestingly, at least one variable from each sector is significant suggesting that all these provide useful information for predicting real GDP growth, while one of those is forward looking (CNS11: Likelihood of saving over the next 12 months). The lower panel of Table 1 shows a restricted model which is obtained by eliminating the

<sup>5</sup> The standard errors are corrected for autocorrelation and heteroskedasticity using the Newey-West procedure.

insignificant variables from the econometric equation and including only five of the initial variables.<sup>6</sup>

The restricted model includes the current overall order books (IND2), the turnover of company over past 3 months (SERV2), the likelihood of saving over next 12 months (CNS11), the current overall order books (CNSTR3) and the sales over past 3 months (RT1).

Thus far, the analysis allowed us to pin down which variables are significant for the cross-country sample as a whole. These results mask possible heterogeneity across countries which would be interesting to investigate. To do so we estimate the model by letting the coefficients to vary with country and using fixed effects to take account of heterogeneity,

$$\begin{aligned} \Delta GDP_{j,t} = & c_j D_j + A_{1j} (D_j \times IND2_{j,t-1}) + A_{2j} (D_j \times SERV2_{j,t-1}) + A_{3j} (D_j \times CNS11_{j,t-1}) \\ & + A_{4j} (D_j \times CNSTR3_{j,t-1}) + A_{5j} (D_j \times RT1_{j,t-1}) + \varepsilon_{j,t}. \end{aligned} \quad (2)$$

Table 2 shows the results of this analysis with the coefficients for each variable tabulated separately for each one of the 23 EU countries included in the sample. These show important differences across countries, and reveal that only few of these variables are statistically significant. In a number of instances, four variables appear to be statistically significant (Hungary, Ireland and Slovenia). Similarly, two or three variables are significant for many countries while no variable is found to have a statistically significant relationship with GDP for Poland or the UK. The rest of the countries lie in the middle, showing strong significance for at least one dependent variable.

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<sup>6</sup>  $R^2$ , or other statistics which are usually quoted.  $R^2$  for the original model is 0.7757, but for restricted is 0.7389.

**Table 2: Differentiation by Country Based on the Reduced Model**

Country	IND2	SERV3	CNS11	CNSTR3	RT1
Austria	0.008	0.006	-0.011	0.034**	0.025*
Belgium	0.068**	0.001	0.010	0.000	-0.032
Cyprus	0.046**	0.009	-0.007	0.017*	0.035*
Czech Rep.	0.185**	-0.184**	0.143**	-0.032	-0.030
Germany	0.023	0.019*	0.024	0.039*	0.008
Denmark	-0.008	0.051*	0.004	0.050**	0.004
Estonia	0.021	0.013	-0.017	0.091**	0.015
Spain	0.030	0.010	0.052**	0.003	-0.022
France	0.046**	0.003	-0.040*	0.005	-0.006
Greece	-0.013	-0.002	-0.003	0.026**	0.011
Hungary	0.038**	0.008	-0.029**	0.023*	-0.021**
Ireland	0.123**	0.076**	-0.143**	-0.043**	-0.022
Italy	0.088**	-0.001	-0.019	-0.041**	-0.002
Lithuania	-0.116**	0.138**	0.025	-0.001	-0.035
Latvia	-0.072	0.063	-0.163**	0.178**	-0.078**
Netherlands	0.071**	0.021**	-0.029	0.014	0.011
Poland	-0.104	0.123	0.099	-0.107	0.038
Portugal	0.067**	0.017	0.045	0.006	0.061**
Sweden	0.005	0.024**	-0.022	-0.012*	0.047**
Slovenia	0.057**	-0.113**	-0.022	-0.054**	0.092**
Slovakia	-0.039	-0.055**	0.104	0.003	-0.034**
UK	0.009	0.005	-0.005	0.004	0.002
Finland	0.047**	0.007	-0.040*	0.043**	0.000

Overall, the results reveal a varying degree of association between business and consumer survey results and real GDP growth. To examine the usefulness of these variables in more depth we repeat the exercise by separating current climate and forward-looking variables. We test whether the former are correlated with GDP, while the latter with next period's GDP. In particular, after removing insignificant current-climate variables we estimate the following models

$$\Delta GDP_{j,t} = c_j D_j + A_1 IND2_{j,t} + A_2 SERV2_{j,t} + A_3 CNSTR3_{j,t} + A_4 RT1_{j,t} + \varepsilon_{j,t} \quad (3)$$

and

$$\begin{aligned} \Delta GDP_{j,t} = c_j D_j + A_{1j} (D_j \times IND2_{j,t}) + A_{2j} (D_j \times SERV2_{j,t}) + A_{3j} (D_j \times CNSTR3_{j,t}) \\ + A_{4j} (D_j \times RT1_{j,t}) + \varepsilon_{j,t}. \end{aligned} \quad (4)$$

The estimation results appear in Table 3 and 4.

Table 3: Current Climate Variables, Common Coefficients

Variables	Coefficient	Std. Err.	p-value
IND2	0.052**	0.006	0.000
SERV2	0.008**	0.003	0.019
CNSTR3	0.010**	0.005	0.042
RT1	0.018**	0.004	0.000

Table 4: Current Climate Variables, Country Specific Coefficients

Country	IND2	SERV2	CNSTR3	RT1
Austria	0.019	0.018	0.027*	0.022*
Belgium	0.108**	0.018	-0.016	-0.047**
Cyprus	0.060**	0.002	-0.002	0.02
Czech Rep.	0.128**	-0.046	0.003	-0.013
Germany	0.048**	0.000	0.005	0.035**
Denmark	0.027	0.044	0.035*	-0.006
Estonia	0.018	0.045	0.075**	-0.013
Spain	0.053**	0.007	0.002	0.027*
France	0.060**	0.007	0.000	-0.016**
Greece	0.011	-0.011	0.011	0.004
Hungary	0.042**	0.042**	0.003	-0.038**
Ireland	0.148**	0.074**	-0.029	-0.005
Italy	0.103**	-0.003	-0.037**	0.015
Lithuania	-0.099**	0.016	0.064**	0.009
Latvia	-0.105	0.160*	0.125**	-0.036
Netherlands	0.119**	0.011**	-0.005	0.015*
Poland	0.091	0.04	-0.055	0.050
Portugal	0.063**	0.026	0.023	0.071**
Sweden	0.013	0.034**	-0.014**	0.043**
Slovenia	0.081**	-0.059**	-0.027**	0.024
Slovakia	-0.032	-0.038**	0.068**	-0.019
UK	0.007	0.013*	0.002	0.009
Finland	0.057**	0.003	0.032**	-0.020

For the forward-looking variables the models, after eliminating insignificant variables, are given by

$$\Delta GDP_{j,t} = c_j D_j + A_1 IND5_{j,t-1} + A_2 CNS7_{j,t-1} + A_3 CNS11_{j,t-1} + A_4 RT4_{j,t-1} + \varepsilon_{j,t} \quad (5)$$

and

$$\begin{aligned} \Delta GDP_{j,t} = c_j D_j + A_{1j} (D_j \times IND5_{j,t-1}) + A_{2j} (D_j \times CNS7_{j,t-1}) + A_{3j} (D_j \times CNS11_{j,t-1}) \\ + A_{4j} (D_j \times RT4_{j,t-1}) + \varepsilon_{j,t}. \end{aligned} \quad (6)$$

The estimation results are shown in Table 5 and 6.

