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Do Business Tendency Surveys in Industry and Services Help in Forecasting GDP Growth?

A Real-Time Analysis on French Data

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Document de travail

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Do Business Tendency Surveys in Industry and Services Help in Forecasting GDP Growth?

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Abstract

Business tendency surveys (BTS) carried out by the statistical institute INSEE are intensively used for the short-term forecasting of the French economic activity. In particular, the service BTS has been used together with the industry BTS for the short-term forecasting of GDP growth since Bouton and Erkel-Rousse (2003-2004) showed that the former survey contained a specific piece of information on GDP growth with respect to the latter survey. However, it remained to be demonstrated that this specific piece of information permits one to significantly improve the quality of short-term GDP forecasts with respect to models involving variables from the industry survey exclusively. More generally, the predictive accuracy of models based on the two surveys with respect to simpler autoregressive (AR) models deserved to be assessed.

We, therefore, perform a real-time out-of-sample analysis that consists in estimating and, then, simulating miscellaneous kinds of models (VAR and univariate multistep models) aimed at the short-term forecasting of the quarterly GDP growth rate. Some BTS-based models encompass industry and service data, others either service or industry data exclusively. The predictive accuracy of these three kinds of models is compared to that of simple AR models; that of models including service and industry survey data is also compared to that of models based on data from one of the two surveys exclusively. Predictive accuracy tests (Harvey, Leybourne and Newbold, 1997, Clark-West, 2007) are performed up to four-quarter-forecast horizons. To assess the robustness of the results, we carry out both recursive and rolling estimations as well as three tests (differing by the method used to estimate the variance of the test statistics' numerators) for each couple of competing forecasts. The results establish the usefulness of the two BTS, as well as the limited but significant contribution of the service survey in addition to the industry survey especially in the months when long enough service series are available (namely January, April, July, and October). The industry survey, nonetheless, appears to predominate over the service survey as a source of leading indicators of GDP growth.

Keywords: Business Tendency Surveys, Services, Macroeconomic forecasting, Multistep and VAR models, Iterated and direct forecasts, Forecast comparisons

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Apport des enquêtes de conjoncture dans l'industrie et les services à la prévision à court terme de la croissance :

Une analyse en temps réel sur données françaises

Résumé

Les enquêtes de conjoncture de l'Insee sont très utilisées pour la prévision à court terme de l'activité. Bouton et Erkel-Rousse (2003-2004) ont montré que l'enquête de conjoncture dans les services de l'Insee contient une information sur le taux de croissance trimestriel du PIB français en partie complémentaire à celle apportée par l'enquête de conjoncture dans l'industrie réalisée par le même institut. Toutefois, il n'avait jusqu'à présent pas été établi que cette information spécifique contenue dans l'enquête Services permettait d'obtenir des prévisions de croissance significativement meilleures que si l'on ne mobilisait que des indicateurs tirés de l'enquête Industrie. Plus généralement, l'apport des deux enquêtes de conjoncture de l'Insee à la prévision conjoncturelle de la croissance française n'avait pas été comparé à celui de simples modèles autorégressifs.

Nous effectuons donc une analyse hors échantillon en temps réel consistant à estimer puis simuler plusieurs modèles de prévision du taux de croissance trimestriel du PIB (VARs et modèles multipériodes univariés). Certains modèles mobilisent des variables tirées des deux enquêtes de conjoncture, d'autres des variables issues soit de l'enquête Services soit de l'enquête Industrie. Nous comparons les qualités prédictives de ces trois types de modèles et de chacun d'entre eux avec celles de simples modèles autorégressifs au moyen de tests (Harvey, Leybourne et Newbold, 1997, Clark-West, 2007) effectués sur quatre horizons de prévision. La robustesse des conclusions est évaluée à travers des comparaisons d'estimations sur fenêtres glissantes et croissantes, ainsi que par l'utilisation de trois méthodes d'estimation différentes de la variance des numérateurs des statistiques de test. Les résultats concluent au net apport des deux enquêtes de conjoncture à la prévision de la croissance et à la contribution limitée mais significative de l'enquête Services par rapport à la seule enquête Industrie, surtout pour les mois trimestriels (janvier, avril, juillet et octobre), qui correspondent à des séries de services suffisamment longues. Néanmoins, l'enquête Industrie s'avère dominer l'enquête Services comme source d'indicateurs avancés pour la prévision de la croissance.

Mots-clés : Enquêtes de conjoncture, Services, Prévision macroéconomique, Modèles multipériode et modèles VAR, Prévisions itérées et directes, Équivalence prédictive

Classification JEL : C22, C32, E32, E37

CONTENTS

Executive Summary **5**

Résumé analytique **7**

Introduction **9**

I - The Contribution of BTS to Forecasting: A Controversial Issue **10**

II - Data and Methodology **14**

II.1 Data *14*

II.2 Four Sets of Models of Two Different Kinds *17*

II.3 Tests of Predictive Accuracy *23*

III - Main Results **27**

III.1 In-Sample Analysis *27*

III.2 Out-of-Sample Analysis *29*

Conclusion **34**

References **36**

Appendix 1: The Series under Analysis **41**

Appendix 2: Main Results of the In-Sample Analysis **46**

Appendix 3: VAR3 and Multistep Models - Selected Variables **54**

Appendix 4: Out-of-Sample Results - Root-Mean-Square-Forecast-Errors **61**

Appendix 5: Out-of-Sample Results - Tests of Predictive Accuracy
1- Tests by kind of models **73**

Appendix 6: Out-of-Sample Results - Tests of Predictive Accuracy
2- Univariate Models versus VAR Models **91**

Executive Summary

Sub-annual business tendency surveys (BTS) provide early pieces of information on economic activity. Within the European Union (EU), BTS are harmonised in the framework of the Joint Harmonised Programme of Business and Consumer Surveys. As such, they constitute a unique set of comparable sources, which have become a focus of interest for central bankers, economic researchers, managers and other economic agents especially since the creation of the Euro zone. Their results are intensively used for the short-term analysis and forecasting of economic activity in the Euro area considered as a whole, as well as in the EU Member States.

A number of recent articles have been published, aiming to assess the contribution of the harmonised BTS to the quality of forecasts of economic activity in Europe. However, the contribution of the BTS carried out in service sectors (hereafter referred to as the service surveys) is still seldom studied, due to data scarcity. The few assessments provided up to now have led to mixed results. This may be due to the short length of time series, most European service surveys having been created in the late 1990s or in the early 2000s.

Created in January 1988 on a quarterly basis, then performed on a monthly basis from June 2000 onwards, the BTS in services carried out by the French statistical institute INSEE is the oldest harmonised BTS in Europe in this sector. Even though the time series derived from this survey are still a little short, especially those available on a monthly basis, they constitute the longest ones in Europe.

Bouton and Erkel-Rousse (2003-2004) showed that the service survey contains a specific piece of information on GDP growth with respect to the INSEE survey on the situation and outlook in industry (*industry survey*).

However, it remained to be demonstrated that this specific piece of information permits one to significantly improve the quality of short-term GDP forecasts with respect to models involving variables from the industry survey exclusively. More generally, the predictive accuracy of models based on the two surveys with respect to simpler autoregressive models deserved to be assessed. Our empirical work, therefore, consists in addressing these two issues. We estimate and, then, simulate miscellaneous kinds of models (VAR and univariate multistep models) aimed at the short-term forecasting of the quarterly GDP growth rate using real-time data. Some BTS-based models encompass industry and service data, others contain either service or industry data exclusively. The predictive accuracy of these different kinds of models is compared to that of simple autoregressive models; that of models including service and industry data is also compared to that of models based on data from one of the two surveys exclusively.

The survey data that we use include the main quarterly and monthly balances of opinion from the two BTS as well as several synthetic indicators resulting from either static factor analysis or dynamic factor-model estimations. All series derived from the industry survey are either monthly or quarterly on the whole period under analysis (1988Q1-2008Q4). Conversely, the series derived from the service survey differ both in periodicity and length: some are quarterly during the whole period, others are quarterly before June 2000 and monthly afterwards, and some begin in June 2000, or even later. We retropolate those series that became monthly in June 2000 from 1988 on a monthly basis, as we want to give a first experimental assessment of the predictive performance of the monthly data from the service survey. Therefore, our conclusions derived from the monthly service data must be considered with caution and need to be confirmed when longer “true” monthly series are available. We also present results derived from pure quarterly data, which serve as benchmarks with respect to the less reliable results derived from monthly data.

The set of survey variables is defined so as to fully use the piece of information given by the two surveys. In fact, rather than transforming the monthly variables into quarterly ones by using averaging techniques (which would have implied a loss of information), we transform each monthly series into three quarterly sub-series that may be used as regressors of the

GDP quarterly growth rate. The values of these three quarterly sub-series at quarter *q* of year *y* are equal to those at the first (respectively second, third) month of quarter *q*. The variable-selection procedure is, therefore, carried out from a big set of variables containing the exhaustive piece of information encompassed in the survey data, notably the monthly ones. This enables us to build forecast models that allow us to up-date our GDP forecasts at a given quarter by incorporating the new monthly piece of information from the two BTS month after month. In practice, this leads to the elaboration of forecast models that differ depending on the month in the quarter (*m*) when the forecasts are supposed to be performed.

The selection of the variables entering the VAR models is directly derived from the results of a preliminary in-sample analysis (correlations, estimations, causality analysis) carried out on the big set of variables described in the previous paragraph. The multistep univariate models are either totally or partly derived from the general-to-specific (GETS) automated variable-selection procedure proposed by Hoover and Perez (1999) as refined by Krolzig and Hendry (2001).

The simulations are carried out on the subperiod beginning in either 1999Q4 or 2000Q1, depending on the forecast horizon. Predictive accuracy tests (Harvey, Leybourne and Newbold, 1997, Clark-West, 2007) are performed up to the four-quarter-forecast horizon. To assess the robustness of the results, we carry out both recursive and rolling estimations as well as three tests differing by the method used to estimate the variance of the test statistics' numerators for each couple of competing forecasts.

