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Abstract

This paper considers the leading indicator properties of quantitative and qualitative variables for France, Germany, and Italy. The analysis employs cross-correlograms to gain a basic understanding as to the lead-lag characteristics of indicator variables. Furthermore, the study qualifies the short-term and long-term linkages between possible indicator variables and the reference series of the business cycle by carrying out bivariate and multivariate Granger-causality tests and by estimating error correction models. The results suggest that the examined indicator variables generally establish a lead over the business cycle, albeit only at short horizons. Cross-country differences prevail as to the direction of the effect of a chosen variable on industrial production.

Keywords: Business Cycles, Leading Indicators, Granger-Causality Tests, Error-Correction Models

JEL Classifications: E32, E37, C51

I. Introduction

The formation of the European Monetary Union (EMU) and the associated transfer of monetary sovereignty from national central banks to the European Central Bank (ECB) creates an environment full of challenges. One challenge results from the change in the scope of economic policies which increasingly adopt a European rather than purely national focus. In view of this development, the formulation of policy strategies within the sphere of EMU imposes new demands on business cycle forecasts regarding the geographic dimension of applicability. Surely, the usefulness and reliability of Euro-zone forecasts depends on the ability to account for the country-specific features of economic structures.

Several approaches are applied to project business cycle developments.[1] One methodology employs numerical estimates on the economic relationship between variables to generate out-of-sample forecasts. Another theory-based forecasting approach is the iterative analytical technique. In comparison to business cycle projections from econometric models, those from the iterative method are better able to accommodate the effect of unexpected events.

While econometric models and the iterative analytical technique generate forecasts on the basis of theoretical considerations, the indicator approach projects business cycle developments rather pragmatically. The pragmatic view derives from the fact that the indicator method produces forecasts by taking advantage of systematic lead-lag relationships between indicator variables and the reference series.[2]

This paper is in the tradition of the indicator approach. Its purpose lies in the identification of quantitative and qualitative variables that lead the business cycle of the three largest EMU member countries, i.e., France, Germany, and Italy. To meet this objective, the discussion considers two themes. The first topic analyzes the lead-lag properties of indicator variables. The second theme qualifies the indicating properties of variables that are found to lead the reference series of the business cycle. Following these steps, the analysis cumulates in the identification of possible components of a composite index of leading indicators.

The remainder of the paper is structured as follows. Section two presents theoretical considerations regarding the choice of indicator variables. The third section reviews the existing empirical work on leading indicators. Section four and five present the empirical framework and the data for the time-series analysis, respectively. The sixth section reports the findings of the empirical study. Within this framework, attention is directed towards the results of unit root tests and cross-correlation estimations that decide on the structure of the

[1] For a detailed discussion, see Nerb (1997, pp. 241-242).

subsequent analysis. A discussion of bivariate and multivariate estimations follows. The final section summarizes and provides suggestions for future research.

II. Theoretical Considerations

Variables with leading properties are tools that assist in the formulation of monetary and fiscal policy strategies. However, since leading indicators lack sound theoretical foundations, their pragmatic origin renders them inappropriate in predicting the effects of policy actions. In order to overcome criticisms for being ‘measurements without theory’ (Koopmans, 1947), attempts are directed towards selecting indicators on the basis of rationales. De Leeuw (1991, pp. 17-23) discusses the role of production time, ease of adaptation, market expectations, prime mover, and statistical features of data transformations as possible criteria by which to rationalize the use of time series as leading variables.

Considering production time, this criterion refers to the observed time lag between the making and the realization of production decisions. Indicators of early stages in the production process are building permits and the producer’s assessment of order book positions. The rationale of prime movers describes the idea that leading indicators may reflect forces that drive the business cycle in the short run. The indicator to which this idea predominantly applies is real money supply.

Ease of adaptation accounts for the flexibility with which output production responds to unforeseen events. The response is accomplished by modifying the quantity of those input components that are subject to relatively low adjustment costs. Examples for this type of leading indicator are average hours worked and time to delivery. Both variables are relatively flexible in absorbing demand-driven fluctuations in orders or sales, thereby leading changes in employment and shipments (De Leeuw, Ibid., p. 19).

Market expectations reflect the sentiment of market participants regarding the degree of future economic activity. Changes in expectations feed back into the actual performance of the economy through their effects on business and consumption decisions. Variables that are most responsive to changes in expectations about future earnings and the balance between market demand and supply are the price of financial assets and price-sensitive commodities.

The final rationale refers to the observation that time series expressed in rates of change generally have a lead over those expressed in levels. This claim accounts for the general understanding that time series in first-differences reflect short-run dynamics and, hence, short-

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[2] A variable X is said to lead the reference series Y if the correlation of X_t with past values of Y_t is lower than

run business behavior, while variables in levels display long-run dynamics. According to De Leeuw (Ibid., p. 22), indicators of this rationale are changes in inventories, unemployment insurance, and changes in business and consumer credit. In contrast to the previous rationales, this reason is of a statistical rather than economic nature.

Although intrinsically reasonable, the criteria employed to rationalize the use of variables as leading indicators are subject to shortcomings. Specifically, assessments of the order book position only lead the reference series of the business cycle if demand fluctuations are not anticipated. De Leeuw (Ibid., p. 18) justifies this view by arguing that expected changes in new orders would induce immediate responses in the intensity of production. Considering the role of building permits as leading indicator of economic activity, a comparable argument is put forward. The number of building permits only has a positive influence on construction and, hence, economic output if producers judge the economic environment to be advantageous for investment. Along a similar line of reasoning, criticism is exercised on the leading properties of easily adaptable variables. Rationally expected changes in demand conditions are likely to affect variables whose adjustment can be accomplished at high and low speed, with and without large adjustment costs (De Leeuw, Ibid., pp. 19-20).

Problems also arise with respect to the leading role of financial asset prices and commodity prices. The rationale assumes that these prices only depend on expectations regarding future earnings and market conditions. In making this claim, it is ignored that these prices are also determined by changes in taxes and interest rates, by political and technological shocks to the supply of commodities, and by speculative market behavior (De Leeuw, Ibid., p. 20). Given these considerations, it appears that share and commodity prices are only indirect measures of market expectations. Alternative and more appropriate sources of market sentiments are surveys on the degree of confidence prevailing in, e.g., retail trade, private households, and in industrial and construction sectors.

Considering prime movers, difficulties arise from the observation that firms use variables different from prime movers to indicate changes in economic conditions. The main difference between prime movers and firms' leading indicators concerns the lead horizon, being longer for the former than for the latter variables.

The identification of leading indicators should not only be based on rationales and theoretical reasoning regarding the economic relevance of the leading variable. Instead, time series which may qualify as leading indicators also have to meet certain qualitative requirements. Firstly, leading indicators should be characterized by a stable and long lead relative to the reference

the correlation of Y_t with past values of X_t (De Leeuw, 1991, p. 23).

variable of the business cycle. Secondly, variables with leading properties should be promptly available and not subject to considerable revisions.

This paper examines the role of leading variables whose use can be rationalized by reasons on production time and market expectations. Rationales on production time are investigated by using the assessment of order book position. The relevance of market expectations is examined with data on business and consumer surveys, and on the share price index. As to surveys, attention is paid to the performance of industry, construction, retail, and consumer confidence indicators. Moreover, interest is also with composite indices of leading indicators such as the economic sentiment indicator of the European Commission (EC) and the OECD leading indicator. The former indicator assembles information on a standard set of variables, i.e., the share price index, industry confidence, construction confidence, and consumer confidence. Alternatively, the OECD index is a country-specific composite index of leading indicators. Besides these variables, the analysis also tests the leading properties of the consumer price index (CPI). The use of this variable as leading indicator is warranted by issues regarding prompt availability and relative resistance against data revision.[3] The significance of reasons on the ease of adaptation are not examined due to data constraints.

III. Existing Empirical Evidence

Leading indicators derive their significance from being means by which to forecast the degree of economic activity. The need to identify variables that are useful in forecasting the direction and amplitude of business cycle fluctuations is acknowledged as early as in 1938 by Mitchell and Burns. Since then, a large number of studies on economic indicators has emerged, with studies differing in terms of focus and methodology. Ignoring methodological issues for the moment, the existing empirical literature on the construction of leading economic indicators can be classified along two broad lines. One track of studies interprets individual time series as leading indicators. The second line views leading indicators as a combination of variables with leading properties.

One study belonging to the first branch is presented by Stock and Watson (1998). Using quarterly data, they investigate the lead-lag relationship between the cyclical component of 70 U.S. time series and real GDP by determining cross-correlation coefficients at various leads and by carrying out Granger-causality tests.[4] Considering the results, it appears that the

[3] Alternative variables that are promptly available are nominal and real effective exchange rates. The analysis initially considers the role of these factors as leading indicators. Since cross-correlation coefficients and regression estimations do not point to the existence of a significant lead of these exchange rates over industrial production, they are not further considered. The estimation results are available on request.

[4] For an overview of the time series see Stock and Watson (1998, Table 2).

majority of time series fluctuates with real output. Even though positive linkages exist, the number of time series which actually lead GDP is found to be small.

Another study in this field of research is carried out by Fritsche and Stephan (2000). Being interested in the identification of leading indicators for the German business cycle, they use spectral analysis, Granger-causality tests, and out-of-sample forecasts to assess the leading indicator properties of a number of quantitative and qualitative measures. The indicators under investigation are order inflows, the Ifo business climate, EC consumer confidence, the spread between government and private bond yields, nominal and real money supply, and the real effective exchange rate. The reference variable is industrial production whose cyclical component is considered to move with the cyclical component of real GDP. Interpreting the empirical evidence, only the Ifo business climate index, order inflows, and the interest rate spread are found to qualify as leading indicators. However, the predictive power of these variables only prevails in the very short run, i.e., in the period of one to twelve months (Ibid., p. 10).

Bandholz and Funke (2001) present a study which defines leading indicators as a combination of variables with leading properties. Their primary objective is the construction of a composite index of leading indicators from variables that are subject to a common unobserved component. Building on the framework of a dynamic factor model, the analysis is carried out for Germany by using information on the index of new orders total manufacturing and the finished goods stock level (Ibid, pp. 3-4). The choice of these variables is justified by referring to the reliability and accuracy with which the composite of these parameters can anticipate business cycle developments.

Regardless of whether leading indicators reflect information on single or multiple time series, these studies have in common that they are country-specific. With the advance of the European Monetary Union, the focus of analysis has shifted towards modeling leading indicators for the Euro-zone business cycle. Studies in this field are presented by Nilsson (2000) and Fritsche and Marklein (2001).

The work of Fritsche and Marklein (2001) builds on Fritsche and Stephan (2000). Similar to the earlier study, Euro-zone leading indicators are identified in a three-step procedure. In a first instance, the framework of frequency domain analysis is employed to distinguish variables that are subject to similar cyclical patterns as is the reference series of the business cycle. The analysis proceeds by investigating the nature of the relationship between each leading indicator and the reference variable at various leads and lags. The corresponding estimates are obtained by calculating cross-correlation coefficients and by implementing Granger-causality tests. The final choice of leading indicators is made dependent on the variables' performance in out-of-sample forecasts.

Using aggregate Euro-zone data[5], Fritsche et al. (2001) investigate the performance of monetary and non-monetary variables in leading the reference series of the business cycle, i.e., industrial production. The evidence suggests that non-monetary qualitative measures perform well as leading indicators. However, similar to the findings for Germany, the leading indicator properties appear to be a short-run phenomenon. Considering monetary aggregates, the empirical findings do not support the existence of a lead relationship between money supply, interest rates, or exchange rates and the reference series, neither in the short run, nor in the long run.

The analysis by Nilsson (2000) differs from the study by Fritsche et al. (2001) in two ways. Firstly, Nilsson (2000) assesses the leading properties of the EC economic sentiment indicator and the indicator's components. The findings are related to the performance of the OECD composite leading indicator. Secondly, Fritsche et al. (2001) compare indices of leading indicators for a Euro-zone aggregate. While Nilsson (2001) studies the characteristics of leading indicators for an aggregate of countries as well, he also assesses the reliability of leading indicators for single countries. The aggregate is the European Union (EU); the individual countries are the EU's largest member countries, i.e., France, Germany, Italy, and the United Kingdom.

The study's results point to the superior performance of the OECD leading indicator relative to the EC counterpart. This empirical finding is attributed to differences in the composition of these variables that affect their ability to account for the structural particularities of an economy. The OECD indicator succeeds in capturing economic features since it is a country-specific compilation of indicator variables. In contrast, the EC economic sentiment indicator is constructed on a similar set of variables across countries.

The study presented in this paper is closest in spirit to Fritsche et al. (2000, 2001). Similar to the earlier investigations, the analysis centers on Germany. Additional components of the working sample are France and Italy. Moreover, the previous analyses' main focus is on the examination of bivariate Granger-causal relationships. The current study goes further in that it discusses the linkage between indicator variables and the reference series in bi- as well as multivariate settings. Within the framework of bivariate estimations, a distinction is made between the short- and long-run.

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[5] Alternatively, Fritsche et al. (2001, p. 4) suggest the construction of a Euro-zone composite index of leading indicators by using non-aggregated data on EMU member countries.

IV. Empirical Model

As stated, the analysis presented in this paper adopts several focal points. The point of departure is the examination of the lead-lag performance of quantitative and qualitative variables via cross-correlograms. Variables for which cross-correlation coefficients show signs of leading properties are further analyzed within ordinary least squares regression frameworks. The aim is to qualify the relationship between indicator variables and the business cycle. The explicit setting is explained below.

The underlying relationship between the reference variable and indicators is assumed to be linear at all leads and lags. Given this assumption, industrial production, IP, is modeled to be a function of n leading variables, LI, such as:

$$(1) \qquad IP_t = f\,[LI_{s,t-j}], \qquad s = 1, ..., n,\ j>0,$$

where j depicts the lag. Based on this function, Granger-causality tests (Granger, 1969) are specified. The structure of these tests depends on the order of integration of the individual time series. For indicator variables which are integrated of order one, I(1), Granger-causality tests are implemented for their first-difference. With industrial production containing a unit root, the tests assume the following form:

$$(2) \qquad \Delta IP_t = \sum_{i=1}^{p-1} a_i\, \Delta IP_{t-i} + \sum_{j=1}^{q-1} b_j\, \Delta LI_{t-j} + u_t .$$

Δ depicts the difference operator defined by $\Delta IP_t \equiv IP_t - IP_{t-1}$. For indicator variables that are stationary in their levels, Granger-causality tests are carried out according to the following specification:

$$(3) \qquad \Delta IP_t = \sum_{i=1}^{p-1} a_i\, \Delta IP_{t-i} + \sum_{j=1}^{q-1} c_j\, LI_{t-j} + u_t .$$

This model differs from equation (2) in that the indicator variable is not specified in terms of growth rates. For equations (2) and (3), the parameters a_i, b_j, and c_j are the coefficient estimates and u_t is the white noise error term. The indicator variable is said to Granger-cause industrial production if the coefficient estimates b_j or c_j (j = 0, ..., q-1) are significantly different from zero. Following Zhang (1999, p. 526), the sign of causal links is determined by adding the coefficient estimates of statistically significant lagged indicator variables.