Table 5: Forward-looking Variables, Common Coefficients

Variables	Coefficient	Std. Err.	p-value
IND5 <sub>t-1</sub>	0.024**	0.006	0.000
CONS7 <sub>t-1</sub>	-0.029**	0.005	0.000
CONS11 <sub>t-1</sub>	-0.014*	0.008	0.087
RT4 <sub>t-1</sub>	0.023**	0.004	0.000

Table 6: Forward-looking Variables, Country Specific Coefficients

	IND5 <sub>t-1</sub>	CONS7 <sub>t-1</sub>	CONS11 <sub>t-1</sub>	RT4 <sub>t-1</sub>
Austria	0.014	0.011	-0.007	0.018
Belgium	0.074**	-0.003	-0.019	0.008
Cyprus	-0.013	0.066**	-0.002	0.022
Czech Rep.	0.001	-0.046*	-0.006	-0.010
Germany	0.079**	0.009	0.058*	0.033**
Denmark	-0.022	-0.025	0.022	0.033*
Estonia	-0.048	-0.056	0.049	0.056
Spain	0.064*	-0.036**	0.016	0.031*
France	0.066**	-0.015**	-0.051**	0.000
Greece	0.03	0.044*	-0.001	0.066**
Hungary	0.022	-0.023**	-0.057**	-0.015*
Ireland	0.092**	-0.016	-0.125*	0.026
Italy	0.114**	0.024**	0.027*	0.012*
Lithuania	0.063	0.012	0.139	-0.030
Latvia	0.047	-0.159**	-0.037	-0.061
Netherlands	0.056	-0.014	-0.018	0.033*
Poland	0.029	-0.049**	-0.088	-0.031
Portugal	0.050	-0.002	0.095**	0.067**
Sweden	0.034**	0.015	0.018	0.055**
Slovenia	0.016	0.046**	-0.138**	0.063*
Slovakia	-0.031	-0.090**	-0.164**	0.003
UK	0.029**	-0.005	0.012	0.012
Finland	0.012	-0.094**	0.064	0.073**

Right away, one can observe that more variables are significant for the aggregate regression shown on the top of each table. Specifically, four variables are significant in each group of, current or forward-looking, variables (i.e., a total of eight variables compared with only five from Table 1). For the first set of results with the exception of two countries, Greece and Poland, all countries appear to have a number of significant variables. Similarly, with expectation variables Estonia and Lithuania do not appear to have any significant variables, while all other include a number of significant variables.

To summarize, splitting the variables into current and forward looking allows us to uncover more statistically significant relationships between several of the variables and GDP (contemporaneous or next period's, respectively). This suggests that the practise of aggregating all fifteen variables to obtain one composite sentiment indicator for each country may lead to valuable loss of information since it combines data referring to different time dimensions.

#### **4. CONSTRUCTING ALTERNATIVE SENTIMENT INDICES**

Based on this proceeding analysis it would seem logical to simplify the composite sentiment indicators indices by including only significant variables, as revealed by the regression analysis. These alternative indices would then be constructed using only series which contain useful information in tracking, or predicting, GDP. The rest of the information can be discarded. In addition, whereas the published ESIs are constructed using fixed weights derived from the share of each sector in total value added, regression-based weights can also be used as alternative to reflect better the historic association between a specific series and GDP. Such a simplified procedure can reduce significantly the cost of producing, while at the same time improving the quality of, such indicators.

In the analysis which follows we construct alternative composite indicators based on these principles.

##### **4.1. Aggregate results**

The first alternative composite sentiment indicator for the EU is constructed by aggregating only the significant variables at the EU level as shown in Table 1. Instead of 15 survey variables this indicator uses only five series which were found to contain significant information in predicting GDP (Figure 5). Additionally, the regression weights, instead of value added shares, can be used to obtain the composite indicator (Figure 6).<sup>7</sup>

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<sup>7</sup> It is also possible to take into account country heterogeneity and allow for different variables to enter the different national ESI using the results displayed in Table 2. The results of this exercise are not materially different and are therefore not included in the paper.

Interestingly, the new series seem to track well GDP, and do not appear to be inferior compared to the published ESI for the EU. Without applying any formal statistical tests, a simple comparison of the ESIs and the alternative indices suggests that the simplification process did not lead to a serious, if any, loss of information.

Figure 5: ESI Using Only Significant Variables

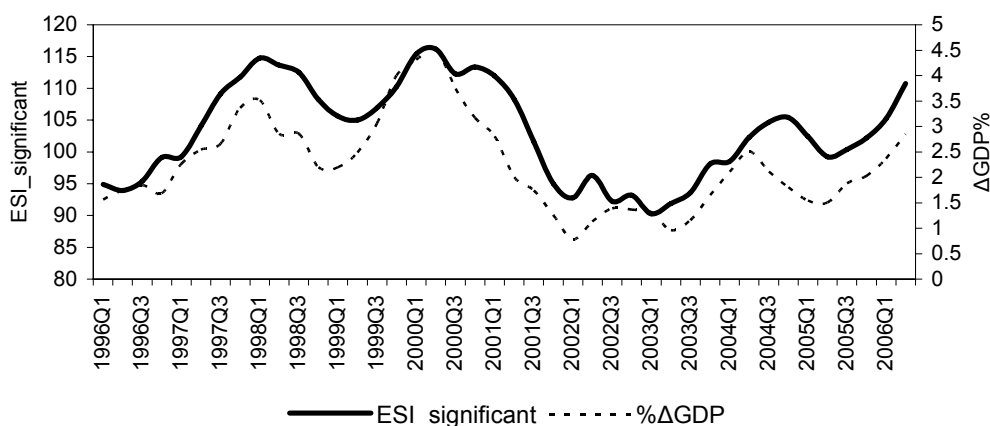
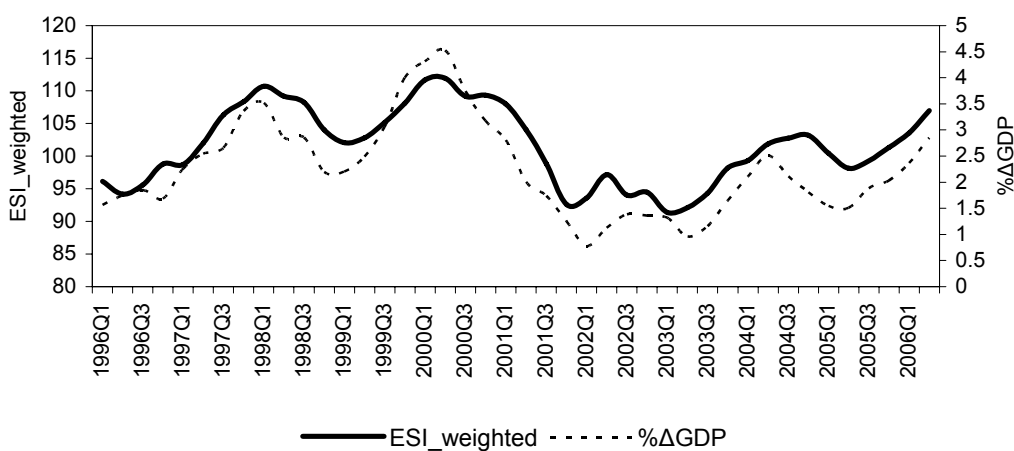