The results of the predictive accuracy tests establish the clear usefulness of the two BTS for the short-term forecasting of GDP growth. Both surveys provide interesting non-identical pieces of information on GDP growth which can help one obtaining more accurate forecasts of GDP growth than when using simple autoregressive models of the latter up to the two or three-quarter horizon. The study shows, however, that the industry survey predominates over the service survey as a source of leading indicators of GDP growth. Compared to the industry survey, the service survey appears to be not a competing source of short-term indicators of GDP growth but an interesting *secondary* source. Finally, the contribution of the service survey *in addition to the industry survey* appears to be more clearly positive in the first months of each quarter, January, April, July, and October, in which the service survey was carried out when it was quarterly, than in the other months (for which much shorter observed service series are available).

This suggests that the analysis carried out in the latter months might be fragile due to the interpolation performed to alleviate the short length of the observed monthly service series. This also suggests that more clearly positive results as concerns the contribution of the service survey in addition to the industry survey can reasonably be expected when longer monthly service series are observed. This intuition needs to be confirmed when long enough monthly series are available.

Résumé analytique

Légères et rapides, les enquêtes de conjoncture délivrent une information précoce sur l'activité économique. Parce qu'elles sont harmonisées à l'échelle européenne, elles constituent un ensemble unique de sources comparables, très utilisées par les banquiers centraux, les chercheurs, les décideurs privés et bien d'autres agents économiques, particulièrement depuis la création de la zone euro. Leurs résultats servent de base à l'élaboration d'outils d'analyse conjoncturelle et de prévision à court terme de l'activité dans la zone euro considérée dans son ensemble et dans chacun de ses États membres.

Plusieurs articles récents évaluent l'apport des enquêtes de conjoncture harmonisées à la qualité des prévisions de l'activité économique en Europe. Toutefois, l'apport de l'enquête de conjoncture effectuée dans les services (à laquelle on fera désormais référence sous l'appellation d'enquête services) demeure rarement étudié, par manque de données suffisantes. Les quelques tentatives d'évaluation existantes conduisent à des résultats mitigés, peut-être du fait de la longueur limitée des séries disponibles. En effet, la plupart des enquêtes services européennes ont été créées dans la deuxième moitié des années 1990, voire au début des années 2000.

Créée en janvier 1988 en périodicité trimestrielle puis mensualisée à partir de juin 2000, l'enquête services conduite par l'Insee pour la France est la plus ancienne enquête de conjoncture harmonisée au niveau européen effectuée auprès des entreprises de services. Même si les séries qui en sont tirées demeurent relativement courtes, particulièrement en périodicité mensuelle, ce sont les plus longues sur lesquelles on puisse travailler au sein de l'Union européenne.

Bouton et Erkel-Rousse (2003-2004) ont montré que l'enquête services contient une information spécifique sur le taux de croissance trimestrielle du PIB en sus de celle apportée par l'enquête de conjoncture sur la situation et les perspectives dans l'industrie (*enquête industrie*) réalisée par l'Insee.

Toutefois, il n'avait jusqu'à présent pas été établi que cette information spécifique contenue dans l'enquête services permettait d'établir des prévisions de croissance significativement meilleures que si l'on ne mobilisait que des indicateurs tirés de l'enquête Industrie. Plus généralement, à notre connaissance, l'apport des deux enquêtes de conjoncture de l'Insee à la prévision conjoncturelle de la croissance française n'avait pas été comparé à celui de simples modèles autorégressifs. Ce sont ces deux dimensions que vise à traiter la présente étude. Nous effectuons des estimations puis des simulations de divers modèles (VAR et modèles multipériodes univariés) de prévision du taux de croissance trimestrielle du PIB en utilisant des données en temps réel. Certains modèles combinent des variables tirées des deux enquêtes de conjoncture, d'autres n'utilisent que des variables d'une seule des deux enquêtes. Les performances prédictives de ces différents modèles sont comparées avec celles de simples modèles autorégressifs ; celles des modèles contenant des variables tirées des deux enquêtes sont en outre comparées à celle des modèles utilisant une seule enquête.

Les données d'enquêtes utilisées dans le cadre de notre étude comprennent les principaux soldes d'opinion trimestriels et mensuels des enquêtes industrie et services ainsi que plusieurs indicateurs synthétiques tirés d'analyses factorielles statiques ou de l'estimation de modèles à facteurs dynamiques. Toutes les séries de l'enquête industrie sont soit mensuelles soit trimestrielles sur l'ensemble de la période étudiée (1988T1-2008T4). A contrario, les séries tirées de l'enquête services diffèrent à la fois par leur périodicité et leur longueur. Certaines sont trimestrielles sur toute la période, d'autres trimestrielles avant juin 2000 et mensuelles ensuite. D'autres encore commencent en juin 2000, voire plus tardivement. Nous interpolons les séries devenues mensuelles en juin 2000 depuis 1988 pour les rendre mensuelles sur l'ensemble de la période étudiée. Dès lors, les conclusions tirées des données mensuelles de services doivent être considérées avec prudence et demanderaient à être confirmées lorsque des séries mensuelles observées sur plus longue période seront disponibles. Nous présentons aussi des résultats fondés sur les seules

données trimestrielles, qui servent de référence aux résultats plus fragiles obtenus à partir des données mensuelles partiellement interpolées.

L'ensemble des variables d'enquêtes est défini de manière à utiliser la totalité de l'information véhiculée par les deux enquêtes. Ainsi, plutôt que d'utiliser des moyennes trimestrielles des variables mensuelles (au prix d'une perte d'information) nous transformons chaque série mensuelle en trois sous-séries trimestrielles qui peuvent chacune être rapprochée de la série de taux de croissance trimestrielle du PIB. Ces trois séries dérivées trimestrielles correspondent aux séries des occurrences de chacun des trois mois d'un trimestre. La procédure de sélection de régresseurs du taux de croissance du PIB est donc menée sur un grand ensemble de variables englobant l'ensemble de l'information contenue dans les données (mensuelles notamment) des deux enquêtes de conjoncture. Ceci permet de construire des modèles de prévision à partir desquels peut être mise à jour au mois le mois la prévision de croissance trimestrielle du PIB pour un trimestre donné. En pratique, ceci conduit à l'élaboration de modèles de prévision différents selon le mois dans le trimestre (*m*) auquel les prévisions sont supposées être effectuées.

La sélection des variables entrant dans les modèles VAR découle directement des résultats d'une analyse préliminaire en échantillon (calculs de corrélations, estimations, analyses de causalités) menée sur le grand ensemble de variables décrit dans le paragraphe précédent. Les modèles univariés multipériodes résultent totalement ou partiellement de la procédure automatisée de sélection de variables connue sous le sigle GETS (pour "general-to-specific") introduite par Hoover et Perez (1999), telle que raffinée par Krolzig et Hendry (2001).

Les simulations sont réalisées sur une sous-période débutant en 1999T4 ou en 2000T1, selon l'horizon de prévision retenu. Des tests de performances prédictives (Harvey, Leybourne et Newbold, 1997, Clark-West, 2007) sont effectués sur quatre horizons de prévision. La robustesse des conclusions est évaluée sur la base de comparaisons d'estimations sur fenêtres glissantes et croissantes et de trois méthodes d'estimation différentes de la variance des numérateurs des statistiques de test.

Les résultats des tests de performances prédictives concluent au net apport de chacune des deux enquêtes de conjoncture à la prévision de la croissance. Les deux enquêtes donnent des informations utiles et non identiques qui contribuent à l'obtention de meilleures prévisions de croissance que les modèles autorégressifs jusqu'à un horizon de prévision de deux ou trois trimestres. L'étude établit toutefois que l'enquête industrie domine l'enquête services comme source d'indicateurs avancés pour la prévision de la croissance. Comparée à l'enquête industrie, l'enquête services n'apparaît ainsi pas comme une source concurrente mais comme une intéressante source secondaire pour l'obtention d'indicateurs avancés sur la croissance. Enfin, l'apport de l'enquête services *en sus de l'enquête industrie* s'avère plus nettement significatif pour les premiers mois de chaque trimestre, janvier, avril, juillet et octobre, lors desquels était réalisée l'enquête services quand elle n'était que trimestrielle, que pour les autres mois (pour lesquels les séries de services observées sont beaucoup moins longues).

Ceci suggère que l'analyse réalisée sur ces mois pourrait être fragile en raison de l'interpolation effectuée pour pallier la longueur insuffisante des séries mensuelles observées de services. Ceci permet également de penser que des résultats concluant à un apport plus nettement positif de l'enquête services en sus de l'enquête industrie pour tous les mois devraient être obtenus lorsque les séries mensuelles de services seront observées sur plus longue période. Cette intuition pourra être confirmée lorsque des séries mensuelles suffisamment longues seront disponibles.

Introduction

Sub-annual business tendency surveys (BTS) provide one with early pieces of information on economic activity. Within the European Union (EU), BTS are harmonised in the framework of the Joint Harmonised Programme of Business and Consumer Surveys (cf European Commission, 2007). As such, they constitute a unique set of comparable sources, which have become a focus of interest for central bankers, economic researchers, managers and other economic agents especially since the creation of the Euro zone. Their results are intensively used for the short-term analysis and forecasting of economic activity in the Euro area considered as a whole, as well as in the EU Member States.

In this context, the use of BTS and, more generally, leading indicators for nowcasting and short-term forecasting has become an important issue for European economists. A number of recent articles have been published, aiming to assess the contribution of the harmonised BTS to the quality of forecasts of economic activity in Europe. However, the contribution of the BTS carried out in service sectors (hereafter referred to as the service surveys) is still seldom studied, due to data scarcity. The few attempts in this respect up to now have led to mixed results. As Gayer (2005) suggests, this may be due to the short length of time series, most European service surveys having been created recently (see below, section I, for a survey of literature).

The French statistical institute INSEE carries out ten sub-annual business surveys, which cover most sectors of activity. Created in January 1988 on a quarterly basis, its BTS in services is the oldest harmonised BTS in Europe in this sector. Even though the time series derived from this survey are still a little short, especially those available on a monthly basis (from June 2000 onwards), they constitute the longest ones in Europe. From an in-sample analysis, Bouton and Erkel-Rousse (2003-2004) find that the service survey contains a specific piece of information on GDP growth with respect to the industry survey, which might be usefully taken into account in forecasting models. Five years later, it becomes possible to refine their conclusions and test Gayer (2005)'s assumption on the basis of a real-time out-of-sample analysis, at least on quarterly data. Some preliminary results can be derived from monthly data, which will have to be confirmed when longer monthly series are available.