Granger-causality tests are only appropriate to describe short-run causal relationships between the reference series and the indicator variable. To gain an understanding as to the nature of the long-run relationship, error correction models are estimated for industrial production and those indicator variables that are suggested to be integrated of order one.[6] The error correction model (ECM) is specified as follows:

$$(4) \qquad \text{Ä}IP_t = -(1-\text{ë})[IP_{t-1} - \text{è}\,LI_{t-1}] - \sum_{i=1}^{p-1} a_i\, \text{Ä}IP_{t-i} - \sum_{j=1}^{q-1} b_j\, \text{Ä}LI_{t-j} + \text{Trend} + v_t\,.$$

The parameter estimate λ denotes the loading coefficient of the ECM. The coefficient θ defines the long-run parameter. Short-term effects are captured by a_i and b_j. The short-run dynamics are set to produce white noise error terms v_t. The deterministic ‘Trend’ term is included to account for a possible drift in the time series. This component is incorporated in the estimation equation when it proves to be significant in explaining industrial production growth. The ECM as specified here does not supply standard errors and t-values for the long-run coefficient θ. To derive at a measure for the significance of this parameter, the Bewley-transformation of the ECM is computed.

Having determined the nature of the relationship between industrial production and individual indicator variables, the analysis also examines the linkages in a multivariate setting. The objective is to identify a group of indicators which explains more of the variation in the endogenous variable than each leading indicator on its own. Following the approach from bivariate estimations, the study tests for the existence of Granger-causal effects of the group of leading indicators on industrial production. Within this framework, equation (2) is extended as follows:

$$(5) \qquad \Delta IP_t = \sum_{i=1}^{p-1} a_i\, \Delta IP_{t-i} + \sum_{s=1}^{n} \sum_{j=1}^{q-1} b_{s,j}\, \Delta LI_{s,t-j} + \sum_{s=1}^{n} \sum_{j=1}^{q-1} c_{s,j}\, LI_{s,t-j} + u_t\,.$$

The modeling of the estimation equations (2) to (5) indicates that the realization of the empirical analysis requires knowledge as to the unit root properties of the variables. These are determined by applying augmented Dicky-Fuller (ADF, 1979) tests and Phillips-Perron (PP, 1988) tests to the individual time series. The corresponding test equations contain a constant and a trend term.

As a final remark, the estimation of the model coefficients also takes account of exceptional events which are captured by 0-1 impulse dummy variables. Dummies are defined for observations for which the error terms exhibit clearly visible deviations from regular patterns.

[6] Error correction models test for the stationarity of the linear combination of any two variables. If at all, a stable linear combination can only be expected to exist for variables that display similar unit root properties.

In adopting this rather simplistic approach, estimations for France include dummies for 1973:05, 1974:09, 1975:10, 1982:07, and 1987:01. In the case of Italy, dummies are constructed for 1973:01, 1979:08, and 1987:01. Estimations for Germany are augmented to capture the effect of the 1984:06 strike in the metal industry.

V. Data

The analysis uses monthly data to investigate the ability of quantitative and qualitative economic measures to lead industrial production for France, Germany, and Italy. Quantitative instruments are country-specific share price indices and consumer price indices. Qualitative variables are indicators on industry, construction, retail, and consumer confidence, the EC economic sentiment indicator, the OECD leading indicator, the assessment of the order book position, and production expectations.

Data are compiled from the European Commission and the OECD.[7] Given these sources, the majority of estimations is carried out for the period 1970:01-2001:08. For specifications that consider the role of the EC economic sentiment indicator, the share price index, and the retail confidence indicator, parameter estimates build on data that are only available from the second half of the 1980s.

Most of the sampled data are classified to be seasonally adjusted. The exceptions are information on the share price index of France and Italy and on the consumer price index of the investigated countries. Seasonal patterns are removed by using the widely applied Census X12-ARIMA methodology.[8]

The reference variable and data on CPI, the share price index, the EC economic sentiment indicator, and the OECD leading indicator are expressed in natural logarithm. The numerical information on order book position, production expectations, and on industrial, construction, consumer, and retail confidence are initially expressed as percentage balance. To bring these variables' coefficient estimates in line with those obtained for indicators expressed in logarithm, they are re-scaled with the factor 0.01. Given the transformation of the data, the coefficient estimates can be interpreted as elasticities. Growth rates are computed by taking the first difference.

[7] Appendix A.I contains a detailed description of the variables and the corresponding sources.
[8] Seasonal adjustment is carried out by using DEMETRA 2.0 provided by Eurostat.

VI. Empirical Evidence

VI. 1 Unit Root Tests for the Order of Integration

Table 1 reports the results from unit root tests. Starting with the reference variable, both the ADF and PP test statistics indicate that the null hypothesis of non-stationarity cannot be rejected for industrial production. That is, stationarity is achieved by taking the first log-difference. Considering the indicator variables, a unit root is identified to exist for almost all variables. The exceptions are the assessment of the order book position, production expectations, and the industry confidence indicator. Furthermore, while the retail confidence indicator appears to be integrated of order one for Germany and Italy, the unit root tests point to the stationarity of this variable in its level form in the case of France. Cross-country differences are also evident with respect to the order of integration of the consumer confidence indicator. For Italy, this variable does not contain a unit root, while non-stationarity cannot be rejected in the case of France and Germany.

Ambiguity exist as to the order of integration of the EC economic sentiment indicator, the construction confidence indicator, and the consumer price index. While the first two cases are particular to France, the uncertainty as to the stationarity of CPI equally applies to France, Germany, and Italy. In all cases, the ADF test statistics point to the non-stationarity of these variables when being expressed in either levels or first differences, whereas the PP test suggests them to follow an I(1) process. Placing more weight on the PP test, these indicators are assumed to be stationary in their first-differences.

VI. 2 Cross-Correlation

This section presents estimates as to the magnitude of correlation between the reference variable and the indicator variables at leads and lags with length 24. Following Fritsche at al. (2000, pp. 9-10; 2001, p. 10), the maximum of cross-correlation between the reference and indicator variable roughly indicates whether the variables' relationship is characterized by a lead, coincident, or lag structure. The results are displayed in Figure 1.

To help in the selection of indicator variables, the cross-correlation coefficients are plotted together with a five percent significance band. Correlation coefficients that assume values outside this band point to the existence of significant leading, coincident, or lagging relationships between the reference series and the indicator variable. Interpreting the results, such linkages run from almost all indicator series to industrial production. The exceptions are construction confidence for Germany and production expectations for France.

Considering the nature of the relationship between indicators and the reference series, differences prevail across variables and across countries. Variables with leading properties are the consumer confidence indicator, the assessment of the order book position, the construction confidence indicator, and the EC economic sentiment indicator. The first observation is common to Germany and Italy, the second applies to Germany and France. The third and fourth finding is unique to Italy and Germany, respectively. Common to Germany and Italy, production expectations appear to lag industrial production. Industry confidence exhibits lagging patterns. In contrast to the previous indicators, this property is shared by the investigated countries.

Taken together, cross-correlation coefficients provide only weak support for the existence of leading linkages. However, Fritsche et al. (2000, p. 9) criticize findings from cross-correlation estimations in that they can be distorted by overlapping oscillations. Given this shortcoming, the analysis employs the Granger-causality methodology and error correction models to provide deeper insights into the nature of the short- and long-run linkages between the reference variable and the indicator series. The remaining sections of the paper elaborate on the results of the bivariate and multivariate analysis.

VI.3. Bivariate Analysis

According to equations (2) to (5), industrial production is a function of its own lagged values and of indicator variables. Given the dependence on autoregressive terms, the analysis starts by determining the best univariate model for the growth rate of industrial production. Considering Germany and Italy, the reference variable is estimated to evolve as an ARIMA(2,1,0) process. Ambiguity prevails in the case of France. While information criteria suggest that industrial production follows an ARIMA(3,1,0) process, results from Granger-causality tests point to an ARIMA(2,1,0) model. The subsequent analysis will report the estimates for the model that performs best. Table 2 displays the models' corresponding test statistics.

VI.3.1. Granger-Causality Tests

Departing from the best univariate specification for the reference series, lags of stationary indicator variables are added. The bivariate estimation specifications are evaluated in terms of their explanatory power. Here, improvements in the goodness of fit relative to the univariate specification are seen to point at Granger-causality. Furthermore, the evidence on Granger-causal linkages is compiled for models with and without deterministic dummy variables. The subsequent elaboration does not distinguish between these specifications since the choice of model does not feed back into the sign and magnitude of the coefficient estimates. Moreover, differences regarding the significance of coefficient estimates are only observed at the margin. The results are summarized in Tables 3-5.[9]

For the investigated economies, small cross-country differences prevail with respect to the significance and the sign of the indicator variables. Variables that are commonly found to be related to the growth rate of the reference series are the consumer price index, the assessment of order book positions, production expectations, EC economic sentiment, industry confidence, and the OECD leading indicator. No significant linkages appear to run from construction confidence to the reference series of the business cycle. Cross-country dissimilarities exist with respect to the relevance of the share price index, retail trade confidence, and consumer confidence. While the relevance of the first two variables is particular to Italy, the significance of consumer confidence is specific to Germany.

Few cross-country differences exist as to the nature of the linkage between statistically significant indicator variables and the reference series of the business cycle. For France, Germany, and Italy, the direction of effect of production expectations, EC economic sentiment, and the OECD leading indicator on industrial production is positive. These economies also share the uncertainty regarding the influence of the order book position on the reference series. Across the sampled countries, dissimilarities concern the direction of response of industrial production to changes in the consumer price index. For France and Germany, the causal link from CPI to industrial production is suggested to be negative, whereas it is estimated to be positive for Italy.

VI.3.2. Error Correction Estimation

As stated, Granger-causality tests are only appropriate to describe short-run causal relationships. Interest with the existence of stable, economically meaningful long-run linkages between the reference series and indicator variables motivates the estimation of error correction models. In order to reject the null hypothesis of no cointegration, the loading coefficient in the ECM needs to be significantly negative. The Banerjee t-statistic (Banerjee, 1998) supplies the corresponding critical values. Table 6 reports the results for those indicator variables that meet two requirements. Firstly, the exogenous and endogenous time series must display the same unit root characteristics. Secondly, the Granger-causality tests must point to the existence of significant short-run relationships between industrial production and the indicator variables.

[9] The Granger-causality tests are carried out according to the unit root characteristics of the indicator variables. Considering the regression results, the estimates turn frequently out to be insignificant. As stated, the objective is the identification of a set of indicator variables that explains variations in the reference series. Given this motivation, insignificant lags are not omitted from the estimations when they raise the explanatory power of the specification. Furthermore, Tables 3-5 only report the estimation results for indicator variables that raise the explanatory power of the model specifications.

For the countries of interest, error correction models are specified to test for the existence of a long-run causal effect of the consumer price index, the OECD leading indicator, and EC economic sentiment on industrial production. Besides these variables, the model for Germany also considers the long-run influence of consumer confidence. For Italy, the analysis is extended to investigate the role of retail trade confidence and the share price index.

Examining the long-run influence of factors common to France, Germany, and Italy, the evidence does not support the existence of a stable equilibrium effect of the consumer price index and the EC indicator on industrial production. While the null hypothesis of no cointegration cannot be rejected for these indicators, the opposite conclusion holds for the OECD leading indicator. This indicator variable exercises significant long-run unidirectional effects on the reference series. Across countries, the magnitude of the long-run response of industrial production to a percentage change in the OECD indicator is found to be largely similar. For estimations with and without dummies, the elasticities are in the range of 0.961-0.993 and 0.957-1.009, respectively.

Considering the role of country-specific factors, consumer confidence and industrial production appear to be cointegrated in the case of Germany. The nature of the long-run relationship is estimated to be positive; the coefficient estimates being equal to 0.51 and 0.46 in the estimation with and without dummy variables, respectively. With respect to Italy, the results from Granger-causality tests on the leading properties of share prices and retail trade confidence do not extend to the long run.

Taken together, the evidence from Granger-causality tests and error correction models suggests that the investigated indicator variables have a short rather than long lead over the reference series. This finding is in line with earlier empirical evidence provided by, for example, Fritsche et al. (2000, 2001). Given this empirical finding, the next section is directed towards assessing the short-run relationship between indicator variables and the reference series in a multivariate framework. Estimating multivariate Granger-causality tests, interest is with the joint performance of the identified quantitative and qualitative indicators as predictive instruments of industrial production.

VI.4. Multivariate Analysis

The interest with the construction of a composite index of indicators arises from the proposition that an aggregate of indicators anticipates business cycle fluctuations more reliably and accurately than any of the aggregate’s individual components. The reason is the inherently volatile nature of cyclical oscillations that cannot be correctly anticipated and explained by a single variable (Nilsson, 2000, p. 3).

The joint explanatory power of indicator variables is examined along several lines. The first category of models consists of those variables that are commonly identified to lead industrial production in France, Germany, as well as Italy. The second group of specifications also includes indicators whose significance is found to be country-specific. For each of these classifications, test equations are constructed to either contain first-difference stationary variables, level stationary variables, or both.[10] Finally, since industrial confidence is one component of the EC economic sentiment indicator, the model equations are separately estimated for only one of these variables. In adopting this approach, biases due to multicollinearity do not arise.[11] Table 7 displays the estimation results obtained from estimating these variants of equation (5).

At a general level, the estimated combinations of indicator variables explain more of the variation in the endogenous variable than each individual variable in the bivariate specifications. Furthermore, the findings from the multivariate specification confirm the empirical results from bivariate Granger-causality tests and error correction estimations in that the investigated indicator variables only establish short leads over industrial production growth. The longest lead properties are identified for the consumer price index, while the shortest lead is observed for the industry confidence indicator. Similar to the results for the bivariate specifications, deterministic dummy variables marginally feed back into the significance of the coefficient estimates, without bearing on their sign and magnitude.

As regards the first group of model specifications, the empirical findings point to cross-country similarities regarding the components of the basket of indicator variables that appropriately explains fluctuations in the reference series. The best performing country-specific models include the consumer price index, the OECD leading indicator, the assessment of the order book position, and production expectations.[12] For France and Italy, the model with the highest explanatory power also consists of the EC economic sentiment indicator, while Germany's preferred specification comprises information on industry confidence.