Figure 6: ESI Using Regression Weights



#### 4.2. Current-climate and forward-looking variables

Secondly, utilizing separately the current- and forward-looking survey variables seems to open up the data and reveal important information which is “hidden” in the composite series.

As above, the first alternative composite sentiment indicator for the EU is constructed by aggregating only significant current-climate variables at the EU level as shown in

Table 3 (Figure 7). The corresponding indicator obtained using the regression weights is shown in Figure 8. We also construct a composite indicator which utilises current climate variables while also taking into account country heterogeneity using the results displayed in Table 4 (Figure 9). Similarly, three corresponding forward-looking composite indicators are constructed based on the results of Table 4. These are shown in Figures 10-12.

These seem interesting since the new indicators seem to do at least as well as the ESI in tracking GDP. Overall, it is clear that the forward-looking variables anticipate a number of turning points, and in general are more animated compared to the climate indicators. It is noteworthy that the forward-looking indicator based on regression weights seems to have a good predictive power, at least based on a visual comparison of the indicator with GDP.<sup>8</sup>

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<sup>8</sup> The individual country indicators are shown in Appendix 2.

Figure 7: ESI Using Current Variables

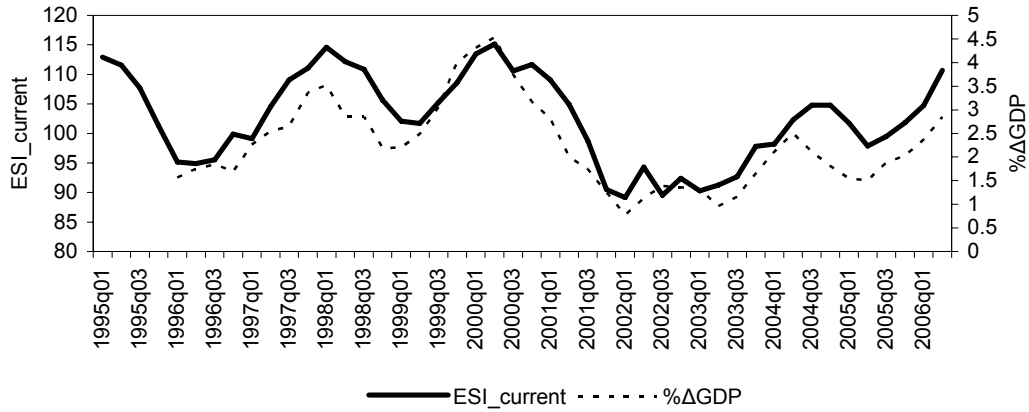


Figure 8: ESI Using Current Variables and Regression Coefficient Weights

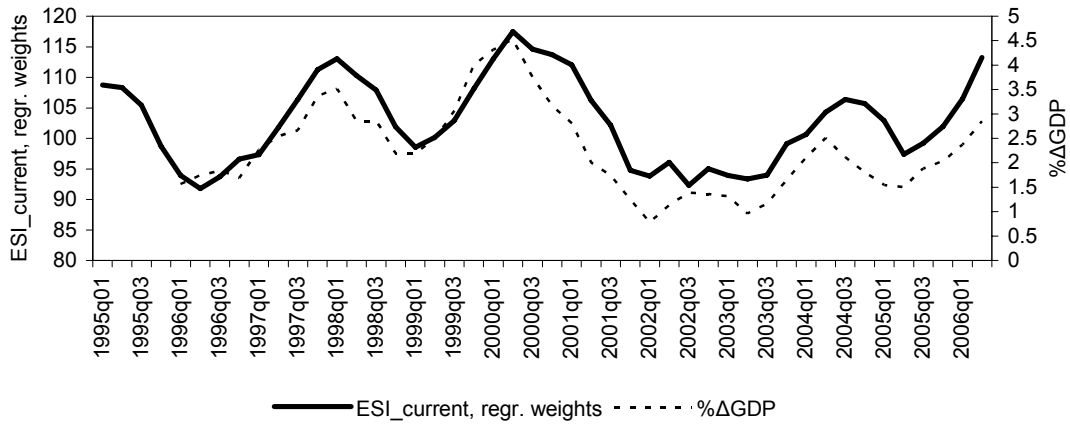


Figure 9: ESI Using Current Variables and Country Regression Coefficient Weights

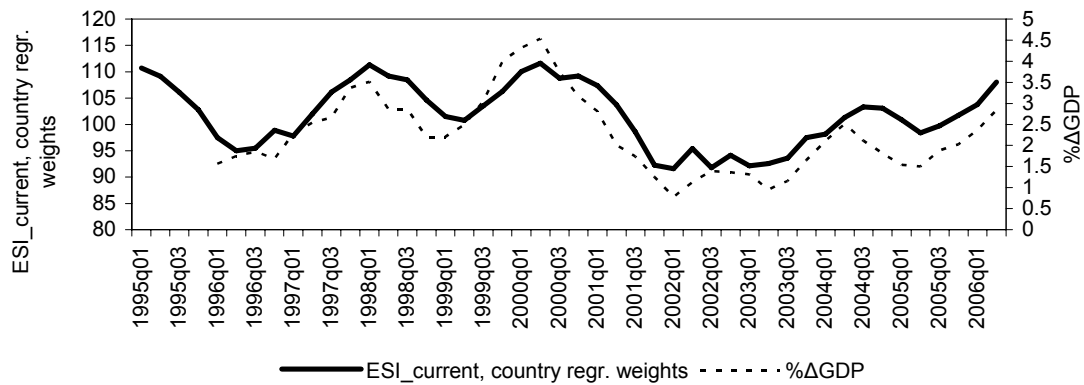


Figure 10: ESI Using Forward-looking Variables

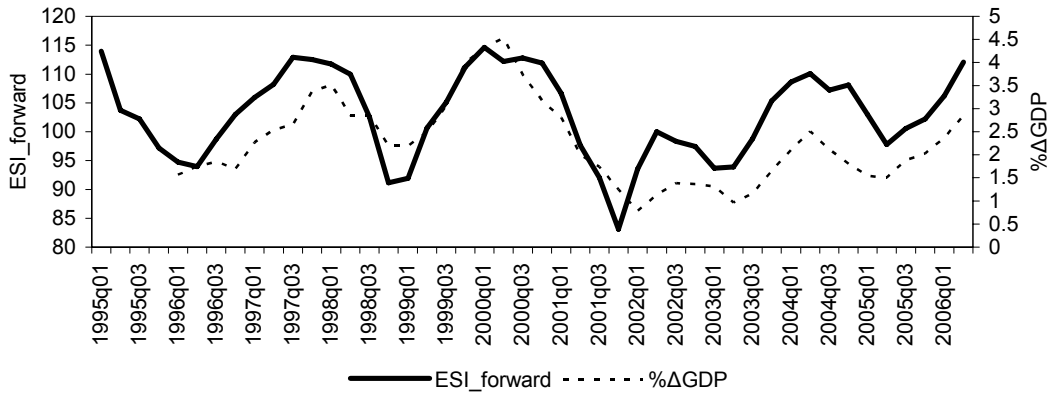


Figure 11: ESI Using Forward-looking Variables and Regression Coefficient Weights

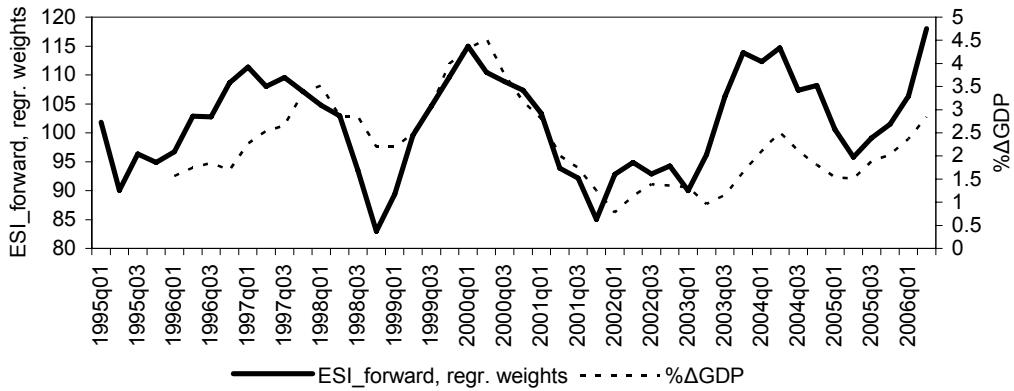
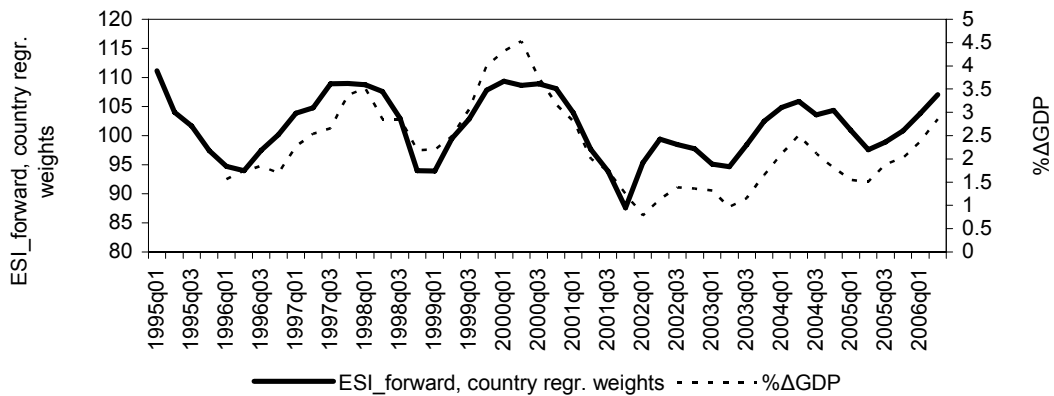


Figure 12: ESI Using Forward-looking Variables and Country Regression Coefficient Weights



## 5. CONCLUSIONS

The use of high frequency survey data for predicting the business cycle turning points is common in most European countries. The data often provides reliable information which can help predict GDP growth, and inflation. This information is used both in the financial press or, as input to econometric models, in academic research. The usage of such information varies from country to country owing to both differences in the quality of these datasets and in differences in the culture of financial journalists and more generally the people.

The aim of this paper was to make a first attempt to examine these data sets in more detail across countries, and for Cyprus more specifically, and to draw some conclusions regarding the practical use of these series. This analysis will be useful in the process of analysing the data for Cyprus, and also in providing useful suggestions about how to use it at a practical level for disseminating information to the public.