More precisely, our out-of-sample analysis consists in estimating and, then, simulating miscellaneous kinds of models (VAR and univariate multistep calibration models) aimed at the short-term forecasting of the quarterly GDP growth rate using real-time data. Some models encompass industry and service data sometimes together with GDP growth lags, others exclude either service or industry data. The predictive accuracy of all these models is compared to that of simple autoregressive (AR) models; that of models including service and industry data is also compared to that of models based on data from one of the two surveys exclusively. The results prove the clear usefulness of the two BTS considered as a whole, as well as the sole industry or service survey, with respect to the AR models of GDP growth. They also confirm that the industry survey predominates over the service survey as a source of leading indicators of GDP growth. However, the overall conclusions as concerns the contribution of the service survey to the short-term forecasting of GDP in addition to the industry survey are rather positive. In this respect, the results obtained at this stage on the monthly data appear less clear than those obtained with the quarterly data. This suggests that the monthly analysis might suffer from the excessively rough retropolation method used to alleviate the short length of the observed monthly service series.

The paper is organised as follows. Section I presents a brief review of the recent literature dealing with the assessment of BTS' contributions to short-term forecasting of economic activity. Section II provides details on the variables under analysis and the methodology used. Section III summarises and discusses the main findings. The conclusion recapitulates and suggests some tracks for further research.

I - The Contribution of BTS to Forecasting: A Controversial Issue

Survey indicators and, more generally, coincident and leading indicators[1] are widely used to assess current economic developments or undertake short-term forecasts. According to Emerson and Hendry (1998), the growing interest in using leading indicators to forecast a variety of economic time series seems to be "partly a reaction to […] forecasting failures by macro-econometric systems and partly due to developments in leading-indicator theory"[2]. More specifically, one can intuitively expect BTS to provide useful information for short-term forecasting due to their almost instantaneous availability (they are released much earlier than quantitative indicators, before the end of the month under analysis) and because they aim to measure economic agents' expectations (which play a crucial part in agents' decisions, the latter affecting the future course of economic activity). From a more technical point of view, Pesaran (1987) points out that qualitative survey data are less subject to sampling and measurement errors than quantitative survey data dealing with the same economic variables. According to other authors, BTS are interesting tools for forecasting since they are never or little revised, unlike quantitative indicators (cf Hansson, Jansson, and Löf, 2005, for instance).

However, BTS data are not easy to use in forecasting. First, most of them are qualitative and their results need to be quantified before being introduced in forecasting models, which raises many methodological issues[3]. Besides, the use of BTS data in forecasting comes up against the same difficulties as that of leading indicators in general. The initial treatment of the underlying data (Weale, 1996) and the choice of indicators included in forecasting models (Stock and Watson, 1992) seem to be notable sources of uncertainty when using leading indicators for forecasting (see below). More especially, Emerson and Hendry (1998) stress that "historical leading indicators do not in practice systematically lead for long", notably because there is no clear basis except extrapolation for leading indicators invariably leading: consequently, they may suddenly fail to lead in evolving economies where the causes of business cycles and the relationships between economic variables change over time. "Structural models would seek to account for such changes". This criticism towards the use of leading indicators in forecasting is closely related to the historical Koopmans (1947) - Vining (1949) controversy[4].

These limitations of leading indicators when used in forecasting are well known and thoroughly documented in the literature. Nonetheless, the need for short-term forecasts and the shortcomings of competing techniques in this respect explain the broad use of leading indicators in forecasting as well as the flourishing academic research and empirical work in the field. While most early empirical work deals with the United States, the progresses of European integration, the creation of the European Monetary Union and the subsequent booming need for short-term indicators to gauge cyclical developments in the Euro area and the rest of the European Union has led to an increasing number of papers assessing the contribution of leading indicators derived from European sources, among which the harmonised BTS, to the forecasting of economic activity either in Euroland as a whole[5], or in

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[1] A coincident indicator refers to the present developments of a given variable of interest, while a leading indicator provides information on its near-term future. Numerous coincident and leading indicators are derived from BTS. Other coincident or leading indicators are based on quantitative statistics (such as the index of industrial production or monetary and financial statistics, for instance).

[2] On leading indicators in general, see for instance Lahiri and Moore (1991). A more sceptical point of view is represented in Emerson and Hendry (1998) - see below.

[3] A huge literature is devoted to BTS quantification. Surveys of this literature can be found in Nardo (2003), Mitchell, Smith, and Weale (2004), D'Elia (2005) or Biau, Erkel-Rousse, and Ferrari (2006), among others.

[4] In his famous article "Measurement without Theory" (1947), Koopmans criticises Burns and Mitchell (1946) for simply "observing and summarizing the cyclical characteristics of a large number of economic series" without referring to any formal theoretical framework. Vining (1949) replies Koopmans' attack notably by arguing: that the state of econometric modelling is not advanced enough to allow one for carrying out accurate forecasts on their basis; that Koopmans' use of statistics focuses too narrowly on "the estimation of postulated relations" - Cf also Simkins (1999).

[5] See, for instance, Fritsche and Marklein (2001), Marcellino (2002), Artís et al. (2003), Rua and Nunes (2003), Grenouilleau (2004), Barnejee, Marcellino, and Masten (2005), Gayer (2005), Clavería, Pons, and Ramos (2007), Angelini, Camba-Méndez, Giannone, Reichlin, and Rünstler (2008), Bańbura and Modugno (2008-2009),

some European Union's Member States[6], or both[7]. The results obtained in these papers concerning the contribution of BTS to forecasting are not perfectly unanimous, but clear regularities can nonetheless be observed in their conclusions.

First, the results depend notably on the data, especially on the out-of-sample period chosen and the country under analysis (Camba-Mendéz et al., 2001). The initial treatment of the data (smoothing, trend removal, interpolation of missing values) plays an important role, for instance in Weale (1996) and Darné and Brunhes-Lesage (2007). Artís et al. (2003) also highlight the potential positive effects on forecasting accuracy of removing outliers from the data. Conversely, they consider that using models based on seasonally adjusted BTS data or, alternatively, working on raw BTS data and, then, applying a seasonal-adjustment method does not make much difference, most BTS data presenting low seasonal components. Besides, the miscellaneous quantification methods of BTS data tested by Clavería et al. (2007) do not alter the main conclusions concerning the contribution of BTS to forecasting.

The results also depend on the model used, but only to a certain extent. The selection of the variables included in the model seems to play an important role (Stock and Watson, 1992) and, therefore, requires special attention (Emerson and Hendry, 1994 and see below, sub-section II.2). Conversely, simple linear models (either univariate or VAR models) often perform as well as more complicated ones. For instance, Mourougane and Roma (2002) derive very limited improvements, if any, from the use of time varying over constant parameter forecasting models. Similarly, Artís et al. (2003) and Clavería et al. (2007) find that non-linear models such as SETAR[8] or Markov-switching regime models do not outperform simpler linear models. Marcellino (2002), who compares linear with time-varying and non-linear univariate techniques, confirms these conclusions. The diagnoses are not so unanimous as concern the relative predictive performances of VAR models (which lead to dynamic iterated forecasts, also referred to as "indirect" forecasts in the literature) and simpler univariate multistep models, from which "direct" *h*-step forecasts can be derived[9]. Marcellino, Stock, and Watson (2005) present an application to a large set of monthly US macroeconomic time series where iterated step-by-step forecasts derived from VAR models are outperformed by "direct" *h*-step forecasts resulting from simpler univariate multistep models. However, they do not use BTS data. In an application on Swedish BTS data, Hansson et al. (2005) find that "direct" and "indirect" forecast set-ups have overall equivalent accuracy - see also Chevillon and Hendry (2005).

Similarly, the relative predictive performances of either composite leading indicators (CLIs)[10] or their individual components considered separately remain a controversial issue. A

Camacho and Perez-Quiros (2008), Charpin, Mathieu and Mazzi (2008), Darracq Paries and Maurin (2008), Diron (2008), Giannone, Reichlin, and Simonelli (2008), Hahn and Skudelny (2008).

[6] Cf Lindström (2000), Mourougane and Roma (2002), Heyer and Péléraux (2004), Dreger and Schumacher (2005), Hansson, Jansson, and Löf (2005), Lemmens, Croux, and Dekimpe (2005), Nunes (2005), Abberger (2007), Schumacher and Breitung (2007-2008), Golinelli, Bulligan, and Parigi (2008), Lui, Mitchell, and Weale (2009), among others.

[7] See Sédillot and Pain (2003) for an application to Germany, France, Italy, the UK, the Euro area as a whole, and the US, and Barhoumi et al. (2008) for an application to ten European countries plus the Euro area as a whole.

[8] SETAR (for Self-Excited Threshold Auto-Regressive) models are simplified versions of Markov-Switching regime models as regard the distribution properties of their error-terms.

[9] Multistep models are regressions of a multistep-ahead value of the variable of interest (Y_{t+h}) on the current and past values of a certain number of explanatory variables (X_t, X_{t-1},..., X_{t-k}). From these models, direct static *h*-step forecasts of the variable of interest can be derived, by contrast with dynamic iterated forecasts at the *h* horizon derived from VAR models. Multistep models are more parsimonious than VAR models in the sense that they do not need forecasting every variable taken into account in the model to obtain an *h*-step forecast for the variable of interest. Their main drawback in practice is that it may be difficult to find indicators that are leading enough to show high correlations with the variable of interest brought *h*-step forward, especially when *h* grows.

[10] CLIs result from the combination of several individual leading indicators, either using simple averaging methods or more complex methodologies, such as factor analysis techniques. The composite indicator resulting from a static factor analysis is a weighted average of its components, whose weights are endogenously determined. The relation between a composite indicator deriving from a dynamic factor analysis and its components is more complex. For theoretical foundations and various applications of the latter kinds of models, see Stone (1947), Sargent and Sims (1977), Stock and Watson (2002), Forni, Hallin, Lippi, and Reichlin (2001), Camba-Méndes, Kapetanios, Smith, and Weale (2001), Grenouilleau (2004), among others. Doz and Lenglart (1996-1999) and

common argument in favour of using CLIs is that the averaging or filtering technique from which they are derived "entails getting rid of the individual series-specific "noise" and keeping those parts of the data that are common to the series under consideration" (cf Hansson et al., 2005). Using CLIs may, therefore, permit one to improve the forecasting of economic activity, by thus removing any undesirable "noise" from the data used in the models. Conversely, CLIs may not perform as well as the set of its components considered separately if the relations between the former and the latter variables evolve in time. In this case, forecast models based on CLIs may be excessively restricted with respect to those introducing their components separately, whose estimated parameters can better adapt to the evolutions in the relation between variables when the estimation period changes. That is without doubt why, depending on the data used, CLIs or, alternatively, individual components perform better.