In the case of France and Germany, the best performing model for one country is the second best for the other. Since differences in the structure of the best performing and second-best model are small, dissimilarities in the magnitude of the adjusted coefficients of determination

[10] Observing the unit root characteristics of the variables, industrial production, the OECD and EC indicator, and CPI are specified in terms of first differences. Production expectations, order book position, and the industry confidence indicator are expressed in levels.

[11] The bias refers to the following property: Multicollinearity lowers t-statistics by rising the standard errors of coefficient estimates. As a consequence, correlated variables that are significant when considered independently of each other may turn out to be insignificant in joint estimations.

[12] For France and Italy, the best performing model is displayed in Table 7.4. The first-best model for Germany is depicted in Table 7.5. The second-best models are reported in Table 7.5, Table 7.4, and Table 7.1 for France, Germany, and Italy, respectively.

are rather negligible. For the first- and second-best specification, the corresponding adjusted R-squared values are 0.32 and 0.31 for Germany, while those for France equal 0.29 and 0.28. Considering Italy, the evidence points to few similarities in the construction of the first- and second-best model. Although the best performing specification is similar to the model identified for France, the structure of the second-best specification clearly differs in that it is a pure representation of first-differenced variables. The adjusted coefficients of determination of the first- and second-best model assume values of 0.36 and 0.31, respectively. To allow for cross-country comparability, the next paragraph only compares the results for the countries' best performing model.

Similar to the results from bivariate Granger-causality tests, cross-country differences prevail. Considerable dissimilarities emerge for France whose estimation results are largely at variance with those obtained for Germany and Italy. In particular, industrial production growth is predicted to decrease with the assessment of the order book position and to increase with production expectations and the OECD leading indicator in the case of Germany and Italy. For France, the OECD indicator is insignificant in the first-best specification, while the remaining two indicator variables have an ambiguous effect on the reference series. Different observations prevail with respect to the role of the consumer price index. This variable turns out to be insignificant in the estimations for Italy. For France and Germany, industrial production is negatively related to inflation. In contrast to other indicator variables, this relationship is only observed at higher lags.

Given the structure of the EC indicator, changes in the EC indicator and its components are anticipated to induce similar responses on the part of the reference series.[13] As is apparent from Tables 7.1, 7.3-7.5, the estimation results for the industry confidence and the EC indicator only provide ambivalent support for this proposition. In the case of France, the linkage to industrial production is positive for the EC economic indicator, whereas it is negative for industry confidence. In contrast, industrial production growth rises with the EC indicator as well as with industry confidence in Germany and Italy.

Table 7.6 reports the results for multivariate Granger-causality estimations that are structured around indicators whose leading role is particular to one country. Using the findings from the bivariate Granger-causality estimations, the leading properties of the consumer confidence and retail trade confidence indicators are further investigated for Germany and Italy, respectively. Similar to the industry confidence indicator, the variables on consumer and retail trade confidence are components of the EC economic sentiment indicator. Again, to gain a correct understanding as to the significance of coefficient estimates, the indicator properties of these confidence indicators are separately identified. Next to examining the role of qualitative indicators, the analysis for Italy also tests for the significance of the share price index as leading variable of the reference series.

With respect to Germany, the incorporation of consumer confidence raises the adjusted coefficient of determination from 0.32 to 0.35. Improvements in the performance of model specifications are also recorded for Italy. Considering the estimation with industry confidence, the retail trade confidence indicator and the share price index drive the explanatory power up from 0.29 to 0.39.[14] For the model with the EC indicator, the increase in the adjusted coefficient of determination is less impressive, being from 0.36 to 0.37.

The extended specifications have not only implications for the goodness of fit. Instead, they also bear on the significance and magnitude of some of the other indicator variables. As regards the estimation for Germany, the responsiveness of industrial production growth to a one percentage change in the OECD leading indicator lagged one period declines with the inclusion of the consumer confidence indicator by about 0.16 percentage points. With respect to Italy, the augmented multivariate estimation points to the significance of the EC economic indicator as explanatory variable of industrial production, while it proved to be insignificant in the earlier estimation. Dependent on the model, two pictures emerge as to the nature of the response of industrial production to a change in the assessment of the order book position. While the specification in Table 7.4 predicts industrial production to be negatively related to the order book position, the augmented model views the reference variable to be an increasing function of the reference series.

Finally, dependent on the indicator, the direction of the reference series' response to a change in the added variable differs across the bivariate and multivariate framework. For Germany, the results from the bivariate and multivariate estimations are opposed in that they hint at a positive and negative relationship between industrial production and consumer confidence, respectively. For Italy, the estimation results are consistent across estimation structures. For the bivariate and multivariate causality tests, industrial production increases with retail trade confidence and the share price index.

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[13] This proposition holds despite the differences in the unit root properties of the EC indicator and industry confidence.

[14] The analysis also determines the relative contribution of the share price index and the retail trade confidence indicator to the explanatory power of the model in Table 7.4. To accomplish this end, the specification is separately estimated for each indicator variable. A comparison of the resulting coefficients of determination suggest that both factors raise the explanatory power by approximately five percentage points.

VII. Conclusion

To summarize, this paper has estimated cross-correlation coefficients, error correction models, and Granger-causal linkages to identify indicator variables with leading properties for France, Germany, and Italy. Dependent on the methodological approach, two differences emerge as to the qualification of the empirical results. Firstly, dissimilarities arise regarding the comparability of indicator properties of variables across countries. The results from cross-correlograms point to largely dissimilar patterns, the only coincidence being observed for industry confidence. Contrasting this finding, Granger-causality tests and error correction models provide evidence for comparable lead-lag characteristics of indicator variables across France, Germany, and Italy.

The second difference concerns the interpretation of the lead-lag characteristics of indicator variables. Cross-correlation coefficients suggest that the majority of indicators lags rather than leads the reference series. On the contrary, the evidence from Granger-causality tests and error correction models points to the predominance of lead relationships. However, the lead horizon is generally short, being approximately equal to one quarter.

The analysis presented in this paper does not yield results on a composite index of leading indicators. It only identifies combinations of time series that can possibly improve the accuracy and reliability of forecasts on business cycle fluctuations relative to individual variables. In order to construct an index of leading indicators, it is necessary to account for the component series' relative importance and cyclical amplitude in the basket of indicators. Future research can extend the analysis along this line of reasoning.

Work on leading indicators is not only of importance for individual economies. Instead, the process of European integration and the operation of a common monetary policy warrants research on the construction of a Euro-zone composite index of leading indicators. The empirical findings from country-specific analyses constitute the point of departure for such research. Extending the analysis in these directions should provide improved guidance in the formulation of macroeconomic policy strategies.

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Appendix

A.I Variable Explanation

Variable	Units	Source[a]	Abbreviation: Level	Abbreviation: First-Difference
Industrial Production Index	1995=100	OECD Main Economic Indicators	IP	Δ IP
Consumer Price Index	1995=100	OECD Main Economic Indicators	CPI	Δ CPI
OECD Leading Indicator	[b]	OECD Main Economic Indicators	OL	Δ OL
Economic Sentiment Indicator	1995=100	European Commission	ES	Δ ES
Share Price Index	1995=100	European Commission	SPI	Δ SPI
Order Book Position	% Balance	European Commission	OBP	Δ OBP
Production Expectations	% Balance	European Commission	PE	Δ PE
Industrial Confidence Indicator	% Balance	European Commission	CI	Δ CI
Construction Confidence Indicator	% Balance	European Commission	CC	Δ CC
Consumer Confidence Indicator	% Balance	European Commission	CK	Δ CK
Retail Confidence Indicator	% Balance	European Commission	CR	Δ CR

[a] The data are extracted from Datastream.
[b] Different base years.

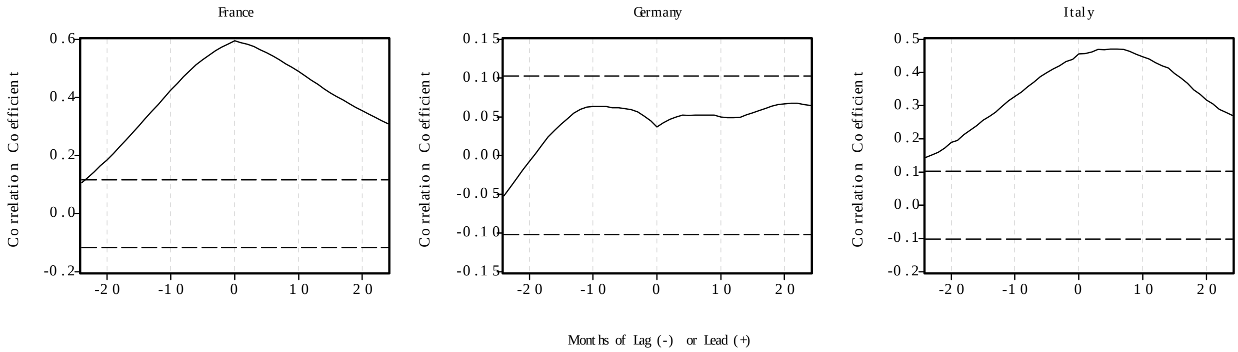
A.II General Explanations to the Table Entries

- In all OLS estimations, the endogenous variable is always the first log-difference of industrial production Δ IP.
- Standard errors are given in parentheses.
- *, **, *** depict significance at the one, five, and ten percent level, respectively, for critical values from the student t-distribution.
- $^{+}$, $^{++}$, $^{+++}$ denote significance at the one, five, and ten percent level, respectively, for critical values from the Banerjee t-statistic.
- For all regressions, the number of lags is set to produce white noise error terms. To test for the i.i.d. distribution of the residuals, the Box-Pierce Q-statistic is computed. Q_{10} and Q_{20} denote the p-value of the Q-statistic at residual lag 10 and 20, respectively.
- The prefix D_ is used to depict a deterministic dummy.

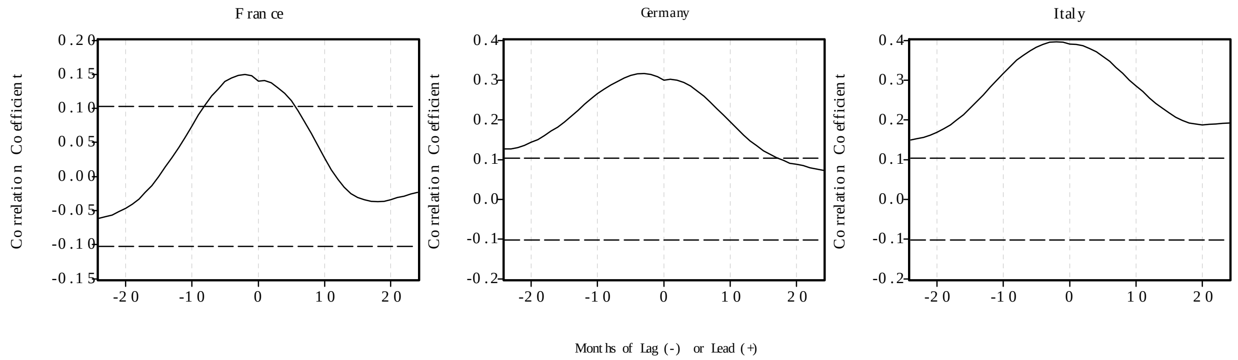
A.III Empirical Results

Figure 1: Cross Correlations between the Reference Series and Indicator Variables[a]

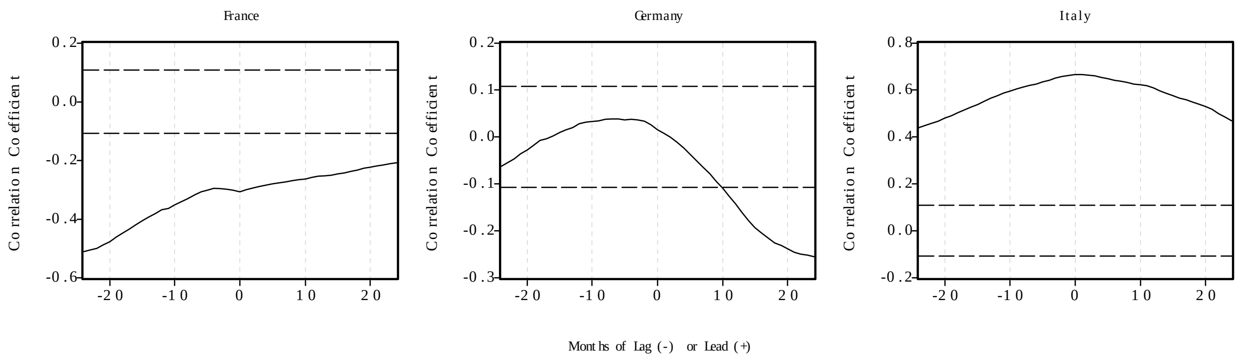
Panel 1 Construction Confidence Indicator