The key results can be summarised as follows. The aggregate sentiment indicator for the EU and the Eurozone seem to track well GDP. However, looking at the country-specific indicators one can see significant differences in the ability of these series to track well GDP. Given that these composite indicators contain both current and forward looking, or expectation, variables we construct simple current and forward-looking series both at the aggregate and country level. This provides more interesting indicators for analysing the economy, particularly since the forward-looking components appear to have superior leading indicator properties.

By employing cross country regressions we are able to confirm that on average only a handful of variables appear to be statistically significant in tracking GDP. By utilizing only these handful of series we can reconstruct composite, aggregate activity, indicators which, at least visually, appear to be as good as the ESIs. Using fewer indicators is of course more efficient and cheaper. A formal confirmation of this should be undertaken however using statistical techniques. In addition, we find that there are significant differences across countries, in terms of which variables are more informative. Again, this finding allows us to construct alternative aggregate indices by utilizing heterogeneous datasets from each country. This can allow us to improve the quality of the series and lower costs.

This analysis is also repeated by splitting the current and forward looking components. By doing so we find more statistically significant results. This confirms the earlier finding that aggregation of these two frequency dimensions may not be optimal. Instead, any econometric analysis or simple presentation of the data should be conducted on this basis.

## REFERENCES

Bergström, R. (1992). The relationship between manufacturing production and different business survey series in Sweden. Working Paper no. 12, National Institute of Economic Research, Stockholm.

Bruno, G., and Malgarini, M. (2002). An indicator of economic sentiment for the Italian economy. Working Paper no. 28/02, Institute for Studies and Economic Analyses, Rome.

Cornec M., and Deperraz T. (2005). A Monthly Indicator of the Business Climate in the French Service Industry. Institut National de la Statistique et des Etudes Economiques (Insee), France.

Gayer, C. and Genet, J. (2006), "Using factor models to construct composite coincident indicators from BCS data. A comparison with European Commission confidence indicators", *European Economy*, no. 240.

Hansson, J., P. Jansson and Löf, M. Business Survey Data: Do they help in forecasting GDP growth?

Kääntä, P., and Tallbom, C. (1993). Using business survey data for forecasting Swedish quantitative business cycle variables: A Kalman filter approach. Working Paper no. 35, National Institute of Economic Research, Stockholm.