As far as the contribution of BTS to short-term forecasting is concerned, the diagnosis is clearer. In a majority of recent papers providing out-of-sample analyses, most tests of predictive equivalence lead to a positive conclusion as concerns the significance of the contribution of BTS based models to the forecasting of economic activity in the short run, namely up to around the two or three-quarter horizon[11]. Some authors find that the generally observed decreases in mean-square-forecast errors (MSFEs) when taking BTS data into account are seldom significant (Clavería et al., 2007) or that the contribution of leading indicators based on BTS data is lower than that of other (quantitative) indicators (Barnerjee, Marcellino, and Mastens, 2005). Nonetheless, most recent papers show that suitable treatment of publication lags enables BTS (or "soft" data) to provide important sources of information in predicting GDP beyond that of "real activity" or "hard" data. BTS are found especially relevant in the months preceding the publication of hard indicators[12]. The contribution of BTS to forecasting is, however, often described as limited in the sense that most forecasts made on their basis are not very precise (see notably Hansson et al., 2005, for a discussion of the causes of high forecast errors at some periods of time). Note that, contrary to intuition, MSFEs do not always increase with the forecast horizon (Artís et al., 2003). Last, the effect of either recursive estimation or rolling estimation on the results is not clear, most papers employing either the one or the other technique exclusively[13].

Among the numerous papers dealing with the contribution of BTS to the short-term forecasting of GDP growth, very few address the issue of the contribution of service surveys, although services represent an increasing (and henceforth notable, if not majority) part of economic activity in most EU member states. Insufficient length of service series is the main reason for the scarcity of studies dealing with this issue. BTS in services are very recent in most European countries. As was mentioned above, the oldest one, carried out in France by INSEE, was created in 1988, but became monthly not sooner than in June 2000. Most other service surveys have been carried out since the mid 1990s or, even, the beginning of the 2000s only. The service survey entered the joint harmonised EU programme relatively recently, in 1996 (to be compared with the industry survey, which has been harmonised since 1962 - cf European Commission, 2007). The late interest in business cycles in services stems from a long-lasting widespread scepticism among short-term analysts as concerns the usefulness of studying business cycles in services[14]. According to this widespread opinion, as the major part of business cycle fluctuations originate from industry, overall business cycles are assumed to be satisfactorily analysed and forecasted by focusing on industry data exclusively. Bouton and Erkel-Rousse (2003-2004) contradict this opinion by showing (using Granger causality tests within VAR and univariate calibration models) that the INSEE service

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Cornec and Deperraz (2006-2007) provide examples of applications of these kinds of techniques to the French data analysed in the present paper.

[11] See, notably, Fritsche and Marklein (2001), Mourougane and Roma (2002), Sédillot and Pain (2003), Gayer (2005), and Hansson, Jansson, and Löf (2005).

[12] Cf Nunes (2005), Bańbura and Rünstler (2007), Schumacher and Breitung (2007-2008), Angelini, Bańbura, and Rünstler (2008), Angelini, Camba-Méndez, Giannone, Reichlin, and Rünstler (2008), Bańbura and Modugno (2008-2009), Charpin, Mathieu, and Mazzi (2008), Camacho and Perez-Quiros (2008), Diron (2008), Giannone, Reichlin, and Simonelli (2008), Hahn and Skudelny (2008), among others.

[13] For a definition of recursive and rolling estimation, see below, sub-section II.2.3.

[14] In the French literature anterior to the 2000s, Fontaine (1992) constitutes a notable exception in this respect.

survey provides a significant leading piece of information on GDP growth which is not encompassed in the corresponding industry survey[15]. Martelli and Rocchetti (2006) study the properties of the Italian service survey in the same spirit. Cornec and Deperraz (2006-2007) introduce a new synthetic indicator in services for France derived from a dynamic factor-analysis methodology generalising Doz and Lenglart (1996-1999) so that service data of different periodicities and beginning at various dates can be taken into account as soon as they are available. On the basis of an in-sample analysis, they show that this indicator might help forecasting GDP growth. Grenouilleau (2004) indicates that he completed the set of harmonised BTS data from the European Commission on which he based the estimation of his forecasting model of GDP growth with "some selected country-wise survey results […] when they provide additional information, for example […] INSEE service survey or the Bank of France credit survey", adding that "some balances[16] in service surveys conducted in France […] exhibit outstanding cross-correlation with euro area GDP" (page 14).

To our knowledge, however, the only specific out-of-sample assessments of the contribution of service surveys to GDP forecasting performed up to now are due to Gayer (2005) and Darné and Brunhes-Lesage (2007). Somewhat disappointingly, Gayer (2005) finds that the European Commission's confidence indicator in services has no useful informative content for the short-term forecasting of Euroland's GDP growth, contrary to most other Commission's confidence indicators. The author points out that "the weaker performance of the service index in the out-of-sample scenario seems to be owed to the shorter estimation sample; the first forecast calculations are based on estimation samples of only three to four years". In fact, at the Euroland level, the service confidence indicator is available from April 1995 onwards only. Darné and Brunhes-Lesage (2007) have longer service series at their disposal, those from the French service BTS carried out by the Bank of France, which was created in 1989 on a two-monthly basis and became monthly in June 2002[17]. The authors retropolate the service series on a monthly basis from 1989. They, then, transform them into quarterly series, using diverse competing techniques. Next, they compare the predictive accuracy of several quarterly models of GDP growth based on broken-up or aggregate industry survey data on the one hand and overall industry and service survey data on the other hand. The results crucially depend on: the methods used to interpolate missing values in the initial service series; the forecasting method used; the way the service data are taken into account (either as individual series or as a restricted set of common factors derived from a static factor analysis of the individual series). In a majority of cases, the models including aggregate industry and service data fail to be significantly more informative than those involving aggregate industry data only. Nonetheless, when the missing values are completed using averaging methods, the contribution of individual service series appear to be significant at least as concerns the first forecast of GDP growth.

Finally, a recent study by Bańbura and Modugno (2008-2009) deserves to be mentioned. These authors deal with the short length of some other service series relating to the European economies by estimating the approximate dynamic factor model *à la* Doz, Giannone and Reichlin (2006) for large panels with arbitrary pattern of missing data. They apply this methodology to the nowcasting and short-term forecasting of the Euro area GDP. Their empirical results show that adding short monthly indicators can lead to improvements in forecast accuracy. In particular they find substantial gains when service surveys are included in the panel. However, the service surveys used by Bańbura and Modugno (2008-2009) are not the BTS studied by Gayer (2005) but Purchasing Managers' (PM) surveys. As the two kinds of surveys might not contain the same kind of information[18], their result, therefore, does not permit one to infer a probable similar property of the service surveys belonging to the harmonised European system of BTS.

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[15] In this respect see also Heyer and Péléraux (2004), who include a composite indicator derived from the INSEE service survey into their leading indicator for the French GDP quarterly growth rate.

[16] The concept of balances of opinion is defined in sub-section II-1 below.

[17] This survey is not harmonised at the European level.

[18] Bańbura and Modugno (2008-2009) use BTS data from the harmonised European system of BTS relating to several sectors, to the exclusion of the service sectors, which are represented by PM surveys. They find that the BTS do not encompass the same piece of information on GDP growth as the PM surveys. The reason for this result, however, is not clarified: the latter may be due to the kind of survey or to the analysed sectors (or to both).

II - Data and Methodology

II.1 Data

The variable of interest in our study is the quarterly growth rate of GDP derived from the French quarterly accounts (cf Labarthe, 2004). The causality analyses performed by Bouton and Erkel-Rousse (2003-2004) not only show that the INSEE industry and service surveys contain partly complementary specific pieces of information on GDP growth. They also show that the BTS carried out by INSEE in other sectors of activity (retail trade, wholesale trade, construction, public works) do not add any significant piece of information on GDP growth *in addition to* that encompassed in the industry survey[19]. That is why our empirical work focuses on the sole INSEE BTS in industry and services. Table 1 (next page) presents the main characteristic features of the two surveys. Of the ten business surveys currently managed by INSEE, the industry survey is the one that has remained most stable over time, especially during the period under analysis in the present paper (which covers the releases from January 1988 to February 2009[20]). All industry series are either monthly or quarterly on the whole period. Conversely, the much younger service survey has experienced several major changes since 1988. Consequently, the time series derived from the service survey differ both in periodicity and length: some are quarterly during the whole period, others are quarterly before June 2000 and monthly afterwards, and some begin in June 2000, or even later. It is noteworthy that the later stabilisation of the service survey due to its younger age may induce a bias against the service survey in our results[21]. This is all the more the case that we retropolated those series that became monthly in June 2000 from 1988 on a monthly basis, as we wanted both to follow the usual practice of short-term analysts and to give a first experimental assessment of the predictive performance of the monthly data from the service survey[22]. However, any conclusion derived from the monthly service data in the present paper must be considered with caution and needs to be confirmed when “true” monthly series are available on a longer time period. Note, however, that the results derived from pure quarterly data that we also present in the paper can serve as benchmarks with respect to the less reliable results derived from monthly data.

The questions of the two surveys are both backward looking (regarding the situation in the past three months) and forward-looking (regarding the expectations for the next three months). Most of them are qualitative questions relating to a particular variable of interest (for instance production, demand, or turnover) requiring a response among three possible ones: positive (“increasing” or “above normal”), intermediate (“stable” or “normal”) or negative (“decreasing” or “below normal”). The main monthly questions relating to activity in the monthly industry survey deal with past and expected production, overall and foreign orders, general expectations, and inventories. The resulting monthly balances of opinion[23] are referred to as, respectively, $PROI^{pa}$, $PROI^{ex}$, *OORI*, *FORI*, $GENI^{ex}$, and *INVI*. The synthetic indicator introduced by Doz and Lenglart (1996-1999) results from a dynamic factor analysis on the set of these six balances. The authors stress that this dynamic factor does not significantly differ from a common factor derived from a static factor analysis of the same

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[19] Conversely, these surveys give useful pieces of information on sectoral variables, such as production and employment growth at sector level.