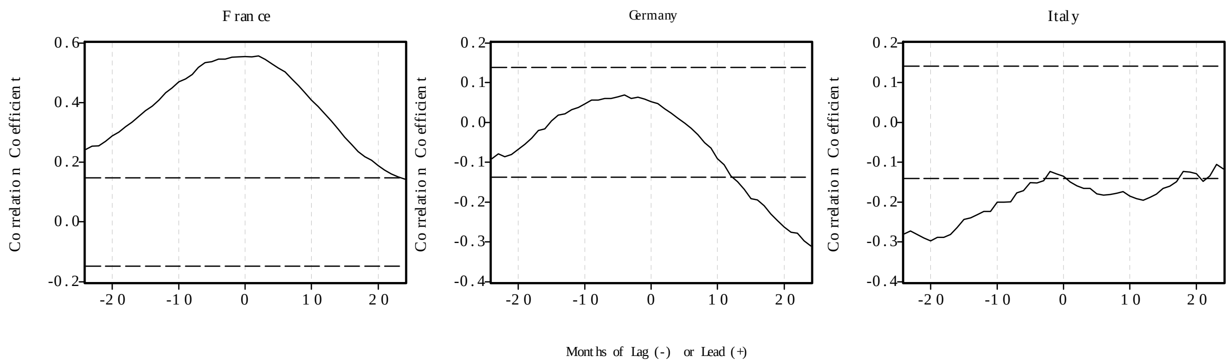
Panel 2 Industry Confidence Indicator



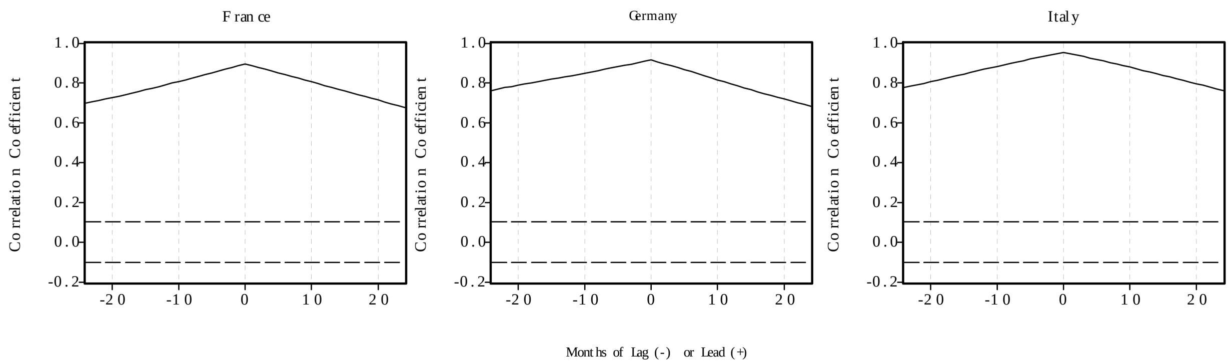
Panel 3 Consumer Confidence Indicator



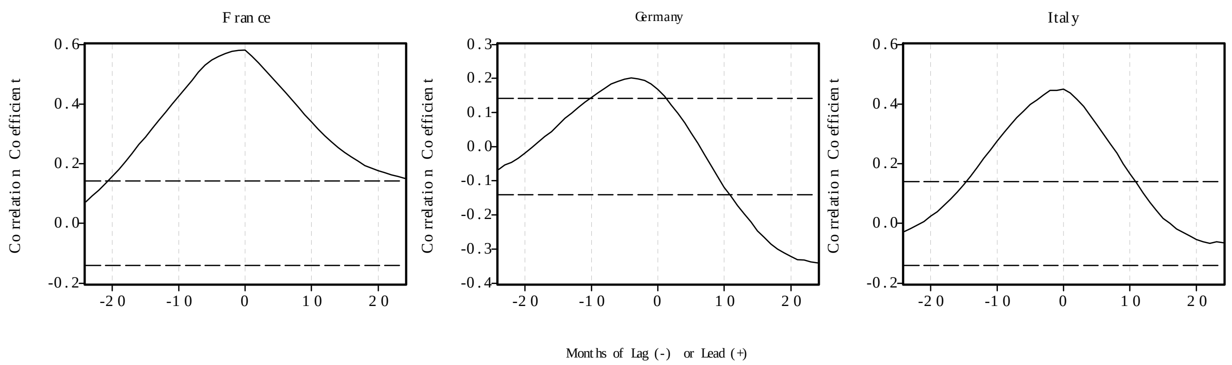
Panel 4 Retail Trade Confidence Indicator



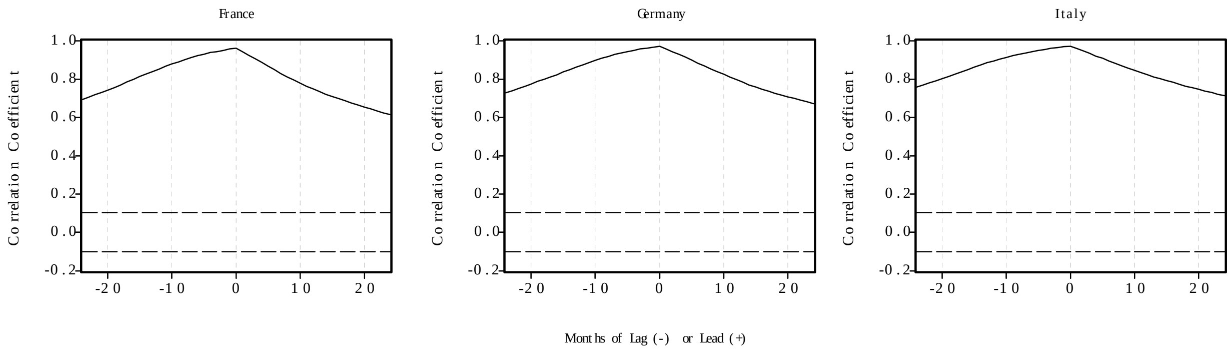
Panel 5 Consumer Price Index



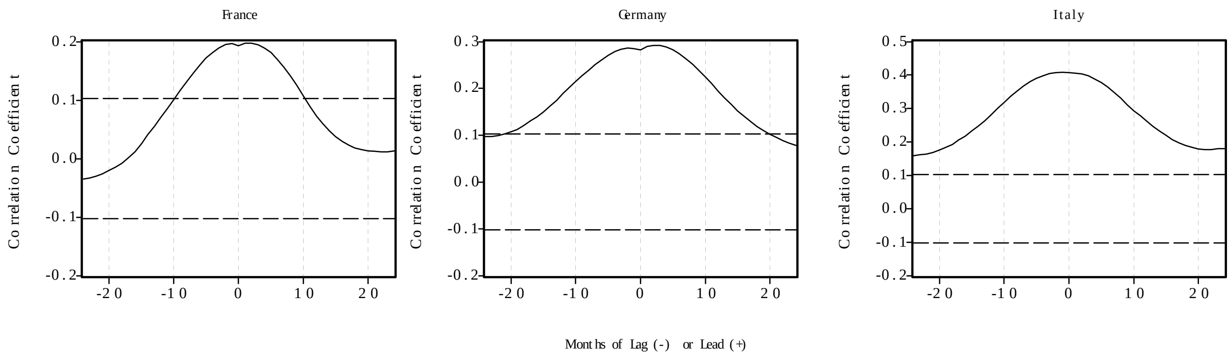
Panel 6 EC Economic Sentiment Indicator



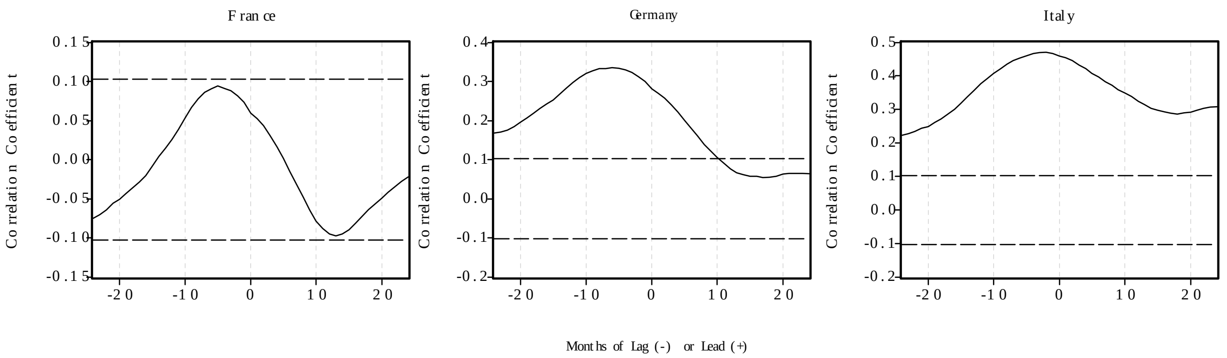
Panel 7 OECD Leading Indicator



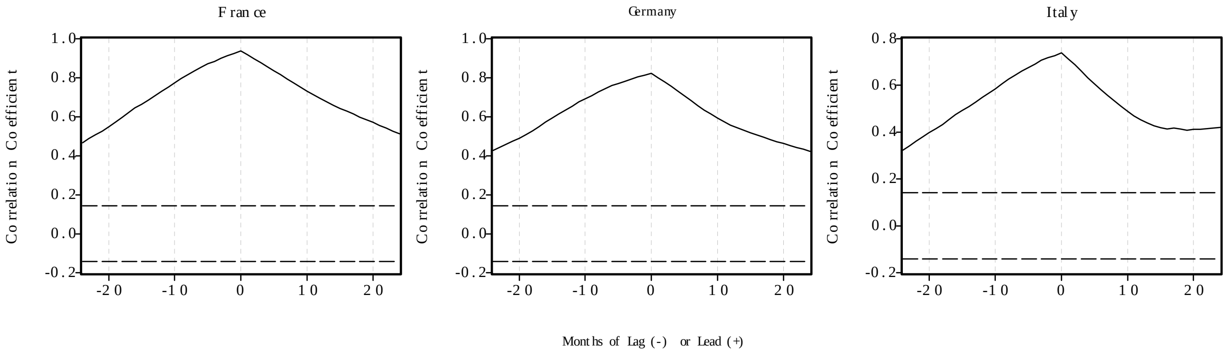
Panel 8 Assessment of the Order Book Position



Panel 9 Production Expectations



Panel 10 Share Price Index



[a] The dashed lines depict the boundaries of a five percent significance band approximated by $\pm 2/\sqrt{T}$. T is the number of observations.

Table 1: Tests for Unit Roots

	Level			First Difference			
	ADF Test	PP Test	Optimum Lag	ADF Test	PP Test	Optimum Lag	Order of Integration
IP							
France	-3.915**	-17.926	8	-5.294*	-579.352*	14	I(1)
Germany	-2.605	-20.483***	4	-10.005*	-495.359*	3	I(1)
Italy	-3.713**	-41.428*	8	-6.458*	-501.061*	7	I(1)
CPI							
France	-1.390	0.651	9	-3.050	-187.115*	8	I(1)
Germany	-2.301	-2.265	12	-3.036	-412.118*	10	I(1)
Italy	-0.436	0.946	14	-3.369***	-371.575*	15	I(1)
OL							
France	-3.393***	-16.877	15	-5.274*	-95.710*	11	I(1)
Germany	-3.377***	-23.014**	14	-5.510*	-72.822*	14	I(1)
Italy	-3.651**	-14.479	7	-5.606*	-130.526*	6	I(1)
ES							
France	-3.032	-7.851	8	-2.954	-190.605*	5	I(1)
Germany	-3.278***	-10.245	10	-3.712**	-228.937*	12	I(1)
Italy	-2.978	-11.166	8	-3.641**	-271.629*	5	I(1)
CC							
France	-3.117	-6.606	11	-3.115	-430.129*	10	I(1)
Germany	-3.621**	-16.788	14	-4.624*	-419.289*	14	I(1)
Italy	-3.212***	-53.908*	4	-9.382*	-462.261*	5	I(1)
CK							
France	-2.741	-13.143	2	-10.548*	-357.398*	2	I(1)
Germany	-3.600**	-19.697***	12	-6.769*	-334.888*	4	I(1)
Italy	-4.034*	-27.164**	11	-8.216*	-399.364*	3	I(0)
CR							
France	-3.990*	-35.145*	11	-4.484*	-190.196*	7	I(0)
Germany	-2.866	-20.671***	12	-4.013*	-248.728*	12	I(1)
Italy	-1.898	-99.060*	12	-4.722*	-199.389*	12	I(1)
SPI							
France	-2.292	-7.982	3	-7.094*	-147.406*	2	I(1)
Germany	-2.267	-8.918	3	-7.342*	-139.769*	2	I(1)
Italy	-2.109	-8.820	12	-4.262*	-209.671*	12	I(1)
OBP							
France	-4.706*	-19.260***	6				I(0)
Germany	-4.506*	-22.266**	9				I(0)
Italy	-5.956*	-28.288*	9				I(0)
PE							
France	-4.388*	-27.198**	7				I(0)
Germany	-4.796*	-34.026*	15				I(0)
Italy	-5.251*	-39.177*	9				I(0)
CI							
France	-4.533*	-25.353**	8				I(0)
Germany	-4.038*	-28.815**	14				I(0)
Italy	-6.298*	-27.127	7				I(0)

Table 2: Best Univariate Specification of Industrial Production

Independent Variable	France		Germany	Italy
Constant	0.002*	0.002*	0.002**	0.003**
	(0.0006)	(0.0006)	(0.0008)	(0.001)
D **IP(-1)**	-0.325*	-0.334*	-0.409*	-0.448*
	(0.052)	(0.049)	(0.051)	(0.051)
D **IP(-2)**	-0.013		-0.129**	-0.114**
	(0.052)		(0.051)	(0.051)
D **IP(-3)**		0.154*		
		(0.049)		
N	377	376	377	378
Adjusted R^2	0.098	0.122	0.141	0.168
F-Statistic	21.494*	27.005*	31.793*	39.091*
Q_{10}	0.000	0.089	0.746	0.107
Q_{20}	0.000	0.017	0.092	0.002

Table 3: Bivariate Granger-Causality Tests France

Table 3.1: Granger-Causal Effects of I(1) Indicator Variables on Industrial Production Growth

Constant	0.008** (0.003)	0.003** (0.001)	**Constant**	0.001 (0.001)	0.001 (0.001)	**Constant**	0.002* (0.001)	0.002* (0.001)
D **IP(-1)**	-0.343* (0.049)	-0.324* (0.047)	D **IP(-1)**	-0.388* (0.048)	-0.367* (0.046)	D **IP(-1)**	-0.441* (0.074)	-0.435* (0.071)
D **IP(-3)**	0.167* (0.049)	0.154* (0.047)	D **IP(-3)**	0.110** (0.047)	0.102** (0.045)	D **IP(-2)**	-0.171** (0.074)	-0.199* (0.071)
D **CPI(-2)**	-0.037 (0.292)	-0.101 (0.277)	D **OL(-2)**	0.568* (0.153)	0.539* (0.146)	D **ES(-1)**	0.241 (0.167)	0.270*** (0.161)
D **CPI(-4)**	**0.280** (0.311)	**0.116** (0.308)	D **OL(-3)**	-0.354** (0.164)	-0.337** (0.157)	D **ES(-2)**	0.208 (0.170)	0.174 (0.164)
D **CPI(-5)**	0.348 (0.312)	0.125 (0.310)	D **OL(-5)**	0.180 (0.125)	0.116 (0.119)	D **ES(-6)**	0.527* (0.172)	0.629* (0.168)
D **CPI(-8)**	-0.596*** (0.304)	-0.446 (0.290)	D **OL(-7)**	0.244*** (0.125)	0.230** (0.119)	D **ES(-7)**	0.197 (0.176)	0.126 (0.170)
D **CPI(-10)**	-0.736** (0.320)	-0.800* (0.304)	D **OL(-9)**	0.253** (0.116)	0.162 (0.112)	D **ES(-8)**	0.239 (0.178)	0.210 (0.171)
D **CPI(-11)**	0.653** (0.330)	0.700** (0.316)				D **ES(-11)**	-0.231 (0.168)	-0.178 (0.162)
D **CPI(-12)**	-0.225 (0.322)	-0.048 (0.308)				D **ES(-12)**	-0.183 (0.168)	-0.174 (0.161)
D **CPI(-14)**	-0.656** (0.309)	-0.690** (0.293)						
D **CPI(-17)**	0.517*** (0.301)	0.457 (0.288)						
D **CPI(-20)**	0.790* (0.283)	0.489*** (0.280)						
D_May_1973		0.046* (0.012)	**D_May_1973**		0.043* (0.011)	**D_Jan_1987**		-0.031* (0.008)
D_Sep_1974		-0.040* (0.012)	**D_Sep_1974**		-0.040* (0.011)			
D_Oct_1975		0.029* (0.011)	**D_Oct_1975**		0.027** (0.011)			
D_Jul_1982		-0.032* (0.012)	**D_Jul_1982**		-0.033* (0.011)			
N	359	359	**N**	370	370	**N**	187	187
Adjusted R^2	0.171	0.252	**Adjusted R^2**	0.206	0.285	**Adjusted R^2**	0.185	0.244
F-Statistic	7.164*	8.541*	**F-Statistic**	14.706*	14.357*	**F-Statistic**	5.692*	6.995*
Q_{10}	0.364	0.721	Q_{10}	0.149	0.323	Q_{10}	0.853	0.938
Q_{20}	0.151	0.337	Q_{20}	0.109	0.203	Q_{20}	0.982	0.995