Koskinen, L., and Öller, L.-E. (2004). A classifying procedure for signalling turning points. *Journal of Forecasting*, 23, 197– 214.

Lindström, T. (2000). Qualitative survey responses and production over the business cycle. Sveriges Riksbank working paper series no. 116, Sveriges Riksbank, Stockholm.

Öller, L.-E., and Tallbom, C. (1996). Smooth and timely business cycle indicators for noisy Swedish data. *International Journal of Forecasting*, 12, 389–402.

Rahiala, M., and Teräsvirta, T. (1993). Business survey data in forecasting the output of Swedish and Finnish metal and engineering industries: A Kalman filter approach. *Journal of Forecasting*, 12, 255–271.

## APPENDIX 1

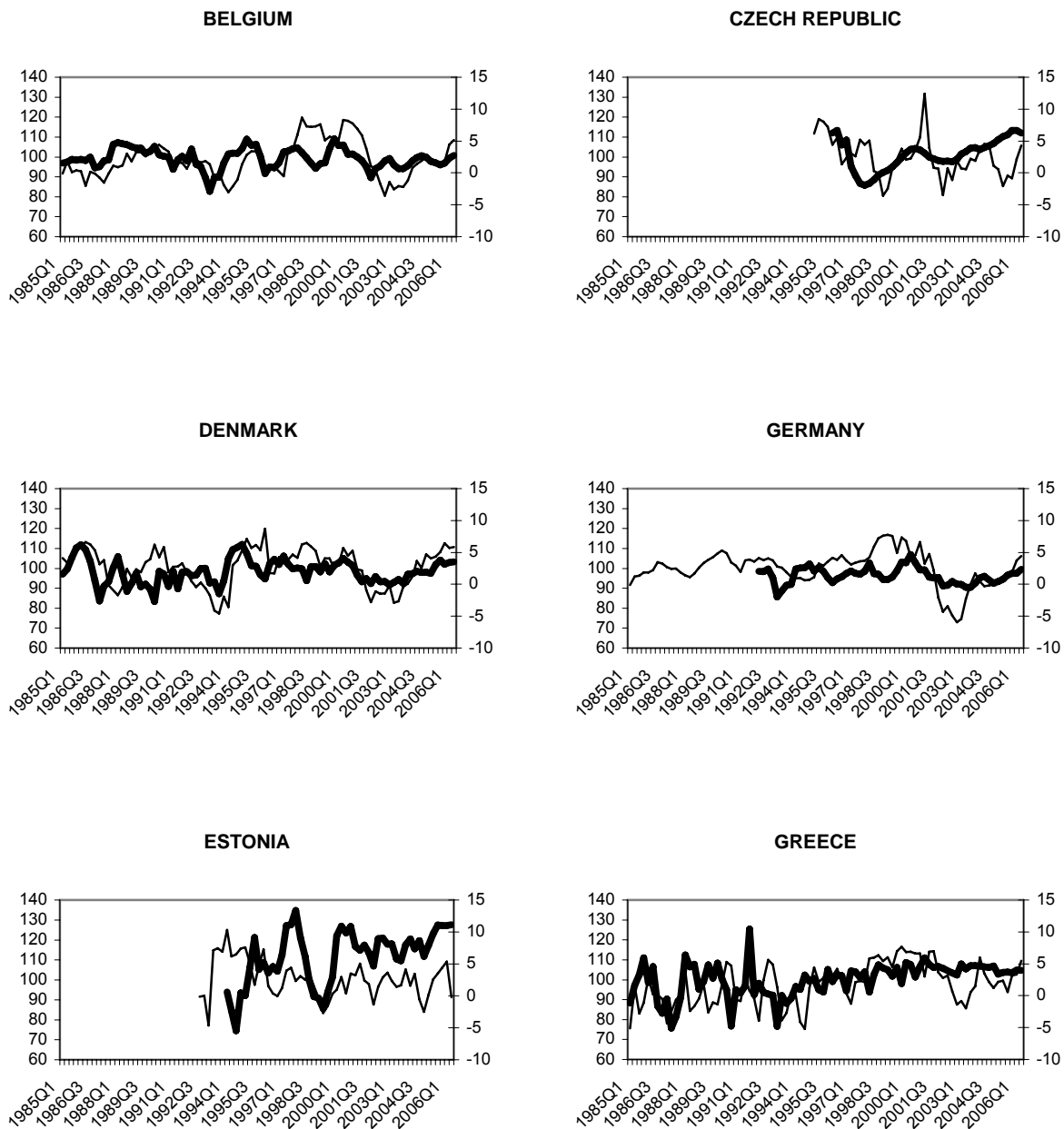
Table A1: Components of the Economic Sentiment Indicator (ESI)

INDUSTRY		
Question Number	Variable	Description
Q2	IND2	Current overall order books
Q4	IND4	Current stock of finished products
Q5	IND5	Production expected over next 3 months
SERVICES		
Question Number	Variable	Description
Q1	SERV1	Business situation developed over past 3 months
Q2	SERV2	Turnover of company over past 3 months
Q3	SERV3	Turnover of company expected over next 3 months
CONSUMERS		
Question Number	Variable	Description
Q2	CNS2	Financial position of household expected over next 12 months
Q4	CNS4	Economic situation of country expected over next 12 months
Q7	CNS7	Unemployment expected in the country over next 12 months
Q11	CNS11	Likelihood of saving within over 12 months
CONSTRUCTION		
Question Number	Variable	Description
Q3	CNSTR3	Current overall order books
Q4	CNSTR4	Employment of the firm expected over next 3 months
RETAIL TRADE		
Question Number	Variable	Description
Q1	RT1	Sales over past 3 months
Q2	RT2	Volume of stock currently held
Q4	RT4	Business activity (sales) expected over next 3 months

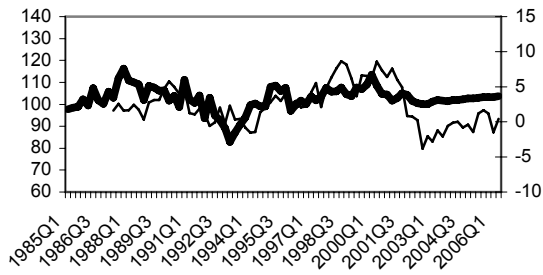
Note: The question number refers to the numbering of the questions in the corresponding sector questionnaire, see User Guide at [http://ec.europa.eu/economy\\_finance/indicators/business\\_consumer\\_surveys/userguide\\_en.pdf](http://ec.europa.eu/economy_finance/indicators/business_consumer_surveys/userguide_en.pdf).