[20] January 1988 corresponds to the first release of the service survey, February 2009 to the last available survey release at the moment when the empirical work was performed.

[21] This risk was taken into account in the testing methodology as far as possible - cf below, end of sub-section II.3.

[22] Following the usual practice of INSEE short-term analysts, we used the procedure EXPAND of the SAS software, option method = join, which approximately comes down to linear interpolation between two successive quarterly observations (Cornec and Deperraz, 2007, do the same). Doing so, we put ourselves in a position to assess the predictive contribution of the series data that are used in practice for nowcasting and short-term forecasting of GDP growth. However, the question whether a better interpolation method might be used or kinds of models that would deal with missing monthly values (as in Bańbura and Modugno, 2008-2009, for instance) would deserve some attention. This issue is left for future research, the spirit of the present paper being to stick to the usual practice of short-term analysts.

[23] For a given qualitative question requiring a response between three modalities (positive, intermediate or negative), a balance of opinion, also called net balance, is defined as the difference between the (generally weighted) share of firms that have specified a positive response and the share of firms that have specified a negative one. For theoretical foundations of the balances of opinion, see Theil (1952) and, among many subsequent papers, Fansten (1976).

set of variables. Therefore, as it is simpler to implement, the official synthetic indicator published each month by INSEE derives from a static factor analysis on the set of these six balances. Let $FACI^{m}$ denote the corresponding standardised factor. The two quarterly questions of the industry survey relating to past and expected demand are also widely used by short-term analysts for the forecasting of industrial production growth (cf also Hild, 2007). Let $DEMI^{pa}$ and $DEMI^{ex}$ denote the corresponding quarterly balances.

Table 1: The INSEE BTS in Industry and Services: Overall Characteristic Features

Characteristic features	Industry survey	Service survey
Creation	1951, harmonised at the European level since 1962	January 1988, harmonised at the European level since 1996
Periodicity	Monthly (except August until 2007), with a more *thorough* "quarterly" questionnaire in January, April, July and October.	Quarterly from January 1998 to April 2000, then monthly (except August until 2007) from June 2000 onwards for some questions
Sample	4,000 enterprises of more than 20 employees surveyed, among which all enterprises of 500 or more employees, as well as all enterprises with annual turnover exceeding €150 million, irrespective of size.	4,500 enterprises surveyed, among which all enterprises with annual turnover exceeding €45 million, irrespective of size.
Sector coverage	Equipment goods, consumption goods, intermediary goods, automobile and food industries, oil refineries[24]	Business services (computer and related activities, advertising, temporary work, etc.), household services and real estate activities[25]
Release	Around the 25th of the month under analysis	
Main evolutions (besides change in periodicity - in this respect, see above)	1979: the four-monthly section of the survey becomes quarterly 1991: harmonisation of the scope of coverage (exclusion of enterprises with fewer than 20 employees); the survey's quarterly waves are conducted in January, April, July and October. 1997: simplified questions on total and export demand; new questions on competitiveness 2004: slight modifications of a few questions for harmonisation purpose[26]. The industry survey becomes compulsory[27]. From 2008 onwards: the survey is carried out in August	1998: enlargement of the sector coverage to telecommunications, arts, entertainment, and recreation activities 2004: the question relating to expected demand becomes monthly. The service survey becomes compulsory. 2006: extension of the sector coverage of the survey to landing transports From 2008 onwards: the survey is carried out in August
Sources: INSEE Méthodes (2007) for the industry survey, available on the INSEE website; BTS Unit, INSEE, for the service survey. A future volume on the service survey in the INSEE Méthodes series is under preparation.		

The main questions derived from the service survey for which relatively long series are available on a quarterly basis are those relating to expected demand, plus the recent and expected evolutions of operating profit and turnover. Let the corresponding balances of opinion be referred to as: $OPPS^{pa}$, $OPPS^{ex}$, $TOVS^{pa}$, $TOVS^{ex}$, and DEM^{ex}. The first two ones have remained quarterly, the two balances relating to turnover became monthly in June 2000, and the balance on expected demand has been monthly since September 2004

[24] Specific BTS are performed in construction and public works. Note that the industry survey data taken into account in this paper refer to manufacturing (food industries and oil refineries excluded).
[25] The coverage of the service survey includes neither financial nor insurance services. Transports have been included in the survey's coverage since February 2006 (the results are not published yet).
[26] As for the variables used in the paper, the only change concerns the questions on past and expected "tendency" of production, which have become questions on the "evolution" of production since 2004.
[27] In this respect, see Bardaji et al. (2009).

only[28]. Let $FACS^m$ denote the synthetic indicator in services introduced by Cornec and Deperraz (2006-2007) and published each month by INSEE since September 2004. $FACS^m$ derives from a dynamic factor analysis involving the five above defined service balances, to the addition of that concerning general expectations[29]. As was already mentioned in section I, Cornec and Deperraz (2006-2007) extended the Doz and Lenglart (1996-1999) framework to cope with service series with different lengths and periodicities. In addition, for symmetry purpose, we also consider a dynamic factor in industry $FACI^{m'}$ calculated *à la* Cornec and Deperraz (2006-2007), including all the mentioned balances in industry, among which the two quarterly balances relating to demand. We also introduce two static common factors in industry ($FACI^q$) and in services ($FACS^q$) derived from a static common factor analysis performed on the quarterly values of the whole set of balances mentioned, for industry on the one hand and services on the other[30].

Note that the published balances relating to questions dealing with the surveyed's firms or products result from a weighted aggregation scheme taking into account both the sectors and firms' sizes. Conversely, the balances relating to more general questions (namely those relating to general expectations for the whole sector of activity) are based on non-weighted aggregation schemes. Those of the published balances that are available on a monthly basis also differ from the other ones by the application of a completion procedure handling partial responses before the aggregation of individual responses[31]. However, unpublished non-weighted balances based on non-completed responses also exist for questions dealing with the surveyed's firms or products. On the basis of a preliminary in-sample analysis of the data (whose results are detailed in sub-section III.1 below), we decided to include in the analysis both the non-weighted balances relating to services and the same common factors as those resulting from the published balances but calculated on the basis of the non-weighted balances[32].

All considered balances are seasonally adjusted[33]. All series under analysis can be considered as stationary processes[34]. Most of them are represented in Appendix 1.1. Note that the non-weighted service balances appear to be a little smoother than the weighted balances. This stems from the fact that the responses of a few big firms have more impact on the values of the latter balances due to their higher weights.

It is noteworthy that the composite indicators considered in the paper are not conceived to be CLIs. The large sets of balances on which they are based (most balances derived from each survey as concerns activity, including those relating to the past three months) give them the *ex ante* status of summaries of the underlying surveys rather than that of CLIs. Yet, those forecast models used by INSEE short-term analysts that are based on the official

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[28] The resulting monthly series are not published yet. We, nonetheless, used the monthly part of the series on expected demand in some VAR models (see below and Appendix 2).

[29] The corresponding question has been asked since June 2000 only. That is why we did not mention it above. In fact, the series is too short to be used in the out-of-sample analysis. However, we present some preliminary in-sample results concerning this series for information only (in Appendix 2).

[30] Bouton and Erkel-Rousse (2003-2004) used a static quarterly common factor in services too.

[31] This procedure (known as the "constant-sample" procedure) is explained thoroughly in INSEE Méthodes (2007) as concern industry series, the procedure used for the service series being quite similar - see pages 23 to 26 of the English translation of INSEE Méthodes (2007) (available on the INSEE website from the following link: http://www.insee.fr/en/ppp/sommaire/imet117c.pdf). In short, the procedure consists in imputing a firm's missing response to a particular question from its most recent responses to the question given either at the previous survey release or at the next-to-last one. The denomination of the procedure stems from the fact that it leads to identical samples for the two latest surveys question by question, in order to allow one to interpret the latest evolutions given by the balances as representative of the fluctuations of the responses rather than of a structure effect due to differences in the set of responding firms from the last survey to the next-to-last one. The constant-sample procedure is applied to the answers to the monthly questions dealing with the firm or its products but not to either more general monthly questions or quarterly ones.

[32] From now on, the non-weighted balances/common factors will be referred to by using the same name as the corresponding published balances/common factors to the addition of a "0" in parenthesis. For instance, $DEM^{ex}(0)$ denotes the non-weighted balance relating to expected demand in services.

[33] The synthetic indicators in industry and services are calculated on the basis of seasonally adjusted balances.

[34] The GDP growth rate can be considered as stationary without ambiguity. The stationarity of the balances is accepted at least by the KPSS test at a usual threshold.

synthetic indicators in industry and services (in addition to other models based on balances of opinion considered separately) prove to perform relatively well. A possible extent to the present study might consist in trying to introduce additive composite indicators derived from a restricted set of balances containing the most leading ones as concerns GDP growth. The drawback of this approach, however, would be to limit the number of factor components to a lower number, so that the calculation of a common factor would lose part of its interest. All in all, even though one might envisage to introduce other composite indicators specifically elaborated as CLIs in addition to those considered in this study, we have chosen, as a first approach, to focus on kinds of composite indicators that are usually introduced in forecast models by French short-term analysts. The main point at this stage is to allow the comparison of the forecast performances of several individual and composite indicators, which, as is suggested in the literature, may perform differently - cf above, section I.

More fundamentally, we chose to restrict ourselves to balances of opinion and composite indicators based on balances, while many other quantification methods of the individual responses to the surveys might have been tested. There are three reasons for this choice. First, balances of opinion refer to the official quantification method used to publish the INSEE BTS and, more widely, the surveys belonging to the joint harmonised EU programme of business and consumer surveys. Second, Clavería et al. (2007) do not find notable differences between results derived from balances or, alternatively, other quantification methods. Last, there is no unambiguous evidence on INSEE data that balances should perform less well than other quantification methods[35].