Table 3.2: Granger-Causal Effects of I(0) Indicator Variables on Industrial Production Growth

Constant	0.004* (0.001)	0.004* (0.001)
D **IP(-1)**	-0.486* (0.052)	-0.456* (0.050)
D **IP(-2)**	-0.181* (0.052)	-0.154* (0.052)
CI(-1)	0.128* (0.022)	0.115* (0.021)
CI(-2)	-0.036 (0.035)	-0.031 (0.033)
CI(-3)	-0.082* (0.022)	-0.073* (0.021)
D_May_1973		0.035* (0.011)
D_Sep_1974		-0.041* (0.011)
D_Oct_1975		0.032* (0.011)
D_Jul_1982		-0.030* (0.011)
D_Jan_87		-0.027* (0.011)
N	377	377
Adjusted R^2	0.230	0.313
F-Statistic	23.445*	18.116*
Q_{10}	0.375	0.701
Q_{20}	0.263	0.602

Constant	0.002* (0.001)	0.002* (0.0006)
D **IP(-1)**	-0.446* (0.052)	-0.417* (0.050)
D **IP(-2)**	-0.126** (0.053)	-0.098*** (0.050)
PE(-1)	0.070* (0.011)	0.063* (0.010)
PE(-3)	-0.063* (0.015)	-0.056* (0.014)
PE(-5)	0.043** (0.019)	0.041** (0.018)
PE(-6)	-0.038** (0.019)	-0.036** (0.018)
PE(-8)	0.026*** (0.015)	0.020 (0.014)
PE(-10)	-0.026** (0.010)	-0.021** (0.010)
D_May_1973		0.040* (0.011)
D_Sept_1974		-0.040* (0.011)
D_Oct_1975		0.030* (0.011)
D_Jul_1982		-0.031* (0.011)
N	370	370
Adjusted R^2	0.223	0.299
F-Statistic	14.216*	14.127*
Q_{10}	0.148	0.364
Q_{20}	0.058	0.193

Constant	0.004* (0.001)	0.003* (0.001)
D **IP(-1)**	-0.437* (0.052)	-0.409* (0.051)
D **IP(-2)**	-0.166* (0.054)	-0.130** (0.052)
OBP(-1)	**0.075*** (0.017)	**0.066*** (0.017)
OBP(-2)	-0.036 (0.022)	-0.030 (0.021)
OBP(-4)	-0.043*** (0.022)	-0.036 (0.021)
OBP(-5)	0.031 (0.024)	0.022 (0.023)
OBP(-6)	-0.028 (0.024)	-0.020 (0.023)
OBP(-7)	0.037 (0.024)	0.039 (0.023)
OBP(-8)	-0.043** (0.022)	-0.047** (0.021)
OBP(-11)	-0.025 (0.021)	-0.023 (0.020)
OBP(-12)	0.039** (0.017)	0.036** (0.016)
D_May_1973		0.037* (0.011)
D_Sept_1974		-0.044* (0.011)
D_Oct_1975		0.030* (0.011)
N	368	368
Adjusted R^2	0.210	0.273
F-Statistic	9.895*	10.845*
Q_{10}	0.205	0.428
Q_{20}	0.142	0.426

Table 4: Bivariate Granger-Causality Tests Germany

Table 4.1: Granger-Causal Effects of I(1) Indicator Variables on Industrial Production Growth

Constant	0.005* (0.002)	0.006* (0.001)	**Constant**	0.001 (0.001)	0.0008 (0.0007)	**Constant**	0.003* (0.001)	**Constant**	0.002** (0.001)	0.002** (0.001)
D **IP(-1)**	-0.433* (0.051)	-0.426* (0.048)	D **IP(-1)**	-0.535* (0.051)	-0.525* (0.048)	D **IP(-1)**	-0.490* (0.070)	D **IP(-1)**	-0.430* (0.053)	-0.425* (0.050)
D **IP(-2)**	-0.147* (0.051)	-0.152* (0.049)	D **IP(-2)**	-0.251* (0.050)	-0.253* (0.047)	D **IP(-2)**	-0.242* (0.070)	D **IP(-2)**	-0.149* (0.054)	-0.153* (0.051)
D **CPI(-1)**	-0.626** (0.349)	-0.701** (0.331)	D **OL(-1)**	0.477** (0.211)	0.466** (0.198)	D **ES(-1)**	0.803* (0.245)	D **CK(-2)**	0.119* (0.039)	0.112* (0.036)
D **CPI(-3)**	0.606*** (0.349)	0.561*** (0.331)	D **OL(-2)**	0.514** (0.223)	0.421** (0.211)	D **ES(-2)**	0.768* (0.242)	D **CK(-5)**	-0.065*** (0.038)	-0.047 (0.036)
D **CPI(-5)**	0.487 (0.348)	0.346 (0.330)	D **OL(-5)**	0.239 (0.182)	0.292*** (0.171)			D **CK(-6)**	0.054 (0.038)	0.059*** (0.036)
D **CPI(-9)**	-0.460 (0.358)	-0.463*** (0.340)	D **OL(-7)**	-0.524** (0.248)	-0.553** (0.233)					
D **CPI(-10)**	-1.162* (0.360)	-0.905* (0.343)	D **OL(-8)**	0.392 (0.271)	0.487*** (0.255)					
			D **OL(-9)**	0.369*** (0.213)	0.336*** (0.201)					
D_June_1984		-0.096* (0.015)	**D_June_1984**		-0.096* (0.014)			**D_June_1984**		-0.098* (0.015)
N	369	369	**N**	370	370	**N**	197	**N**	337	337
Adjusted R^2	0.183	0.266	**Adjusted R^2**	0.275	0.359	**Adjusted R^2**	0.226	**Adjusted R^2**	0.178	0.273
F-Statistic	12.748*	17.652*	**F-Statistic**	18.488*	23.938*	**F-Statistic**	15.305*	**F-Statistic**	15.549*	22.063*
Q_{10}	0.837	0.365	**Q_{10}**	0.372	0.393	**Q_{10}**	0.401	**Q_{10}**	0.438	0.056
Q_{20}	0.042	0.010	**Q_{20}**	0.077	0.141	**Q_{20}**	0.142	**Q_{20}**	0.035	0.007

Table 4.2: Granger-Causal Effects of I(0) Indicator Variables on Industrial Production Growth

Constant	0.004*	0.005*	**Constant**	0.003*	0.003*	**Constant**	0.004*	0.004*
	(0.001)	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)
D **IP(-1)**	-0.502*	-0.498*	D **IP(-1)**	-0.506*	-0.503*	D **IP(-1)**	-0.470*	-0.467*
	(0.051)	(0.048)		(0.051)	(0.048)		(0.051)	(0.048)
D **IP(-2)**	-0.226*	-0.231*	D **IP(-2)**	-0.220*	-0.227*	D **IP(-2)**	-0.206*	-0.213*
	(0.05)	(0.048)		(0.051)	(0.048)		(0.052)	(0.049)
CI(-1)	0.151*	0.148*	**PE(-1)**	0.102*	0.101*	**OBP(-1)**	0.091*	0.090*
	(0.023)	(0.022)		(0.017)	(0.016)		(0.018)	(0.017)
CI(-3)	-0.136*	-0.132*	**PE(-3)**	-0.071*	-0.069*	**OBP(-3)**	-0.086*	-0.085*
	(0.022)	(0.022)		(0.016)	(0.015)		(0.017)	(0.016)
D_June_1984		-0.098*	**D_June_1984**		-0.010*	**D_June_1984**		-0.010*
		(0.014)			(0.014)			(0.014)
N	377	377	**N**	377	377	**N**	377	377
Adjusted R^2	0.227	0.315	**Adjusted R^2**	0.226	0.318	**Adjusted R^2**	0.193	0.284
F-Statistic	28.634*	35.633*	**F-Statistic**	28.493*	35.985*	**F-Statistic**	23.534*	30.879*
Q_{10}	0.689	0.693	**Q_{10}**	0.786	0.740	**Q_{10}**	0.904	0.893
Q_{20}	0.086	0.120	**Q_{20}**	0.039	0.054	**Q_{20}**	0.281	0.392

Table 5: Bivariate Granger-Causality Tests Italy

Table 5.1: Granger-Causal Effects of I(1) Indicator Variables on Industrial Production Growth

Constant	0.005** (0.002)	0.005** (0.002)
D **IP(-1)**	-0.467* (0.051)	-0.450* (0.049)
D **IP(-2)**	-0.131** (0.051)	-0.151** (0.049)
D **CPI(-1)**	0.818* (0.291)	0.746* (0.277)
D **CPI(-4)**	-0.660** (0.301)	-0.695** (0.286)
D **CPI(-5)**	-0.428 (0.299)	-0.383 (0.284)
D_Jan_73		0.113* (0.021)
D_Aug_79		0.075* (0.021)
N	375	375
Adjusted R^2	0.190	0.268
F-Statistic	18.525*	20.564*
Q_{10}	0.343	0.306
Q_{20}	0.047	0.007

Constant	0.001 (0.001)	5.63E-05 (0.001)
D **IP(-1)**	-0.516* (0.051)	-0.513* (0.048)
D **IP(-2)**	-0.185* (0.051)	-0.204* (0.047)
D **OL(-2)**	0.217 (0.158)	0.171 (0.148)
D **OL(-4)**	0.264 (0.200)	0.277 (0.186)
D **OL(-5)**	0.311 (0.201)	0.291 (0.188)
D **OL(-7)**	0.090 (0.160)	0.013 (0.150)
D **OL(-10)**	0.499* (0.146)	0.411* (0.136)
D_Jan_1973		0.103* (0.020)
D_Apr_1973		0.068* (0.020)
D_May_1976		0.072* (0.020)
D_Aug_1979		0.071* (0.020)
N	370	370
Adjusted R^2	0.235	0.343
F-Statistic	17.212*	18.479*
Q_{10}	0.055	0.198
Q_{20}	0.041	0.061

Constant	0.002** (0.001)
D **IP(-1)**	-0.540* (0.069)
D **IP(-2)**	-0.227* (0.067)
D **ES(-2)**	1.033* (0.251)
D **ES(-3)**	0.768* (0.260)
D **ES(-5)**	0.349 (0.252)
N	195
Adjusted R^2	0.290
F-Statistic	16.867*
Q_{10}	0.437
Q_{20}	0.477

Constant	0.002** (0.001)	0.003** (0.001)
D **IP(-1)**	-0.477* (0.074)	-0.454* (0.073)
D **IP(-2)**	-0.152** (0.073)	-0.146** (0.072)
D **CR(-1)**	0.016 (0.012)	0.016 (0.011)
D **CR(-2)**	0.037* (0.012)	0.039* (0.012)
D **CR(-3)**	0.020*** (0.012)	0.023*** (0.012)
D **CR(-5)**	0.013 (0.011)	0.012 (0.011)
D **CR(-8)**	-0.019*** (0.011)	-0.019*** (0.011)
D **CR(-10)**	0.015 (0.011)	0.016 (0.010)
D_Jan_1987		-0.039* (0.014)
N	180	180
Adjusted R^2	0.232	0.264
F-Statistic	7.776*	8.123*
Q_{10}	0.515	0.299
Q_{20}	0.421	0.407

Constant	0.002** (0.001)	0.002** (0.001)
D **IP(-1)**	-0.497* (0.069)	-0.475* (0.068)
D **IP(-2)**	-0.198* (0.069)	-0.192* (0.068)
D **SPI(-3)**	0.069* (0.017)	0.070* (0.017)
D **SPI(-6)**	-0.015 (0.017)	-0.016 (0.016)
D_Jan_1987		-0.037* (0.014)
N	194	194
Adjusted R^2	0.248	0.273
F-Statistic	16.944*	15.513*
Q_{10}	0.564	0.446
Q_{20}	0.151	0.196

Table 5.2: Granger-Causal Effects of I(0) Indicator Variables on Industrial Production Growth

Constant	0.004* (0.001)	0.003** (0.001)	**Constant**	0.002** (0.001)	0.002 (0.001)	**Constant**	0.003** (0.002)	0.002** (0.001)
D **IP(-1)**	-0.570* (0.051)	-0.559* (0.048)	D **IP(-1)**	-0.551* (0.051)	-0.553* (0.048)	D **IP(-1)**	-0.521* (-0.051)	-0.517* (-0.048)
D **IP(-2)**	-0.229* (0.051)	-0.247* (0.048)	D **IP(-2)**	-0.213* (0.051)	-0.238* (0.047)	D **IP(-2)**	-0.193* (0.051)	-0.212* (0.048)
CI(-1)	0.143* (0.037)	0.086** (0.035)	**PE(-1)**	0.089* (0.017)	0.081* (0.016)	**OBP(-1)**	0.069* (0.012)	0.059* (0.012)
CI(-2)	-0.042 (0.047)	0.019 (0.045)	**PE(-3)**	-0.018 (0.022)	-0.007 (0.021)	**OBP(-4)**	-0.067* (0.012)	-0.058* (0.012)
CI(-4)	-0.053 (0.047)	-0.057 (0.044)	**PE(-5)**	-0.040*** (0.022)	-0.054* (0.021)			
CI(-5)	-0.040 (0.036)	-0.042 (0.034)	**PE(-7)**	-0.020 (0.016)	-0.010 (0.015)			
D_Jan_1973		0.106* (0.020)	**D_Jan_1973**		0.107* (0.020)	**D_Jan_1973**		0.107* (0.020)
D_Apr_1973		0.073* (0.020)	**D_Apr_1973**		0.074* (0.020)	**D_Apr_1973**		0.080* (0.020)
D_May_1976		0.065* (0.020)	**D_May_1976**		0.080* (0.020)	**D_May_1976**		0.056* (0.020)
D_Aug_1979		0.063* (0.0.20)	**D_Aug_1979**		0.066* (0.020)	**D_Aug_1979**		0.067* (0.020)
N	376	376	**N**	374	374	**N**	377	377
Adjusted R^2	0.264	0.363	**Adjusted R^2**	0.252	0.368	**Adjusted R^2**	0.230	0.335
F-Statistic	23.365*	22.340*	**F-Statistic**	21.935*	22.723*	**F-Statistic**	29.056*	24.672*
Q_{10}	0.003	0.060 [A]	**Q_{10}**	0.010	0.142	**Q_{10}**	0.008	0.034[A]
Q_{20}	0.002	0.015	**Q_{20}**	0.029	0.191	**Q_{20}**	0.001	0.003

[A] Residuals appear to be white noise up to lag six.