## APPENDIX 2

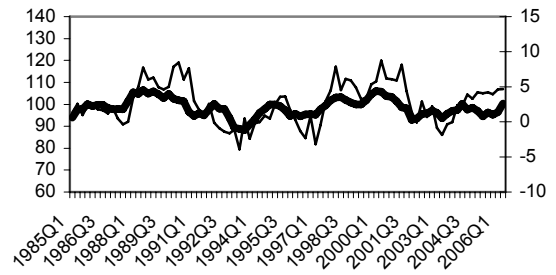
Figure A2.1: ESI Constructed Using Current Variables



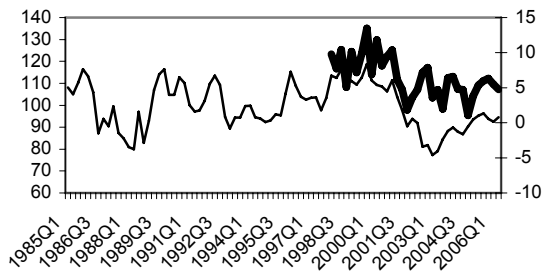
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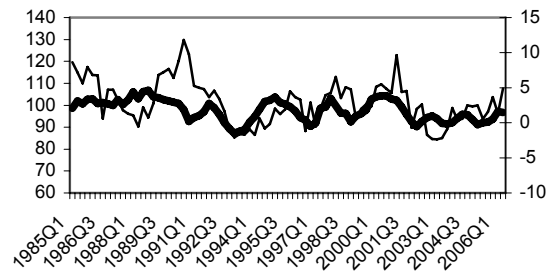
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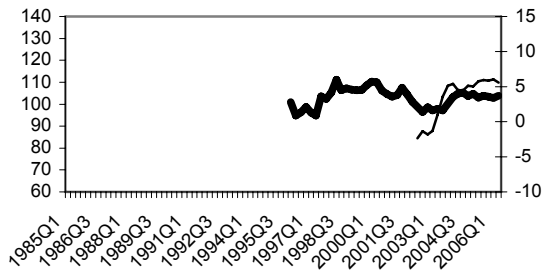
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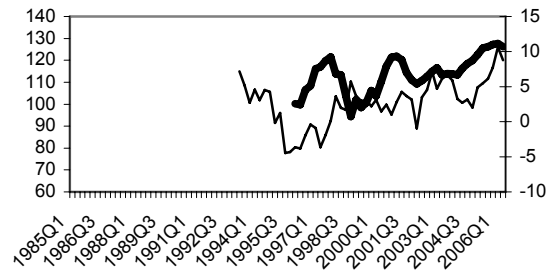
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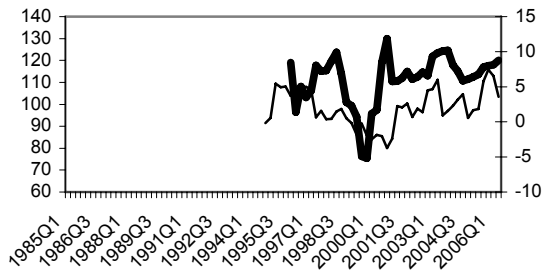
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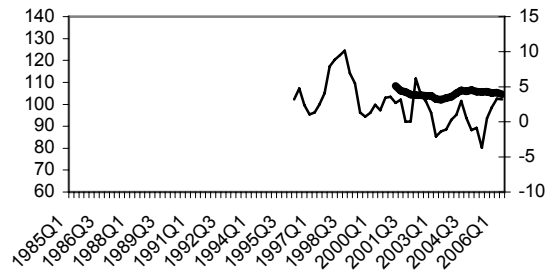
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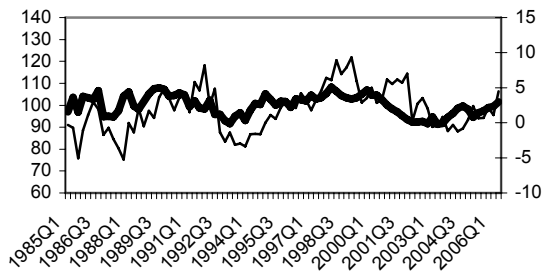
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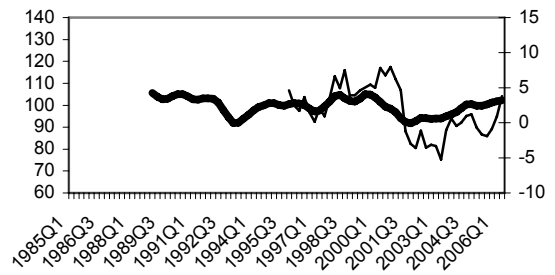
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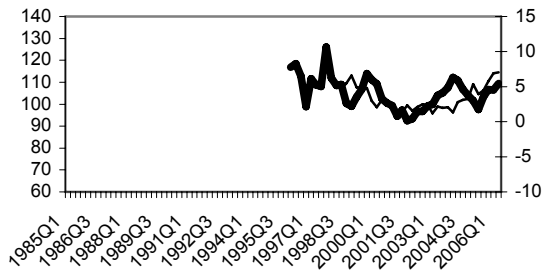
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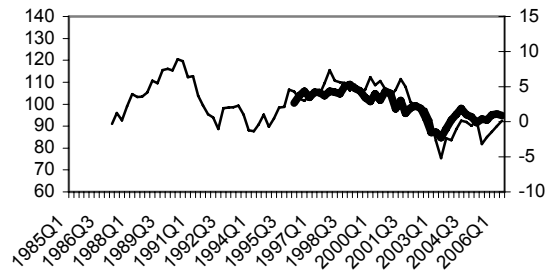
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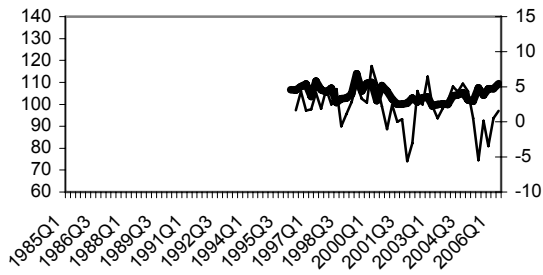
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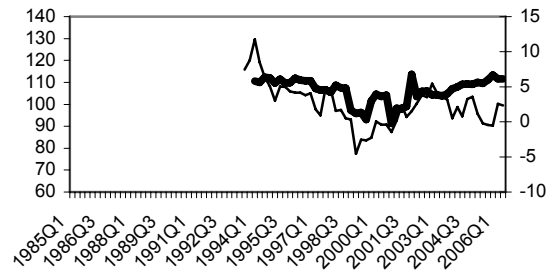
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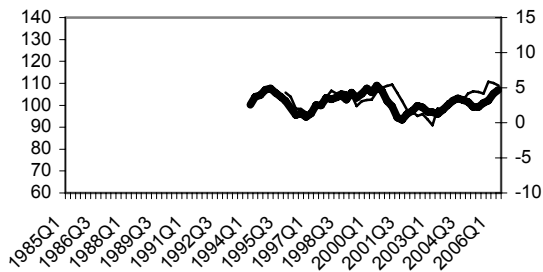
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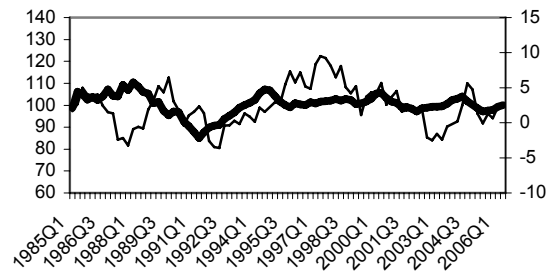
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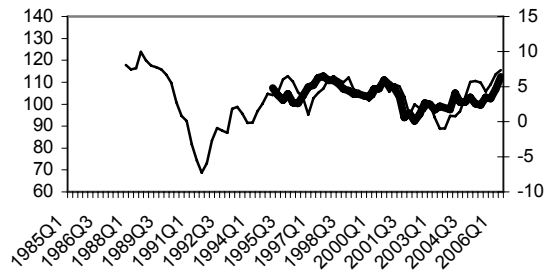
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### UK