II.2 Four Sets of Models of Two Different Kinds

We aim to elaborate forecasting models of the quarterly GDP growth rate that enable us to up-date our forecasts every month, using the last available data. To do so, we apply a methodology suggested by Dubois and Michaux (2006) and used since then by INSEE short-term analysts on macro data[36], which requires introducing the following notations. If x is a monthly series derived from either the industry or the service survey, let x_{m1} (x_{m2}, x_{m3} respectively) denote the quarterly series whose value at any quarter q is equal to that at the first (respectively second, third) month of quarter q. Let, in addition, x_{m4} denote the quarterly series whose value at quarter q is equal to that at the first month of the following quarter q+1. Quarterly series can also be transformed in the same way, but their sub-series x_{m2} and x_{m3} contain missing values only. The interest of considering sub-series x_{m1} to x_{m4} is that one does not have to transform the monthly data into quarterly data using averaging or extrapolation econometric techniques[37]. One, thus, fully uses the piece of information given in the monthly surveys[38].

For instance, suppose that, at the end of January of year y [39], one wishes to forecast the quarterly growth rate of GDP (g) at the last quarter of the previous year y-1 (*backcast*) at a one-step horizon and at the current quarter (*nowcast*) at a two-step horizon. As concerns the backcasting of the previous quarter, for any possible regressor x, one should intuitively gain

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[35] Such as the quantification introduced by Mitchell, Smith, and Weale (2004, 2005), for instance - cf Biau, Erkel-Rousse, and Ferrari (2006-2007). However, some recent applications on French data introducing non-standard quantification methods (Hild, 2003 and 2007, Biau, Biau and Rouvière, 2006-2007) suggest that this issue might deserve future research.

[36] Cf for instance Cornec and Deperraz (2006-2007).

[37] For illustrations of these techniques, see Darné and Bruhnes-Lesage (2007) or Bouton and Erkel-Rousse (2003-2004), for instance.

[38] Doing so, we hope to better capture the fluctuations of GDP growth than if we used quarterly data derived from the averaging of the monthly data, for instance. Another way of dealing with this issue would be to use models à la Doz, Giannone and Reichlin (2006), where quarterly series (including the national account series of interest) are treated as monthly series with missing data. This alternative approach is left for further research, the paper aiming, at this stage, to focus on methods used in INSEE for operational forecasting.

[39] At that time, the last available observation of the quarterly accounts refers to the third quarter of the previous year and the surveys relating to January of year y have just been published.

in quality by using a model linking *g* to sub-series x_{m4}, which encompasses the timeliest information on that quarter (possibly together with less recent observed values of other sub-series). Conversely, one should intuitively improve the accuracy of our nowcasts by using a model linking *g* to sub-series x_{m1}, which encompasses the timeliest information on the current quarter (also possibly together with less recent observed values of other sub-series). In other terms, to use the most recent monthly piece of information from the two surveys in an optimal way, it might be to our advantage to resort to different models depending both on the position of the current month in the quarter and the forecast horizon *h*. Figures 1.4 in Appendix 1 illustrate the way subseries relating to *m*1 to *m*4 evolve with respect to one another, with the example of the published common factors in industry and in services. The subseries relating to quarter *m*4 are slightly more leading than those relating to *m*1.

We, therefore, update our forecasts of GDP growth every month. In months *m1* (for "first month" in the current quarter, that is to say January, April, July, and October) we estimate forecasting models for the current and following quarters; in months *m*2 (February, May, and November) and months m3 (March, June, September, and December) we update these forecasts using other models; in months *m4* (to differentiate from forecast models relating to months *m*1, but still in January, April, July, and October) (months "*m*4") we also define new models for the forecasting of the previous and following quarters. Note that, due to the absence of survey in August until 2007, we do not calculate forecasts at the end of this month[40].

As concerns the kinds of models used, several papers suggest that simple linear models perform at least as well as more complex models (cf section I above). Consequently, we restrict ourselves to linear models for the sake of simplicity. The diagnosis concerning the relative predictive accuracy of multivariate VAR models (leading to "indirect" iterated forecasts) on the one hand, and univariate multistep models (leading to "direct" *h*-step forecasts) on the other hand is less clear. Therefore, we test both kinds of models. Moreover, the issue of whether it is more appropriate to use either composite indicators or their components separately in forecasting models is subject to controversies in the literature. Therefore, we test both VAR models with common factors or, alternatively, individual balances of opinion. We utilize the multistep univariate models to calculate GDP growth forecasts for the current, next and next-to-next quarters, which corresponds to either forecasts at the one, two, and three quarter horizons, or to forecasts at the two, three, and four-quarter horizons, depending on the month when the forecast exercise is performed. Besides, we calculate forecasts up to the four-quarter horizon from the VAR models. Performing forecasts at longer quarter horizons does not seem to be of much interest, most assessments of the BTS contributions to forecasting suggesting that this kind of surveys is essentially useful in the very short run. See table 2, next page, for an overall view of the agenda of the quarterly accounts releases in France together with that of our successive forecasts, using either VAR or univariate multistep models of GDP growth.

As is stressed in the literature, the variable-selection stage seems to be of high importance for the results and, therefore, requires some special care. The methods used in this respect in the paper depend on the models, whose main characteristic features differ notably. This point is addressed in the following two sub-sections.

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[40] Although there is no additive information from the BTS in August (including in 2008 for seasonally-adjusted series), one might nonetheless wish to perform forecasts at the end of this month due to the release of a new piece of information (that of the first release of the quarterly accounts for the second quarter of the current year). As our aim, however, is to assess the contribution to GDP growth forecasting of the BTS, not that of the past values from the national accounts, we chose not to consider forecast up-dates due to non-BTS sources.

Table 2: Agenda of INSEE Quarterly Account Releases and Consequent *h*-Step Forecasts

Current quarter[a]	End of current month	Month in the current quarter	Last released GDP figure[b]	*h*-step forecasts[c]			
				h = 1	*h* = 2	*h* = 3	*h* = 4
(*y*-1)*q*4	January	*m*4	(*y*-1)*q*3 DR	(*y*-1)*q*4	*yq*1	*yq*2	*yq*3
*yq*1	January	*m*1	(*y*-1)*q*3 DR	(*y*-1)*q*4	*yq*1	*yq*2	*yq*3
*yq*1	February	*m*2	(*y*-1)*q*4 FR	*yq*1	*yq*2	*yq*3	*yq*4
*yq*1	March	*m*3	(*y*-1)*q*4 FR	*yq*1	*yq*2	*yq*3	*yq*4
*yq*1	April	*m*4	(*y*-1)*q*4 DR	*yq*1	*yq*2	*yq*3	*yq*4
*yq*2	April	*m*1	(*y*-1)*q*4 DR	*yq*1	*yq*2	*yq*3	*yq*4
*yq*2	May	*m*2	*yq*1 FR	*yq*2	*yq*3	*yq*4	(*y*+1)*q*1
*yq*2	June	*m*3	*yq*1 DR	*yq*2	*yq*3	*yq*4	(*y*+1)*q*1
*yq*2	July	*m*4	*yq*1 DR	*yq*2	*yq*3	*yq*4	(*y*+1)*q*1
*yq*3	July	*m*1	*yq*1 DR	*yq*2	*yq*3	*yq*4	(*y*+1)*q*1
*yq*3	August	*m*2	*yq*2 FR	*yq*3	*yq*4	(*y*+1)*q*1	(*y*+1)*q*2
*yq*3	September	*m*3	*yq*2 DR	*yq*3	*yq*4	(*y*+1)*q*1	(*y*+1)*q*2
*yq*3	October	*m*4	*yq*2 DR	*yq*3	*yq*4	(*y*+1)*q*1	(*y*+1)*q*2
*yq*4	October	*m*1	*yq*2 DR	*yq*3	*yq*4	(*y*+1)*q*1	(*y*+1)*q*2
*yq*4	November	*m*2	*yq*3 FR	*yq*4	(*y*+1)*q*1	(*y*+1)*q*2	(*y*+1)*q*3
*yq*4	December	*m*3	*yq*3 FR	*yq*4	(*y*+1)*q*1	(*y*+1)*q*2	(*y*+1)*q*3
*yq*4	January	*m*4	*yq*3 DR	*yq*4	(*y*+1)*q*1	(*y*+1)*q*2	(*y*+1)*q*3
(*y*+1)*q*1	January	*m*1	*yq*3 DR	*yq*4	(*y*+1)*q*1	(*y*+1)*q*2	(*y*+1)*q*3
(*y*+1)*q*1	February	*m*2	*yq*4 FR	(*y*+1)*q*1	(*y*+1)*q*2	(*y*+1)*q*3	(*y*+1)*q*4
(*y*+1)*q*1	March	*m*3	*yq*4 DR	(*y*+1)*q*1	(*y*+1)*q*2	(*y*+1)*q*3	(*y*+1)*q*4

a) *yqn* = n^{th} quarter of year *y*, *n* = 1 to 4, with the convention defined above for *m*4.

b) FR = First Results, DR = Detailed Results. Note that the release agenda of the French quarterly accounts has evolved over time. The description given here corresponds to the current agenda.

c) Grey tint: forecasts of the current, next, and next-to-next quarters. The concepts of forecasts of the current, next and next-to-next quarters (used in our multistep models) coincide with those of one, two and three-step forecasts used in our VAR models, except in month *m*1, when they correspond to, respectively, two, three, and four-step forecasts.

II.2.1 Variable Selection in the Case of VAR Models

Due to the limited length of the time series, we restrict ourselves to VAR models with at most three variables (VAR3): the GDP quarterly growth rate *g*, a variable relating to industry *IND*, and a variable relating to services, *SER*, to be compared, respectively, with VARs with two variables (*g* and *IND* or, alternatively, *g* and *SER*) and with simple autoregressive models (ARs) of GDP growth (*g*). The VARs with two variables (hereafter referred to as VAR2i and VAR2s, the suffix i or s describing the survey variable which is kept in the VAR, i.e. either *IND* or *SER*) and the AR model of GDP growth to be compared with a given VAR3 derive from the latter by imposing exclusion restrictions on the coefficients relating to either *SER* alone, or *IND* alone, or to both *SER* and *IND*, and suppressing the equation(s) relating to either *SER* or *IND* or both variables. In other terms, every set of three models (VAR3, VAR2i/s, AR) to be compared consists of nested models. For a given month *mi* (*i* = 1 to 4), the selection of the industry (*IND*) and service (*SER*) variables included in the VARs results from a preliminary in-sample analysis carried out on every possible combination of series (*IND*, *SER*) within the set of subseries relating to month *mi* derived from the balances and common factors defined in sub-section II.1 (see sub-section III.1 below and Appendix 2 for a summary of the main stages and results of the in-sample analysis).