Table 6: Error Correction Estimations

Table 6.1: Industrial Production and CPI

Independent Variable	France		Germany		Italy	
IP(-1)[a]	-0.037 (0.020)	-0.034 (0.019)	-0.053 (0.021)	-0.056 (0.020)	-0.047 (0.021)	-0.045 (0.020)
Constant	0.195** (0.088)	0.171** (0.085)	0.351* (0.123)	0.347** (0.117)	0.183** (0.075)	0.175** (0.071)
CPI(-1)	-0.009** (0.004)	-0.006*** (0.004)	-0.031** (0.016)	0.026*** (0.015)	0.007 (0.005)	0.008*** (0.005)
D IP(-1)	-0.342* (0.049)	-0.320* (0.047)	-0.411* (0.053)	-0.401* (0.050)	-0.441* (0.053)	-0.423* (0.051)
D IP(-2)			-0.137* (0.052)	-0.139* (0.049)	-0.118** (0.051)	-0.136** (0.049)
D IP(-3)	0.162* (0.049)	0.152* (0.047)				
D CPI(-1)			-0.715** (0.363)	-0.772** (0.343)	0.764** (0.298)	0.727** (0.284)
D CPI(-2)	-0.103 (0.303)	-0.109 (0.290)				
D CPI(-3)			0.454 (0.364)	0.422 (0.344)		
D CPI(-4)	-0.272 (0.314)	0.119 (0.315)	0.394 (0.371)	0.404 (0.351)	-0.705** (0.302)	-0.719** (0.287)
D CPI(-5)	0.281 (0.309)	0.122 (0.306)	0.365 (0.359)	0.225 (0.340)	-0.522*** (0.300)	-0.454 (0.286)
D CPI(-8)	-0.627** (0.302)	-0.465 (0.290)				
D CPI(-9)			-0.524 (0.361)	-0.538 (0.341)		
D CPI(-10)	-0.789** (0.314)	-0.824* (0.301)	-1.257* (0.364)	-1.013* (0.346)		
D CPI(-11)	0.539*** (0.318)	0.639** (0.306)	0.365 (0.359)	0.225 (0.340)		
D CPI(-14)	-0.726** (0.302)	-0.733** (0.289)				
D CPI(-17)	0.462 (0.298)	0.424 (0.287)	-0.524 (0.361)	-0.538 (0.341)		
D CPI(-20)	0.775* (0.286)	0.484*** (0.284)	-1.257* (0.364)	-1.013* (0.346)		
Trend	6.94E-05*** (3.76E-05)	5.85E-05 (3.64E-05)	0.0001** (5.60E-05)	0.0001** (5.29E-05)		
Dummy 1		[I]0.043* (0.012)		[V]-0.096* (0.015)		[VI]0.110* (0.021)
Dummy 2		[II]-0.039* (0.012)				[VII]0.074* (0.021)
Dummy 3		[III]0.025** (0.011)				
Dummy 4		[IV]-0.030* (0.011)				
Long-Run Coefficients (Bewley Transformation)						
CPI(-1)	-0.238*** (0.141)	-0.189 (0.132)	-0.588*** (0.314)	-0.451*** (0.258)	0.158* (0.043)	0.174* (0.038)
N	359	359	369	369	375	375
Adjusted R^2	0.195	0.265	0.199	0.284	0.202	0.277
F-Statistic	7.179	8.162*	9.312*	13.163*	14.553*	16.942*
Q_{10}	0.428	0.719	0.795	0.256	0.337	0.329
Q_{20}	0.167	0.350	0.039	0.006	0.058	0.011

Note: [a] Banerjee t-statistic.
Dummy Variables: May 1973; [II] Sept. 1974; [III] Oct. 1975; [IV] July 1982; [V] June 1984; [VI] Jan. 1973; [VII] Aug. 1979.

Table 6.2: Industrial Production and OECD Leading Indicator

Independent Variable	France		Germany		Italy	
IP(-1)[a]	-0.066^{+++}	-0.055	-0.131^{+}	-0.142^{+}	-0.254^{+}	-0.222^{+}
	(0.022)	(0.021)	(0.030)	(0.028)	(0.037)	(0.036)
Constant	0.003*	0.001	0.008	0.016	0.048***	0.031***
	(0.022)	(0.021)	(0.025)	(0.027)	(0.026)	(0.026)
OL(-1)	0.066*	0.055*	0.129*	0.139*	0.244*	0.215*
	(0.020)	(0.020)	(0.029)	(0.027)	(0.035)	(0.035)
D **IP(-1)**	-0.359*	-0.342*	-0.445*	-0.429*	-0.351*	-0.353*
	(0.048)	(0.046)	(0.052)	(0.048)	(0.053)	(0.051)
D **IP(-2)**			-0.200*	-0.199*	-0.099**	-0.122**
			(0.050)	(0.046)	(0.049)	(0.048)
D **IP(-3)**	0.115**	0.110**				
	(0.047)	(0.045)				
D **OL(-1)**					-0.324**	-0.225**
					(0.162)	(0.157)
D **OL(-2)**	0.454*	0.443*	0.695*	0.565*		
	(0.158)	(0.150)	(0.179)	(0.168)		
D **OL(-3)**	-0.403**	-0.386**			-0.337***	-0.352***
	(0.163)	(0.155)			(0.200)	(0.193)
D **OL(-4)**			-0.389	-0.392***	0.182	0.236
			(0.247)	(0.230)	(0.198)	(0.191)
D **OL(-5)**	0.071	0.042	0.338	0.384***		
	(0.129)	(0.122)	(0.248)	(0.231)		
D **OL(-6)**					-0.324***	-0.304***
					(0.168)	(0.162)
D **OL(-7)**	0.163	0.214***	-0.619**	-0.652*		
	(0.126)	(0.121)	(0.246)	(0.230)		
D **OL(-8)**			0.483**	0.541*		
			(0.215)	(0.201)		
D **OL(-9)**	0.171	0.122				
	(0.117)	(0.112)				
Dummy 1		[I]0.043*		[VI]-0.100*		[VII]0.098*
		(0.011)		(0.013)		(0.020)
Dummy 2		[II]-0.035*				[VIII]0.054*
		(0.012)				(0.020)
Dummy 3		[III]0.026**				
		(0.011)				
Dummy 4		[VI]-0.030*				
		(0.011)				
Dummy 5		[V]-0.031*				
		(0.011)				
Long-Run Coefficients (Bewley Transformation)						
OL(-1)	0.993*	1.009*	0.991*	0.978*	0.961*	0.957*
	(0.072)	(0.085)	(0.042)	(0.035)	(0.022)	(0.014)
N	370	370	371	371	374	374
Adjusted R^2	0.225	0.308	0.299	0.390	0.293	0.344
F-Statistic	12.923*	12.733*	18.528*	24.661*	20.341*	20.558*
Q_{10}	0.236	0.554	0.582	0.378	0.285	0.297
Q_{20}	0.193	0.295	0.133	0.136	0.081	0.018

Note: [a] Banerjee t-statistic.
Dummy Variables: [I] May 1973; [II] Sept. 1974; [III] Oct. 1975; [IV] July 1982; [V] Jan. 1987¸ [VI] June 1984; [VII] Jan. 1973; [VIII] Aug. 1979.

Table 6.3: Industrial Production and EC Economic Sentiment Indicator

Independent Variable	France		Germany	Italy	
IP(-1)[a]	-0.120 (0.039)	-0.119 (0.038)	-0.098 (0.036)	-0.158 (0.055)	-0.176 (0.054)
Constant	-0.278** (0.138)	-0.259*** (0.133)	-0.541* (0.200)	-0.420 (0.352)	-0.508 (0.343)
ES(-1)	0.171* (0.056)	0.166* (0.054)	0.207* (0.066)	0.236** (0.112)	0.272** (0.109)
D IP(-1)	-0.369* (0.074)	-0.368* (0.071)	-0.451* (0.072)	-0.452* (0.075)	-0.418* (0.073)
D IP(-2)	-0.138*** (0.073)	-0.168** (0.070)	-0.236* (0.070)	-0.193* (0.067)	-0.184* (0.065)
D ES(-1)	0.186 (0.170)	0.192 (0.164)	0.621** (0.252)		
D ES(-2)			0.578** (0.247)	0.839* (0.257)	0.834* (0.250)
D ES(-3)				0.609** (0.264)	0.627** (0.257)
D ES(-4)	-0.128 (0.169)	-0.106 (0.162)			
D ES(-5)				0.281 (0.255)	0.245 (0.248)
D ES(-6)	0.443** (0.172)	0.538** (0.167)			
D ES(-8)	0.191 (0.178)	0.152 (0.171)			
D ES(-11)	-0.311*** (0.170)	-0.266 (0.163)			
D ES(-12)	-0.304*** (0.169)	-0.290*** (0.163)			
Trend	0.0002* (5.01E-05)	0.0002* (4.82E-05)	0.0002* (5.15E-05)	0.0002* (7.50E-05)	0.0002* (7.31E-05)
D_Jan_1987		-0.032* (0.008)			0.0044* (0.013)
Long-Run Coefficients (Bewley Transformation)					
ES(-1)	1.427* (0.237)	1.399* (0.228)	2.119* (0.447)	1.497* (0.414)	1.545* (0.358)
N	187	187	197	195	195
Adjusted R^2	0.211	0.272	0.254	0.313	0.350
F-Statistic	5.533*	6.799*	10.547*	12.038*	20.558*
Q_{10}	0.898	0.954	0.490	0.746	0.568
Q_{20}	0.987	0.996	0.097	0.726	0.734

Note: [a] Banerjee t-statistic.

Table 6.4: Error Correction Model Germany

IP(-1)[a]	-0.076^{+++} (0.022)	-0.084^{++} (0.020)
Constant	0.328* (0.093)	0.360* (0.087)
CK(-1)	0.039* (0.010)	0.038* (0.009)
D **IP(-1)**	-0.427* (0.054)	-0.416* (0.050)
D **IP(-2)**	-0.165* (0.054)	-0.166* (0.050)
D **CK(-1)**		
D **CK(-2)**	0.096** (0.039)	0.087** (0.036)
D **CK(-3)**		
D **CK(-4)**		
D **CK(-5)**	-0.103* (0.038)	-0.085** (0.036)
Trend	0.0001* (2.85E-05)	0.0001* (2.67E-05)
D_June_1984		-0.099* (0.014)
Long-Run Coefficients (Bewley Transformation)		
CK(-1)	0.507* (0.148)	0.457* (0.120)
N	338	338
Adjusted R^2	0.216	0.313
F-Statistic	14.282*	20.173*
Q_{10}	0.741	0.286
Q_{20}	0.038	0.012

Note: [a] Banerjee t-statistic.

Table 6.5: Error Correction Model Italy

IP(-1)[a]	-0.025 (0.014)	-0.027 (0.014)	**IP(-1)**[a]	-0.036 (0.017)	-0.045 (0.017)
Constant	0.116*** (0.065)	0.126** (0.063)	**Constant**	0.140** (0.068)	0.176** (0.067)
CR(-1)	-0.013 (0.010)	-0.011 (0.009)	**SPI(-1)**	0.005*** (0.003)	0.007** (0.003)
D **IP(-1)**	-0.470* (0.073)	-0.452* (0.071)	D **IP(-1)**	-0.492* (0.069)	-0.464* (0.067)
D **IP(-2)**	-0.148** (0.073)	-0.156** (0.070)	D **IP(-2)**	-0.204* (0.068)	-0.198* (0.067)
D **CR(-1)**	0.026*** (0.014)	0.022*** (0.013)	D **SPI(-3)**	0.062* (0.017)	0.061* (0.017)
D **CR(-2)**	0.044* (0.013)	0.044* (0.012)	D **SPI(-6)**	-0.023 (0.017)	-0.026 (0.017)
D **CR(-3)**	0.025** (0.012)	0.027** (0.012)			
D **CR(-5)**	0.014 (0.011)	0.012 (0.010)			
D **CR(-8)**	-0.018*** (0.011)	-0.019*** (0.010)			
D **CR(-10)**	0.016 (0.011)	0.015 (0.010)			
D_Jan_1987		-0.042* (0.013)	**D_Jan_1987**		-0.043* (0.014)
D_Dec_1998		-0.039* (0.013)			
Long-Run Coefficients (Bewley Transformation)					
CR(-1)	-0.548 (0.446)	-0.412 (0.364)	**SPI(-1)**	0.147** (0.060)	0.146* (0.047)
N	180	180	**N**	193	193
Adjusted R^2	0.242	0.310	**Adjusted R^2**	0.258	0.293
F-Statistic	6.713*	7.688*	**F-Statistic**	12.099*	12.342
Q_{10}	0.499	0.136	**Q_{10}**	0.648	0.634
Q_{20}	0.489	0.343	**Q_{20}**	0.144	0.214

Note: [a] Banerjee t-statistic.