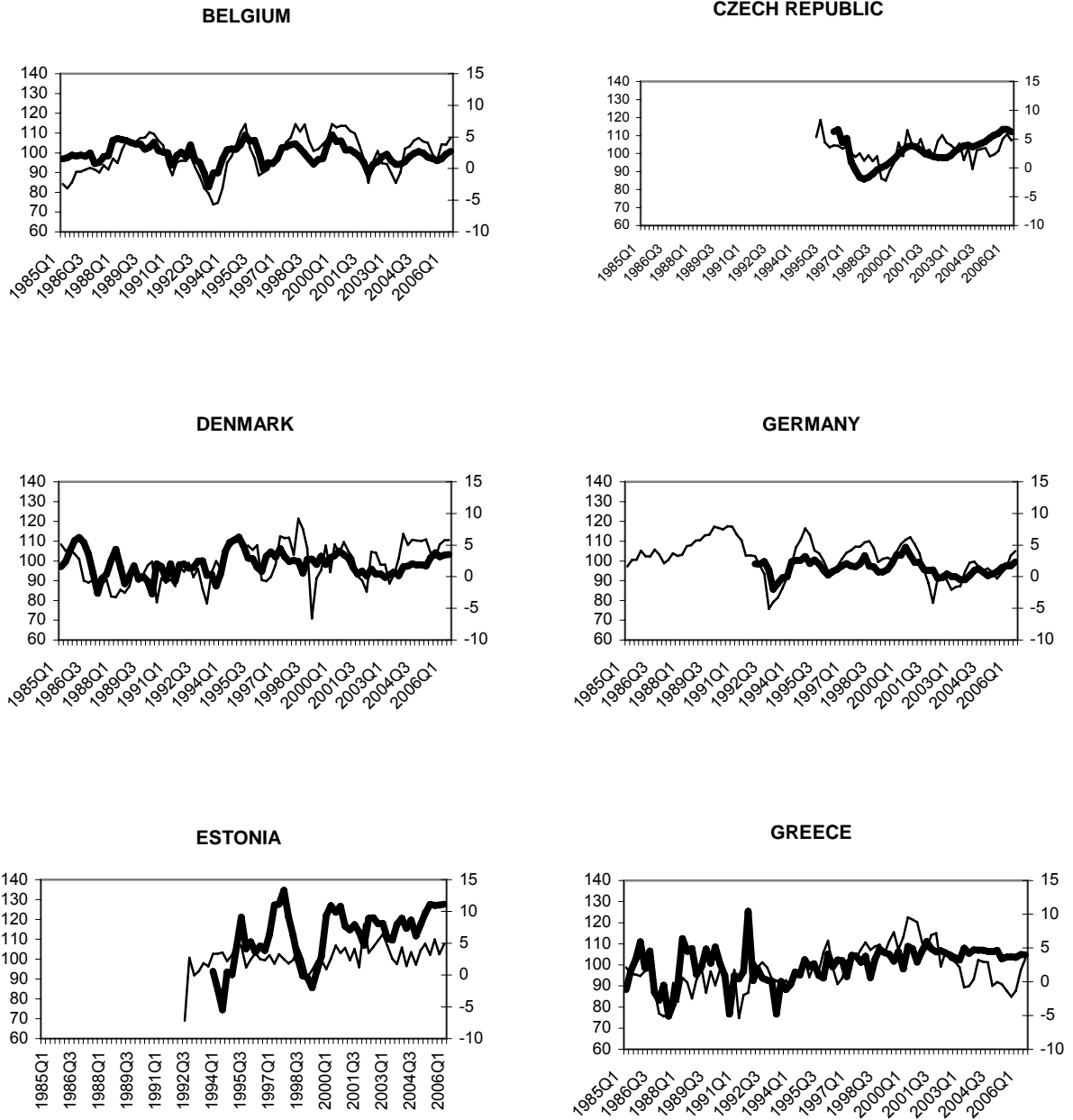


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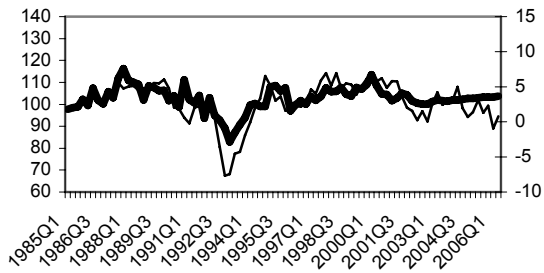


Note: The indicator (ESI) and GDP growth are measured on the primary and secondary axis respectively. The thin and thick lines plot the evolution of the indicator (ESI) and GDP growth respectively.

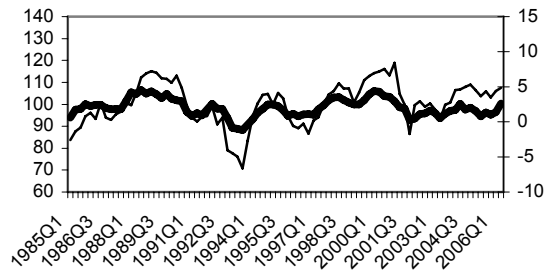
Figure A2.2: ESI Constructed Using Forward-looking Variables