The exploratory econometric analysis on the whole period 1988Q1-2008Q4 using the last available survey and national account releases[41] shows that VARs with two lags are most

[41] Namely the February 2009 survey releases and the quarterly accounts relating to the first results of 2008Q4.

often accepted against VARs with more lags[42]. However, a check on subperiods suggests that, for the very shortest ones (especially those ending before the end of 2001), some fourth lags may be significant (depending on both the VAR and the equation in the VAR). An attempt to estimate unrestricted VARs with four lags proved to be quite unsatisfactory as the high number of non-significant coefficients, together with the occurrence of collinearity in some cases, led to both mediocre adjustment properties and low power of subsequent tests. In practice, we, therefore, worked on restricted VARs with four lags. The restrictions on the coefficients of the VARs with three variables were defined so that they were accepted at any estimation period used in the out-of-sample analysis as well as in the included VARs with two variables VAR2i and VAR2s and the encompassed univariate autoregressive model of GDP growth.

The main advantages of VAR models over simple bridge equations are that VARs allow one to take into account feedbacks from the quarterly variable of interest to the survey variables, which may be useful when making forecasts at “distant” *h*-horizons ($h > 1$). Moreover, the same VAR can be used for the forecasting at several horizons, which is also an advantage. However, even though our VARs were selected from a high number of possible combinations (*IND*, *SER*), the form of a VAR is by nature somewhat restrictive. That is why it can be interesting to supplement the analysis performed on the VARs with an analysis carried out on univariate multistep models. In fact, the specification of univariate models is far less restricted and more regressors can be included in univariate models before coming across excessively low degrees of freedom[43].

II.2.2 Variable Selection in the Case of Univariate Multistep Models

The set of pre-selected variables for this kind of models consists of *mi* subseries (i = 1 to 4) relating to the five service balances introduced in sub-section II.1 above (either the five published balances or, alternatively, the five non-weighted corresponding ones), as well as four or five industry balances (e.g. two or three monthly ones plus the two quarterly ones). We did not make any preselection of the service balances before resorting to any automated or manual model-selection procedure, since their number is limited. Conversely, we had to preselect subsets of monthly industry balances[44] ex ante, for two reasons. First, a robust use of automated model-selection procedures is not compatible with too big initial sets of variables (due to the relatively short estimation period, notably). Second, our assessment of the contribution of the service survey to the forecasting of GDP growth forecasting might have been biased against the service survey if the number of monthly industry balances had exceeded the number of monthly service balances excessively. In fact, the monthly industry balances are observed on the whole period, while the monthly service balances are partly retropolated from the quarterly data from January 1988 to May 2000. By restricting the number of monthly industry variables to subsets of two or three ones (e.g. to at most the same number as that of monthly service balances plus one), we, therefore, tended to create the conditions for a balanced enough analysis. In practice, we did not restrict the resulting industry models excessively, since the balances that were left aside from any given subset of industry balances very seldom appeared together with the preselected variables within calibration models of GDP growth based on either manual or automated selection procedures applied on the whole set of industry balances. Whenever possible, the preselection of industry-variables was based on a preliminary in-sample analysis (detailed in sub-section III.1 below), which confirmed the INSEE experience in GDP forecasting as for which balances perform well in GDP growth forecasting depending on the forecast horizon.

[42] For each VAR, systematic tests of the number of lags were carried out up to seven lags.

[43] Note, however, that the univariate multistep models may not compulsorily outperform the VARs, even at the one-quarter forecast horizon, for the simple reason that they encompass more variables. In fact, in a slightly different context (that of factor analysis), Boivin and Ng (2006) suggest that the forecast accuracy does not necessarily increase with the number of series included in the model. Moreover, Bańbura and Rünstler (2007) find that most of the predictive content of their large scale model is contained in a small set of variables.

[44] More precisely, two or three monthly industry balances were preselected within the set of those relating to past and expected production, overall orders, and past and expected demand.

For example, the more distant the forecast horizon the more balances relating to the near future tended to be preselected.

Once the industry variables were preselected, we used the Dubois-Michaux (2006b) model specification, introducing for each preselected industry (or industry-and-service) the subseries relating to the *levels* of the balance, plus two series per balance relating to monthly differences[45]. Thus, for each month *mi*, forecast horizon *h*, and kind of service variables (either weighed or not) we defined variable subsets which amounted to at least 12 possible regressors for models based on a single survey and 24 possible regressors for models based on the two surveys. We carried out the last stage of the variable selection process by estimating the models on the period 1988Q1 to 2006Q4, for which all series are available on full years, using the last available survey and quarterly-account vintages at the moment when the empirical work was carried out.

More precisely, for each month *m*1 to *m*4, forecast horizon *h*, sector coverage (industry or industry plus services), and kind of service variables (weighted or not) we estimated two forecasting models. As concerns the forecasting of the current and next quarters, we considered a model based on mixing *savoir-faire* and automated selection (hereafter referred to as the “manual” model), together with a model determined from a purely automated selection procedure (hereafter referred to as the “automatic” model). For a given subset of preselected variables, the automated selection procedure chosen (see below) led to an “automatic” model. In that model, however, some estimated coefficients might show some puzzling unexpected signs[46] or some variables might be pointed out as little reliable[47]. An iterative manual stage, then, occurred, which consisted mainly in keeping the clearly reliable variables and sometimes adding some other variables until obtaining satisfactory results (among which coefficients of the expected signs). This stage led to the “manual” model. As concerns the forecasting of the next-to-next quarter, the cumulated past experience is scarce as it mostly suggests that the contribution of BTS at this horizon is hardly significant. Therefore, we limited ourselves to the estimation of two “automatic” models[48], with industry regressors derived from two different sets of preselected balances: either ($PROI^{pa}$, $PROI^{ex}$, *OORI*, $DEMI^{pa}$, $DEMI^{ex}$) or ($PROI^{ex}$, *FORI*, $GENI^{ex}$, $DEMI^{pa}$, $DEMI^{ex}$)[49].

Whenever it was used, the automated selection procedure applied was that proposed by Hoover and Perez (1999), as refined by Krolzig and Hendry (2001). The detailed procedure is explained in Dubois and Michaux (2006b) and programmed in the GROCER package of the Scilab software[50]. Let us just mention that this iterative procedure combines several stages and arborescences involving descending elimination processes, along which non-significant variables and models which do not satisfy a certain number of specification tests are progressively eliminated, as well as stages at which the models that have passed the previous elimination process are compared, using Fisher tests in encompassing models and AIC, BIC or HQ criteria[51].

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45 For instance, for any balance x, x_{m1} -lag(x_{m3}) and lag(x_{m3}) - lag(x_{m2}).

46 Such as, for instance, a negative sign of a variable relating to expected production.

47 The automatic procedure contains a reliability criterion for each regressor, based on the estimation on two sub-periods of the same length. A regressor is considered to be more or less reliable if it enters more or less significantly in both subperiod estimations.

48 Limiting ourselves to clearly reliable variables at a such distant horizon would have led us to put aside too many BTP variables. That is why we stuck to automatic models.

49 The choice of the balances in the second set was very pragmatic. As the quarter to be forecasted was the next-to-next one, the second set of balances tended to prefer monthly balances relating to the near future. That dealing with general expectations, therefore, replaced that relating to past production. In this context, the balance relating to foreign orders seemed to be less redundant than that relating to overall orders.

50 See Dubois and Michaux (2006a) for a presentation of GROCER, which is freely downloadable from Dubois’s home page. See also Hendry and Krolzig (2005).

51 The specification tests are: the Lagrange multiplier of residual autocorrelation of order 5 (Godfrey, 1978), the Doornik and Hansen (1994) normality test, the quadratic heteroskedasticity test between regressors (Nicholls and Pagan, 1983), the Chow test of predictive failure on, respectively, 50% and 90% of the estimation period. This set of tests constitutes those recommended by Krolzig and Hendry (2001). In the GROCER package, the coefficients’ significance tests are performed at 5% and the specification tests at 1% at the first stage of the selection process (again following Krolzig and Hendry, 2001), and the Fischer tests of model selection (at the fourth stage of the process) are carried out at the 5% threshold - for more details, see Dubois and Michaux (2006a,b).

The models based on industry plus service variables were estimated in the same way as the purely "industry" models, with the same preselected industry variables as those that appeared in the "industry" models relating to the same month and step. The selected variables within each multistep model resulting from the selection and estimation process detailed in this sub-section are presented in Appendix 3.

II.2.3 Other Estimation and Simulation Characteristics

Real-time analysis was performed as far as possible. More precisely, GDP figures used within a model estimated at a given subperiod ending at month *n* of year *y* are those that were available at that time. This is crucial for the analysis since GDP figures can be markedly revised over time, depending on the quarters - see Appendix 1, Figure 1.6 for an illustration. Similarly, all common factors that appear in a model estimated on a given subperiod were estimated on the same subperiod. However, as figures 1.7 in Appendix 1 show, the revisions on the common factors from one estimation subperiod to another are limited. The only variables that are not purely real-time are the underlying balances of opinion, whose successive releases are not easily accessible[52]. As a first approximation, we used the truncated series derived from the last release at the moment when the empirical work was performed (i.e. that in February 2009). This should not significantly alter the results. In fact, raw balances are very little revised over time[53]. The main source of revision lies in the seasonal adjustment procedure: every year, raw balances are seasonally adjusted using all available observations. This may change some past values of seasonally adjusted balances slightly. However, on the whole, the revisions of balances are very limited, so that the main sources of revisions are taken into account in our out-of-sample analysis.