Table 7: Multivariate Granger-Causality Tests
Table 7.1: EC Economic Sentiment and other First-Difference Indicators

Independent Variable	France	Germany	Italy	Independent Variable	France	Germany	Italy
Constant	0.001 (0.001)	0.003*** (0.001)	0.002 (0.002)	**Constant**	0.002 (0.001)	0.003*** (0.001)	0.003 (0.002)
D **IP(-1)**	-0.410* (0.074)	-0.541* (0.070)	-0.578* (0.073)	D **IP(-1)**	-0.408* (0.071)	-0.483* (0.067)	-0.560* (0.068)
D **IP(-2)**	-0.169** (0.073)	-0.272* (0.070)	-0.248* (0.067)	D **IP(-2)**	-0.201** (0.071)	-0.232* (0.067)	-0.252* (0.064)
D **CPI(-1)**		-0.460 (0.400)	-0.516 (0.657)	D **CPI(-1)**		-0.278 (0.380)	-0.507 (0.631)
D **CPI(-2)**	0.104 (0.387)			D **CPI(-2)**	0.162 (0.373)		
D **CPI(-3)**	0.303 (0.387)	0.481 (0.397)	1.205*** (0.644)	D **CPI(-3)**	0.301 (0.372)	0.311 (0.381)	0.990 (0.619)
D **CPI(-4)**		0.490 (0.398)	0.917 (0.646)	D **CPI(-4)**		0.406 (0.376)	0.825 (0.619)
D **CPI(-6)**	0.313 (0.381)	-0.276 (0.403)	-0.670 (0.635)	D **CPI(-6)**	0.299 (0.366)	-0.252 (0.381)	-0.711 (0.607)
D **CPI(-7)**			-0.789 (0.606)	D **CPI(-7)**			-0.727 (0.607)
D **CPI(-9)**	0.367 (0.390)	-0.292 (0.394)		D **CPI(-9)**	0.231 (0.376)	-0.287 (0.371)	
D **CPI(-10)**	-0.776** (0.386)	-0.563 (0.400)		D **CPI(-10)**	-0.744** (0.371)	-0.585 (0.377)	
D **OL(-1)**		0.422*** (0.228)		D **OL(-1)**		0.443** (0.216)	
D **OL(-2)**	0.232 (0.184)		0.407** (0.187)	D **OL(-2)**	0.230 (0.177)		0.426** (0.179)
D **OL(-3)**	-0.343 (0.219)	-0.215 (0.297)		D **OL(-3)**	-0.347 (0.211)	-0.262 (0.281)	
D **OL(-4)**	0.201 (0.171)			D **OL(-4)**	0.206 (0.164)		
D **OL(-5)**		0.484** (0.228)	-0.245 (0.200)	D **OL(-5)**		0.487** (0.215)	-0.281 (0.192)
D **OL(-7)**	0.165 (0.151)			D **OL(-7)**	0.160 (0.145)		
D **ES(-1)**	0.260 (0.179)	0.414 (0.279)		D **ES(-1)**	0.278 (0.173)	0.410 (0.264)	
D **ES(-2)**	0.150 (0.189)	0.531*** (0.276)	0.958* (0.288)	D **ES(-2)**	0.125 (0.182)	0.535** (0.261)	0.915* (0.276)
D **ES(-3)**			0.897* (0.287)	D **ES(-3)**			0.897* (0.275)
D **ES(-5)**			0.398 (0.270)	D **ES(-5)**			0.433*** (0.259)
D **ES(-6)**	0.382** (0.170)			D **ES(-6)**	0.493* (0.166)		
D **ES(-7)**	0.177 (0.176)			D **ES(-7)**	0.117 (0.170)		
				Dummy 1	^{I}-0.032* (0.008)	^{II}-0.038* (0.012)	^{I}-0.036* (0.013)
				Dummy 2		^{III}0.033* (0.012)	^{V}-0.042* (0.013)
				Dummy 3		^{IV}0.033* (0.012)	
N	192	197	195	**N**	192	197	195
Adjusted R^2	0.187	0.263	0.311	**Adjusted R^2**	0.248	0.349	0.369
F-Statistic	3.934*	6.390*	8.298*	**F-Statistic**	4.934*	7.572*	9.120*
Q_{10}	0.812	0.364	0.514	**Q_{10}**	0.982	0.546	0.426
Q_{20}	0.970	0.225	0.604	**Q_{20}**	0.998	0.169	0.636

Dummy Explanation: ^{I} Jan. 1987; ^{II} May 1989; ^{III} Jan. 1991; ^{IV} Aug. 1993; ^{V} Dec. 1998.

Table 7.2: Indicators in Level Form

-Order Book Position and Production Expectation-

Independent Variable	France	Germany	Italy
Constant	-0.001 (0.002)	0.001 (0.002)	0.010*** (0.005)
D IP(-1)	-0.482* (0.052)	-0.513* (0.051)	-0.562* (0.051)
D IP(-2)	-0.175* (0.053)	-0.235* (0.052)	-0.226* (0.052)
OBP(-1)	0.045* (0.015)	0.025 (0.029)	0.060** (0.027)
OBP(-2)			-0.030 (0.033)
OBP(-3)	-0.025 (0.022)	-0.033 (0.026)	0.038 (0.033)
OBP(-4)	-0.021 (0.022)		-0.045*** (0.025)
OBP(-7)	0.023 (0.021)		
OBP(-8)	-0.061* (0.020)		
OBP(-12)	0.027* (0.008)		
PE(-1)	0.044* (0.013)	0.087* (0.022)	0.064* (0.019)
PE(-3)	-0.058* (0.016)	-0.030 (0.032)	-0.031 (0.023)
PE(-4)		-0.038 (0.028)	
PE(-5)	0.047** (0.019)		-0.049** (0.023)
PE(-6)	-0.028 (0.019)		
PE(-7)			-0.010 (0.021)
PE(-8)	0.047* (0.016)	0.019 (0.015)	
PE(-10)	-0.015 (0.012)		
N	368	372	374
Adjusted R^2	0.268	0.227	0.264
F-Statistic	10.584*	14.623*	14.352*
Q_{10}	0.190	0.594	0.002
Q_{20}	0.115	0.027	0.006

Independent Variable	France	Germany	Italy
Constant	-0.0005 (0.002)	0.001 (0.002)	0.090 (0.005)
D IP(-1)	-0.447* (0.050)	-0.512* (0.047)	-0.529* (0.049)
D IP(-2)	-0.142* (0.051)	-0.238* (0.047)	-0.218* (0.049)
OBP(-1)	0.036** (0.015)	0.021 (0.027)	0.028** (0.026)
OBP(-2)			-0.029 (0.031)
OBP(-3)	-0.017 (0.021)	-0.028 (0.024)	0.068** (0.031)
OBP(-4)	-0.019 (0.021)		-0.046*** (0.024)
OBP(-7)	0.028 (0.020)		
OBP(-8)	-0.058* (0.020)		
OBP(-12)	0.021* (0.008)		
PE(-1)	0.043* (0.013)	0.082* (0.020)	0.068* (0.018)
PE(-3)	-0.053* (0.015)	-0.029 (0.030)	-0.032 (0.022)
PE(-4)		-0.029 (0.026)	
PE(-5)	0.043** (0.018)		-0.045** (0.022)
PE(-6)	-0.030*** (0.018)		
PE(-7)			-0.012 (0.020)
PE(-8)	0.037** (0.015)	0.015 (0.013)	
PE(-10)	-0.010 (0.012)		
Dummy 1	[I] 0.036* (0.011)	[V] -0.041* (0.014)	[VIII] -0.041** (0.020)
Dummy 2	[II] -0.036* (0.011)	[VI] -0.046* (0.014)	[IX] 0.107* (0.020)
Dummy 3	[III] 0.028** (0.011)	[VII] 0.099* (0.014)	[X] -0.045** (0.020)
Dummy 4	[IV] -0.027** (0.011)		[XI] 0.075* (0.021)
Dummy 5			[XII] 0.066* (0.020)
N	368	372	366
Adjusted R^2	0.327	0.350	0.362
F-Statistic	10.886*	19.201*	14.822*
Q_{10}	0.387	0.382	0.060
Q_{20}	0.240	0.046	0.054

Dummy Explanation: [I] May 1973; [II] Sept. 1974; [III] Oct. 1975 ; [IV] July 1982; [V] July 1973; [VI] Dec. 1974; [VII] June 1984; [VIII] Feb. 1971;[IV] Jan. 1973; [X] Feb. 1974; [XI] May 1976; [XII] Aug. 1979.

Table 7.3: Indicators in Level Form

-Industry Confidence, Order Book Position and Production Expectation-

Independent Variable	France	Germany	Italy	Independent Variable	France	Germany	Italy
Constant	-0.001 (0.002)	0.001 (0.002)	0.008*** (0.005)	**Constant**	-0.0003 (0.002)	0.001 (0.002)	0.006 (0.004)
D **IP(-1)**	-0.502* (0.053)	-0.516* (0.051)	-0.576* (0.051)	D **IP(-1)**	-0.468* (0.051)	-0.501* (0.048)	-0.562* (0.048)
D **IP(-2)**	-0.190* (0.053)	-0.232* (0.051)	-0.240* (0.051)	D **IP(-2)**	-0.157* (0.051)	-0.237* (0.048)	-0.254* (0.048)
CI(-1)	0.063 (0.043)	0.220* (0.054)	0.155* (0.033)	**CI(-1)**	0.064 (0.041)	0.215* (0.051)	0.102* (0.031)
CI(-3)		-0.227* (0.073)	-0.080*** (0.047)	**CI(-3)**		-0.208* (0.068)	-0.066 (0.044)
CI(-4)	-0.081** (0.038)			**CI(-4)**	-0.077** (0.036)		
OBP(-1)	0.017 (0.025)	-0.065 (0.046)		**OBP(-1)**	0.008 (0.024)	-0.067 (0.044)	
OBP(-2)			-0.043 (0.030)	**OBP(-2)**			-0.034 (0.028)
OBP(-3)	-0.025 (0.022)	0.063 (0.045)	0.063*** (0.038)	**OBP(-3)**	-0.017 (0.021)	0.056 (0.042)	0.066*** (0.036)
OBP(-4)	-0.020 (0.029)		-0.040*** (0.024)	**OBP(-4)**	-0.020 (0.028)		-0.037*** (0.022)
OBP(-7)	0.019 (0.021)			**OBP(-7)**	0.023 (0.020)		
OBP(-8)	-0.058* (0.020)			**OBP(-8)**	-0.055* (0.020)		
OBP(-12)	0.025* (0.008)			**OBP(-12)**	0.020* (0.008)		
PE(-1)	0.019 (0.020)			**PE(-1)**	0.017 (0.019)		
PE(-2)			0.013 (0.021)				0.037*** (0.020)
PE(-3)	-0.046* (0.017)	0.050 (0.034)		**PE(-3)**	-0.042* (0.016)	0.040 (0.032)	
PE(-4)		-0.036 (0.028)		**PE(-4)**		-0.026 (0.027)	
PE(-5)	0.061* (0.020)		-0.051** (0.020)	**PE(-5)**	0.057* (0.020)		-0.060* (0.019)
PE(-6)	-0.028 (0.018)			**PE(-6)**	-0.030*** (0.018)		
PE(-8)	0.046* (0.016)	0.022 (0.015)		**PE(-8)**	0.037** (0.015)	0.021 (0.014)	
PE(-10)	-0.013 (0.012)			**PE(-10)**	-0.009 (0.012)		
				Dummy 1	[I]0.035* (0.011)	[V]-0.097* (0.014)	[VI]0.105* (0.020)
				Dummy 2	[II]-0.036* (0.011)		[VII]0.068* (0.020)
				Dummy 3	[III]0.026** (0.011)		[VIII]-0.071** (0.020)
				Dummy 4	[IV]-0.028* (0.011)		[IX]0.067* (0.020)
N	368	372	376	**N**	368	372	376
Adjusted R^2	0.273	0.231	0.274	**Adjusted R^2**	0.332	0.319	0.375
F-Statistic	9.626*	13.383*	16.732*	**F-Statistic**	10.111*	18.367*	18.309*
Q_{10}	0.194	0.496	0.002	**Q_{10}**	0.448	0.526	0.09
Q_{20}	0.211	0.032	0.005	**Q_{20}**	0.447	0.040	0.07

Dummy Explanation: [I] May 1973; [II] Sept. 1974; [III] Oct. 1975; [IV] July 1982; [V] June 1984; [VI] Jan. 1973; [VII] April 1973; [VIII] May 1976; [IX] Aug. 1979.

Table 7.4: EC Sentiment and other First-Difference and Level Indicators

Independent Variable	France	Germany	Italy	Independent Variable	France	Germany	Italy
Constant	0.003 (0.003)	0.003 (0.003)	0.009 (0.006)	**Constant**	0.003 (0.002)	0.004 (0.002)	0.010*** (0.006)
D **IP(-1)**	-0.446* (0.069)	-0.589* (0.070)	-0.640* (0.068)	D **IP(-1)**	-0.440* (0.066)	-0.527* (0.068)	-0.617* (0.065)
D **IP(-2)**	-0.144** (0.070)	-0.288* (0.071)	-0.312* (0.065)	D **IP(-2)**	-0.169** (0.067)	-0.246* (0.069)	-0.310* (0.062)
D **CPI(-1)**		-0.481 (0.391)	-0.636 (0.637)	D **CPI(-1)**		-0.354 (0.376)	-0.579 (0.613)
D **CPI(-2)**	0.178 (0.367)			D **CPI(-2)**	0.212 (0.351)		
D **CPI(-3)**	0.505 (0.375)	0.287 (0.391)	0.815 (0.602)	D **CPI(-3)**	0.500 (0.359)	0.343 (0.374)	0.632 (0.579)
D **CPI(-4)**		0.537 (0.391)	0.932 (0.604)	D **CPI(-4)**		0.565 (0.373)	0.849 (0.579)
D **CPI(-6)**	0.599*** (0.357)	-0.277 (0.390)	-0.375 (0.606)	D **CPI(-6)**	0.551 (0.342)	-0.360 (0.373)	-0.442 (0.581)
D **CPI(-7)**			-0.466 (0.580)	D **CPI(-7)**			-0.439 (0.558)
D **CPI(-8)**	-0.402 (0.350)			D **CPI(-8)**	-0.357 (0.335)		
D **CPI(-9)**		-0.330 (0.387)		D **CPI(-9)**		-0.341 (0.369)	
D **CPI(-10)**	-0.840** (0.362)	-0.503 (0.391)		D **CPI(-10)**	-0.848** (0.346)	-0.531 (0.373)	
D **OL(-1)**		0.436 (0.289)		D **OL(-1)**		0.470*** (0.276)	
D **OL(-2)**	0.146 (0.176)	0.312 (0.332)	0.689* (0.197)	D **OL(-2)**	0.131 (0.168)	0.172 (0.318)	0.715* (0.189)
D **OL(-3)**	-0.263 (0.164			D **OL(-3)**	-0.260*** (0.157)		
D **OL(-5)**		0.555** (0.247)	-0.322*** (0.191)	D **OL(-5)**		0.513** (0.235)	-0.322*** (0.182)
D **ES(-1)**	-0.292 (0.203)	0.356 (0.323)	-0.478 (0.313)	D **ES(-1)**	-0.257 (0.195)	0.333 (0.309)	-0.453 (0.300)
D **ES(-2)**	-0.322 (0.207)	0.688** (0.300)	0.166 (0.319)	D **ES(-2)**	-0.336*** (0.198)	0.680** (0.287)	0.170 (0.305)
D **ES(-6)**	0.603* (0.187)			D **ES(-6)**	0.720* (0.181)		
D **ES(-7)**	0.354*** (0.199)			D **ES(-7)**	0.316*** (0.191)		
OBP(-1)	0.058* (0.017)	-0.124* (0.047)	0.050*** (0.028)	**OBP(-1)**	0.059* (0.016)	-0.103** (0.046)	0.051*** (0.027)
OBP(-2)			0.049 (0.031)	**OBP(-2)**			0.048 (0.030)
OBP(-3)	-0.053* (0.020)	0.131* (0.044)		**OBP(-3)**	-0.055* (0.019)	0.114* (0.043)	
OBP(-4)			-0.074* (0.024)	**OBP(-4)**			-0.074* (0.024)
OBP(-6)	-0.034*** (0.020)			**OBP(-6)**	-0.033*** (0.019)		
OBP(-8)	0.033** (0.015)			**OBP(-8)**	0.033** (0.015)		