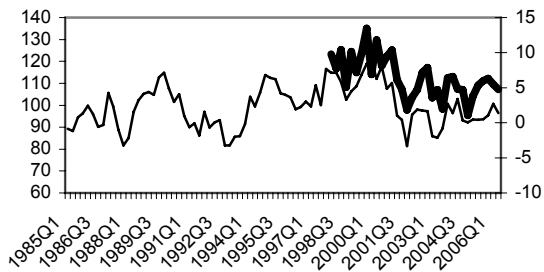
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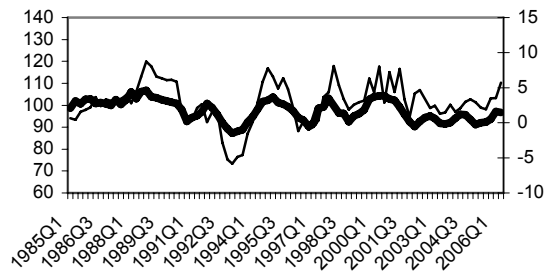
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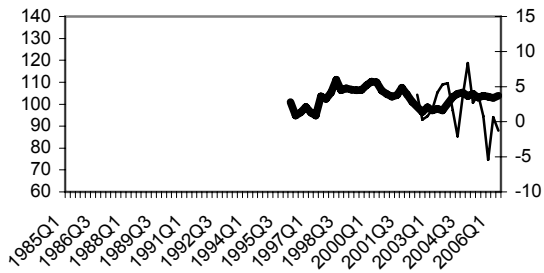
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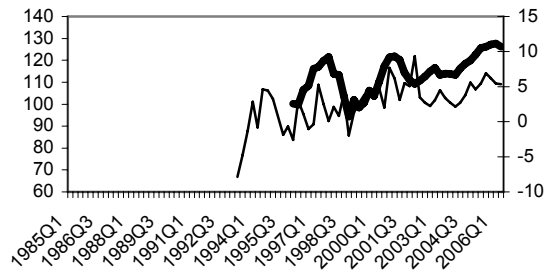
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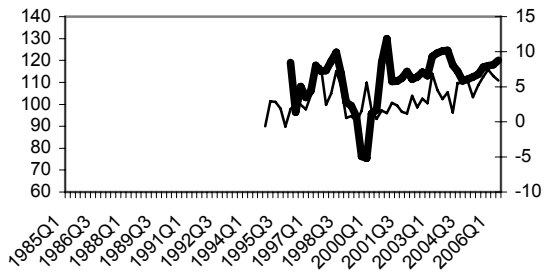
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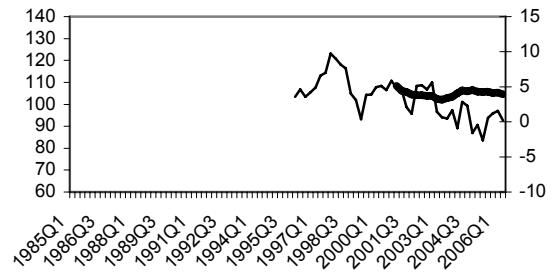
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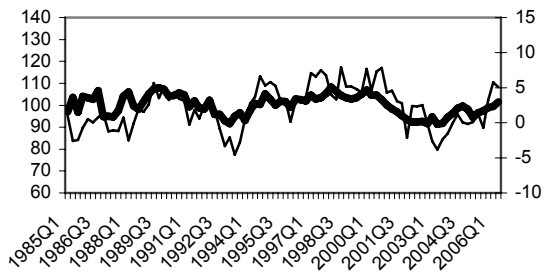
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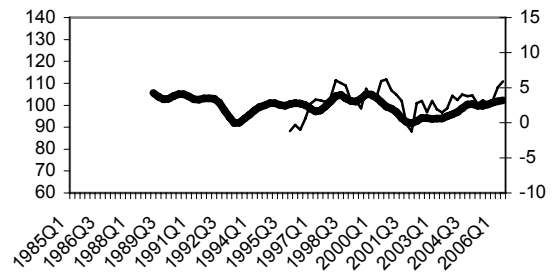
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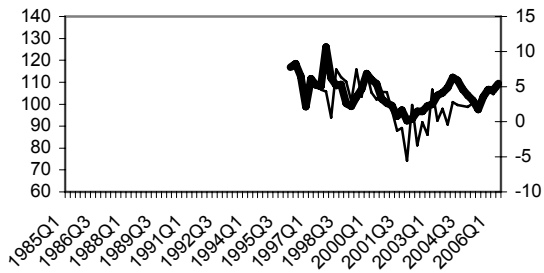
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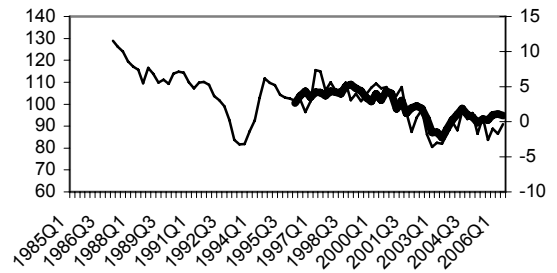
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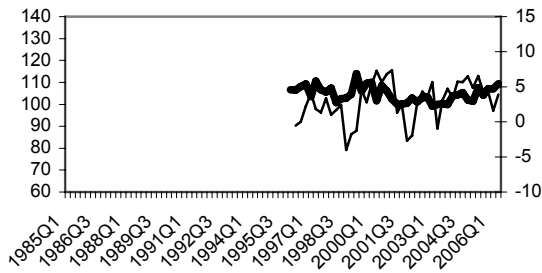
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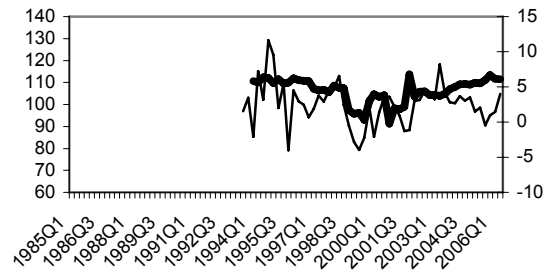
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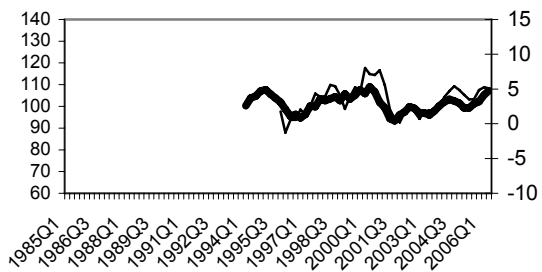
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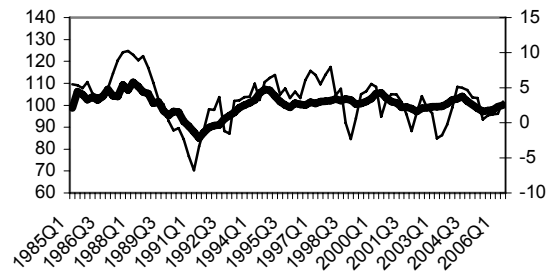
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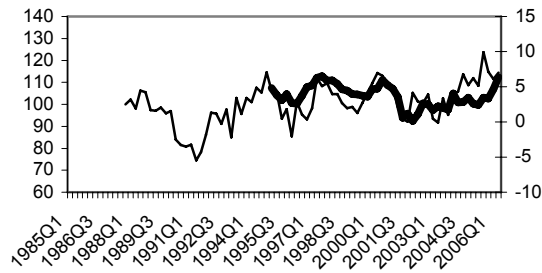
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Note: The indicator (ESI) and GDP growth are measured on the primary and secondary axis respectively. The thin and thick lines plot the evolution of the indicator (ESI) and GDP growth respectively.

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