(Table 7.4 continued on p. 40)

(Table 7.4 continued from p. 39

PE(-1)	0.043* (0.015)	0.075 (0.046)	-0.017 (0.024)	**PE(-1)**	0.040* (0.015)	0.078*** (0.044)	-0.027 (0.024)
PE(-2)		-0.051 (0.045)		**PE(-2)**		-0.057 (0.043)	
PE(-3)	-0.043* (0.016)		0.047*** (0.028)	**PE(-3)**	-0.042* (0.016)		0.051*** (0.027)
PE(-5)			-0.021 (0.025)	**PE(-5)**			-0.020 (0.024)
PE(-7)			-0.040*** (0.021)	**PE(-7)**			-0.037*** (0.020)
				Dummy 1	[I]-0.031* (0.008)	[II]-0.035* (0.012)	[I]-0.036* (0.012)
				Dummy 2		[III]0.038* (0.012)	[IV]-0.038* (0.012)
N	192	197	198	**N**	192	197	198
Adjusted R^2	0.290	0.308	0.359	**Adjusted R^2**	0.351	0.371	0.412
F-Statistic	5.105*	6.143*	7.133*	**F-Statistic**	6.154*	7.083*	7.903*
Q_{10}	0.785	0.270	0.071	**Q_{10}**	0.976	0.373	0.117
Q_{20}	0.964	0.316	0.087	**Q_{20}**	0.996	0.138	0.177

Dummy Explanation: [I] Jan. 1987; [II] May 1989; [III] Aug. 1993; [IV] Dec. 1998.

Table 7.5: Industry Confidence and other First-Difference and Level Indicators

Independent Variable	France	Germany	Italy	Independent Variable	France	Germany	Italy
Constant	-0.0003 (0.002)	0.001 (0.003)	0.005 (0.006)	**Constant**	-0.0001 (0.002)	0.001 (0.002)	0.006 (0.006)
D **IP(-1)**	-0.500* (0.053)	-0.599* (0.050)	-0.585* (0.051)	D **IP(-1)**	-0.449* (0.051)	-0.586* (0.047)	-0.568* (0.048)
D **IP(-2)**	-0.202* (0.053)	-0.307* (0.051)	-0.251* (0.051)	D **IP(-2)**	-0.162* (0.051)	-0.304* (0.048)	-0.260* (0.048)
D **CPI(-1)**	0.218 (0.267)	-0.524 (0.325)	0.670** (0.293)	D **CPI(-1)**	0.010 (0.257)	-0.602*** (0.308)	0.413 (0.277)
D **CPI(-2)**			0.201 (0.311)	D **CPI(-2)**			0.215 (0.290)
D **CPI(-3)**		0.437 (0.330)		D **CPI(-3)**		0.399 (0.313)	
D **CPI(-4)**	-0.294 (0.280)	0.561 (0.341)	-0.594** (0.299)	D **CPI(-4)**	-0.065 (0.281)	0.574*** (0.323)	-0.581** (0.279)
D **CPI(-5)**	0.284 (0.278)	0.688** (0.332)		D **CPI(-5)**	0.189 (0.278)	0.551*** (0.315)	
D **CPI(-7)**				D **CPI(-7)**			
D **CPI(-8)**	-0.330 (0.275)			D **CPI(-8)**	-0.267 (0.274)		
D **CPI(-9)**		-0.276 (0.334)		D **CPI(-9)**		-0.283 (0.316)	
D **CPI(-10)**		-0.996* (0.340)		D **CPI(-10)**		-0.767** (0.324)	
D **OL(-1)**		0.626* (0.219)		D **OL(-1)**		0.608* (0.207)	
D **OL(-2)**	0.340** (0.169)	0.349 (0.255)	0.367*** (0.199)	D **OL(-2)**	0.367** (0.163)	0.278 (0.242)	0.318*** (0.187)
D **OL(-3)**	-0.308 (0.211)		-0.332 (0.213)	D **OL(-3)**	-0.325 (0.202)		-0.314 (0.199)
D **OL(-4)**	0.168 (0.169)			D **OL(-4)**	0.181 (0.162)		
D **OL(-5)**			0.532** (0.212)	D **OL(-5)**			0.436** (0.199)
D **OL(-6)**			-0.352*** (0.197)	D **OL(-6)**			-0.349*** (0.184)
D **OL(-7)**	0.197 (0.129)			D **OL(-7)**	0.220*** (0.123)		
CI(-1)	0.087* (0.201)	0.131** (0.061)	0.161* (0.036)	**CI(-1)**	0.074* (0.200)	0.140** (0.058)	0.113* (0.034)
CI(-2)				**CI(-2)**			
CI(-3)		-0.095 (0.065)	-0.114** (0.050)	**CI(-3)**		-0.096 (0.062)	-0.092*** (0.047)
CI(-4)	-0.094* (0.032)			**CI(-4)**	-0.090* (0.031)		
OBP(-1)		-0.091** (0.046)		**OBP(-1)**		-0.092** (0.043)	
OBP(-2)	-0.012 (0.018)		-0.045 (0.030)	**OBP(-2)**	-0.006 (0.018)		-0.032 (0.028)
OBP(-3)		0.071*** (0.040)	0.065*** (0.038)	**OBP(-3)**		0.066*** (0.038)	0.064*** (0.036)
OBP(-4)	0.023 (0.025)		-0.029 (0.025)	**OBP(-4)**	0.018 (0.024)		-0.029 (0.023)
OBP(-7)	0.015 (0.021)			**OBP(-7)**	0.024 (0.020)		
OBP(-8)	-0.050** (0.021)			**OBP(-8)**	-0.048** (0.020)		
OBP(-12)	0.020** (0.008)			**OBP(-12)**	0.015*** (0.008)		

(Table 7.5 continued on p. 42)

(Table 7.5 continued from p. 41)

PE(-2)		0.045*** (0.025)	0.016 (0.023)	**PE(-2)**		0.037 (0.024)	0.035 (0.022)
PE(-3)	-0.039* (0.015)			**PE(-3)**	-0.034** (0.014)		
PE(-4)		-0.027 (0.024)				-0.021 (0.023)	
PE(-5)	0.065* (0.020)		-0.037*** (0.022)	**PE(-5)**	0.063* (0.019)		-0.052** (0.020)
PE(-6)	-0.035*** (0.019)			**PE(-6)**	-0.039** (0.018)		
PE(-8)	0.039* (0.014)	0.018 (0.014)		**PE(-8)**	0.034** (0.013)	0.017 (0.013)	
				Dummy 1	[I]0.035* (0.011)	[V]-0.087* (0.014)	[VI]0.103* (0.019)
				Dummy 2	[II]-0.036* (0.011)		[VII]0.064* (0.020)
				Dummy 3	[III]-0.030* (0.011)		[VIII]0.069* (0.020)
				Dummy 4	[IV]-0.029* (0.011)		[IV]0.064* (0.020)
N	368	369	374	**N**	368	369	198
Adjusted R^2	0.279	0.321	0.294	**Adjusted R^2**	0.339	0.392	0.388
F-Statistic	7.761*	11.234*	10.695*	**F-Statistic**	8.531*	14.160*	12.802*
Q_{10}	0.189	0.094	0.011	**Q_{10}**	0.348	0.210	0.314
Q_{20}	0.172	0.001	0.013	**Q_{20}**	0.166	0.002	0.133

Dummy Explanation: [I] May 1973; [II] Sept. 1974; [III] July 1982; [IV] May 1986; [V] June 1984; [VI] Jan. 1973; [VII] April 1973; [VIII] May 1976; [IV] Aug. 1979.

Table 7.6: Country-Specific Multivariate Estimations

Independent Variable	Germany		Independent Variable	Italy		Independent Variable	Italy	
Constant	0.002 (0.002)	0.002 (0.002)	**Constant**	0.006 (0.006)	0.008 (0.006)	**Constant**	0.003 (0.005)	0.004 (0.005)
D **IP(-1)**	-0.601* (0.052)	-0.584* (0.049)	D **IP(-1)**	-0.642* (0.070)	-0.626* (0.068)	D **IP(-1)**	-0.626* (0.068)	-0.607* (0.066)
D **IP(-2)**	-0.285* (0.053)	-0.278* (0.050)	D **IP(-2)**	-0.292* (0.067)	-0.295* (0.064)	D **IP(-2)**	-0.287* (0.068)	-0.288* (0.066)
D **CPI(-1)**	-0.701** (0.345)	-0.798** (0.323)	D **CPI(-1)**	-0.666 (0.650)	-0.728 (0.625)	D **CPI(-1)**	-0.634 (0.626)	-0.659 (0.608)
D **CPI(-3)**	0.745** (0.351)	0.681** (0.329)	D **CPI(-3)**	1.035*** (0.603)	0.819 (0.577)	D **CPI(-3)**	0.726 (0.582)	0.568 (0.562)
D **CPI(-4)**	0.441 (0.363)	0.474 (0.340)	D **CPI(-4)**	0.746 (0.610)	0.613 (0.583)	D **CPI(-4)**	0.364 (0.571)	0.278 (0.550)
D **CPI(-5)**	0.652*** (0.354)	0.475*** (0.333)	D **CPI(-5)**			D **CPI(-5)**		
D **CPI(-7)**			D **CPI(-7)**	-0.797 (0.607)	-0.705 (0.581)	D **CPI(-7)**		
D **CPI(-9)**	-0.311 (0.349)	-0.316 (0.327)	D **CPI(-9)**			D **CPI(-9)**		
D **CPI(-10)**	-0.905** (0.356)	-0.644*** (0.336)	D **CPI(-10)**			D **CPI(-10)**		
D **OL(-1)**	0.466** (0.231)	0.441** (0.216)	D **OL(-1)**			D **OL(-1)**		
D **OL(-2)**	0.415 (0.266)	0.317 (0.250)	D **OL(-2)**	0.642* (0.194)	0.679* (0.203)	D **OL(-2)**	0.656* (0.195)	0.681* (0.188)
D **OL(-4)**			D **OL(-4)**	-0.304 (0.213)	-0.262 (0.203)	D **OL(-4)**	-0.158 (0.215)	-0.116 (0.207)

(Table 7.6 continued on p. 43)

(Table 7.6 continued from p. 42)

D CK(-2)	0.060 (0.037)	0.056 (0.034)	**D SPI(-3)**	0.042** (0.017)	0.031*** (0.017)	**D SPI(-3)**	0.042** (0.017)	0.033*** (0.017)
D CK(-3)			**D SPI(-6)**	-0.038** (0.017)	-0.038** (0.016)	**D SPI(-6)**	-0.029*** (0.016)	-0.029*** (0.016)
D CK(-4)	-0.059 (0.036)	-0.079** (0.034)	————	————	————			
D CK(-5)	-0.083** (0.036)	-0.069** (0.034)	**D CR(-2)**	0.025** (0.010)	0.026** (0.009)			
D CK(-6)	0.052 (0.036)	0.055 (0.034)	**D CR(-3)**	0.018*** (0.010)	0.021** (0.010)			
CI(-1)	0.186** (0.090)	0.167** (0.084)	**CI(-1)**			**D ES(-1)**	-0.589** (0.267)	-0.589** (0.267)
CI(-2)			**CI(-2)**	0.092 (0.056)	0.096*** (0.053)	**D ES(-4)**	-0.372 (0.273)	-0.372 (0.273)
CI(-3)	-0.153** (0.071)	-0.127*** (0.066)	**CI(-3)**	-0.090 (0.070)	-0.084 (0.066)			
OBP(-1)	-0.098*** (0.055)	-0.086*** (0.052)	**OBP(-1)**	0.070** (0.029)	0.070** (0.028)	**OBP(-1)**	0.087* (0.019)	0.085* (0.018)
OBP(-3)	0.083*** (0.045)	0.067 (0.042)	**OBP(-3)**			**OBP(-3)**		
OBP(-4)			**OBP(-4)**	-0.053** (0.023)	-0.056** (0.022)	**OBP(-4)**	-0.073* (0.019)	-0.072* (0.019)
PE(-1)	-0.035 (0.043)	-0.017 (0.040)	**PE(-1)**	-0.035 (0.023)	-0.046** (0.023)	**PE(-1)**		
PE(-2)	0.061*** (0.037)	0.043*** (0.034)	**PE(-2)**			**PE(-2)**		
PE(-4)			**PE(-3)**	0.063*** (0.036)	0.064*** (0.034)	**PE(-3)**	0.037*** (0.022)	0.036*** (0.021)
PE(-5)			**PE(-5)**	-0.044*** (0.023)	-0.040*** (0.022)	**PE(-5)**	-0.042*** (0.023)	-0.039*** (0.022)
D_June_1984		-0.089* (0.013)	**D_Jan_1987**		-0.040* (0.012)	**D_Jan_1987**		-0.038* (0.012)
			D_Dec_1989		-0.034* (0.012)	**D_Dec_1989**		-0.032** (0.013)
N	337	337	**N**	187	187	**N**	194	194
Adjusted R^2	0.348	0.428	**Adjusted R^2**	0.385	0.441	**Adjusted R^2**	0.368	0.414
F-Statistic	9.959*	12.952*	**F-Statistic**	7.123*	7.976*	**F-Statistic**	8.481*	9.017*
Q_{10}	0.106	0.190	**Q_{10}**	0.110	0.048	**Q_{10}**	0.145	0.210
Q_{20}	0.018	0.052	**Q_{20}**	0.094	0.042	**Q_{20}**	0.081	0.208

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