An almost-real-time out-of-sample analysis is necessary to shed light on how useful the industry and service surveys are for the forecasting of GDP growth in the short run. This analysis requires estimating and, then, simulating our selected forecast models on various subperiods within the whole period 1988Q1-2008Q4. There are two different ways of defining the various estimation subperiods: by carrying out either recursive or rolling estimations. As the literature does not conclude on the respective merits of either kind of estimations in the results, we carried out both. Recursive estimation consists in estimating every selected model successively from an initial quarter *q*0 to quarter *q*, for every *q* comprised between *q*1 and *q*2, *q*0 being given[54]. When rolling estimation is used, the estimations are successively carried out from quarter *q-L* to quarter *q*, for every *q* comprised between *q*1 and *q*2, *L* being given[55]. The relative advantages of recursive estimation are that the latter reflects short-term analysts' common practice and uses longer estimation periods on average. Rolling estimation, however, has advantages too: first, the lengths of all estimation periods are the same, which might intuitively lead to more homogenous forecast series as concerns predictive accuracy; above all, if some structural breaks occur within the period under analysis, rolling estimation may lead to better estimated models than recursive estimation by allowing the estimated coefficients to evolve over time to a larger extent. Such structural breaks probably occurred between 1988Q1 and 2008Q4, notably due to major evolutions in France's international environment within the period. This might explain the presence of instability in the estimation results (such as the evolving significance mentioned above of some fourth lags in the VARs depending on the estimation subperiod). This relative instability in forecasting models based on leading indicators is a current result in the literature. However, instability is considered to be less detrimental when the estimated coefficients evolve regularly and smoothly than when they experience strong variations. This is the case as concern our estimated models.

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[52] They should be more easily accessible within one or two years.

[53] Raw balances relating to month (quarter, for quarterly balances) *n* are revised once, at the end of the month (resp. quarter) following their first release, to take late responses into account.

[54] *q*0 varies from 1988Q2 to 1989Q1 depending on the number of lags in the model, *q*1 = 1999Q3 or 1999Q4 depending on the month in the quarter, and *q*2 = 2008Q4.

[55] *q*1 and *q*2 are the same as for the recursive estimations (see previous footnote). Depending of the number of lags in the different models, *L* varies between 44 and 47.

Whatever the estimation technique (recursive or rolling), the univariate multistep and AR models were estimated using OLS, whereas the restricted VARs were estimated using SURE[56]. The estimations of multistep models were performed using the GROCER package of the Scilab software (see above), while the VAR models were estimated using the SAS software (syslin procedure). Then, forecasts at the one, two, three and four-quarter horizons were carried out using the VAR and AR models (for those estimated on a subperiod ending at quarter *q*, for quarters *q*+1, *q*+2, *q*+3, and *q*+4). As for the multistep models, we restricted ourselves to the forecasting of the current, next and next-to-next quarters, which correspond to either the one-to-three or the two-to-four forecast horizons - cf table 2 above. The comparison of these forecasts with the observed GDP growth rates published for the corresponding quarters led to the calculation of series of forecast errors (one series per model, forecast horizon and GDP benchmark series). As concerns the GDP benchmark series, the first releases are the most interesting ones for short-term analysts, since they are accessible for comparison short after their forecasts are published. Therefore, they constitute the short-term analysts' favourite benchmarks[57]. Last available releases, however, are interesting too, as BTS might encompass leading enough pieces of information to allow one to forecast the definitive account releases on their basis[58]. Therefore, we considered both benchmark series systematically[59]. At the moment when the empirical work was carried out, the last available GDP series consisted of definitive figures until the end of 2005Q4 and still provisional figures afterwards. Therefore, we carried out tests of predictive accuracy on the two periods 2000Q1-2005Q4 and 2000Q1-2008Q4[60]. As the results of predictive accuracy tests are known to significantly depend on the simulation periods (cf above, section I), carrying out such tests on two different periods may also enable us to give a rough assessment of the degree of dependence of our results on the simulation period.

II.3 Tests of Predictive Accuracy

We calculated the mean-squared-forecast error (MSFE) of each series of forecast errors at our disposal and we compared the MSFEs of different sets of three models (one containing service and industry variables, one industry or (exclusive) service variables, and another no survey variable), for each month *m*1 to *m*4, forecast horizon *h*, benchmark GDP series (first or last available release), and out-of-sample simulation period (beginning in 2000Q1 and ending either in 2005Q4 or in 2008Q4). In the following paragraphs, we focus on given month m*i*, forecast horizon *h*, benchmark GDP series, simulation period, and set of three models.

In the case of three non-nested models, we tested the hypothesis of equal predictive accuracy of one model with respect to another within the set of three models, using the modified Diebold and Mariano (1995) test suggested by Harvey, Leybourne and Newbold (1997). To compare the forecast accuracy of two models among the three ones, we calculated the difference d between the MSFEs of the forecast series derived from the two models at stake. The test statistic is homogenous to the ratio of this difference to the root of its estimated variance, i.e. to a *t* statistic. The estimation of the variance requires some care, as the forecast errors are generally autocorrelated. Moreover, Harvey et al. (1997) recommend calculating the *t* statistic using a small-sample correction (even though the test remains an asymptotic one, with the resulting *t* statistic following a normal distribution with *n*-1 degrees of freedom, where *n* is the number of available forecasts). It is noteworthy that each test performed was a unilateral test, as we wished to know which model performed better if the null hypothesis of equal accuracy $t = 0$ was rejected. The direction of the

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56 OLS = ordinary least squares. SURE = Seemingly Unrelated Regression Estimation.
57 Conversely, definitive results are published three years later.
58 This is suggested by Hild (2004).
59 The two series are represented in Figure 1.4, Appendix 1. The two curves show significant differences at some periods.
60 Remember that, for "*m*2" models, not all quarters within these periods are available, since no forecasts are made in August.

inequality in the alternative hypothesis depends on the sign of the *t* statistic. If the latter is positive, then the alternative hypothesis is expressed as: $t > 0$; else it is expressed as: $t < 0$.

In case of nested models, Clark and West (2007) point out that both the Diebold and Mariano (1995) and Harvey et al. (1997) tests may be biased to the detriment of the less parsimonious model. In fact, under the null that the parsimonious model generates the data, the larger model introduces noise into its forecasts by estimating parameters whose population values are zero. The authors, thus, observe that the MSFE from the parsimonious model is expected to be *smaller* than that of the larger model. They describe how to adjust MSFEs to account for this noise. Instead of considering the previous difference:

$$d = MSFE_1 - MSFE_2 = n^{-1}\sum_q \left(y_{q+h} - \hat{y}_{1q,q+h}\right)^2 - n^{-1}\sum_q \left(y_{q+h} - \hat{y}_{2q,q+h}\right)^2 ,$$

where 1 refers to the more parsimonious model, 2 to the larger model, *h* is the forecast horizon, y_{q+h} denotes the observed GDP growth figure at quarter *q+h*, and $\hat{y}_{iq,q+h}$ the forecast of GDP growth calculated at quarter *q* for quarter *q+h*, using model *i*, *i* =1, 2, Clark and West (2007) introduce a corrected $MSFE_2$:

$$MS\tilde{F}E_2 = n^{-1}\sum_q \left(y_{q+h} - \hat{y}_{2q,q+h}\right)^2 - adj., \quad \text{with } adj. = n^{-1}\sum_q \left(\hat{y}_{1q,q+h} - \hat{y}_{2q,q+h}\right)^2 .$$

They divide the adjusted difference $\tilde{d} = MSFE_1 - MS\tilde{F}E_2$ by the root of its estimated variance, with the same care for variance estimation as in the case of the Diebold and Mariano (1995) and Harvey at al. (1997) tests, thus generating a *t* statistic. As in the case of non-nested models, unilateral tests must be performed, with the specification of the alternative depending on the sign of the *t* statistic.

In order to test the robustness of the results, we calculated the test statistics in three different ways. First, we used Newey-West (1987) estimated variances. The resulting test statistics were computed in GROCER. From these *t* statistics, we performed unilateral tests using unilateral quantiles. The main drawback of this way of proceeding, however, is that it does not enable one to test the autocorrelation order of the error-term *u* in the underlying linear models:

d_q = intercept + u_q (1)

where d_q denotes the value in quarter *q* of either d or $\tilde{d}$, depending on the test performed.

Therefore, we also estimated the models (1) directly, using the AUTOREG procedure of the SAS software, allowing for, at most, six lags in the AR model of the error-term *u* and imposing the active option *Backstep*. This option tests the significance of each autocorrelation term within the six possible ones and removes the non-significant ones. Yule-Walker estimates are derived from the AUTOREG procedure, as well as *t* statistics of the significance of the intercept. We used these *t* statistics to perform unilateral predictive accuracy tests on their basis.

This second testing device has two drawbacks: first, the Harvey et al. (1997) small-sample correction is not applied in case of non-nested-model comparisons; second, the distribution quantiles used are those of the normal distribution. As the lengths of our forecast errors were relatively short, especially those derived from the *m*2 models, we decided to perform at least one set of “true” finite-sample tests. To do so, we transformed the linear models (1) into models with non-autocorrelated error-terms, using a transformation *à la* Durbin:

d_q = intercept’ + $a_1 d_{q-1}$ + …. + $a_r d_{q-r}$ + v_q (2)

where *r* is the autocorrelation order of the error-term *u* in model (1), intercept' =(1 -ρ_1 - … - ρ_r) × intercept and $a_i = \rho_i \ \forall i = 1$ to r, (3)

the ρ terms denoting the autocorrelation coefficients in the AR(r) model:

$$u_q = \rho_1 u_{q-1} + \ldots + \rho_r u_{q-r} + v_q \qquad (4)$$

As far as the autocorrelation terms were concerned, as we did not want to limit the number of degrees of freedom excessively, we restricted ourselves to r $\leq$ 6 and we started with $\rho = (\rho_1, \rho_2, \rho_3, \rho_4, \rho_5, \rho_6)$ vectors satisfying the set of restrictions derived from the AUTOREG procedure previously carried out on models (1). Then, we checked that the error terms v in the resulting models (2) could be considered as non-autocorrelated, using Durbin-Watson (DW) tests. If this was not the case, we made the slightest possible modifications of the sets of non-zero terms in vectors ρ allowing the error-terms in the resulting models (2) to become non-autocorrelated. Resulting models (2) were estimated using OLS. We used the t statistics of the modified intercept to perform unilateral tests of predictive accuracy, reversing the inequality sign in the alternative in cases when the estimated (1 - ρ_1 - ρ_2 - ρ_3 - ρ_4 - ρ_5 - ρ_6) (obtained from the estimation of the a_i parameters in (2) - cf (3)) were negative. These are finite-sample tests, whose degree of freedom is equal to n-p, where p is the total number of non-zero parameters in (2) (including the intercept) and the quantiles are those of the Student distribution.

It is noteworthy that none of the three ways of proceeding can be considered as strictly better than the two others. The second device determines the autocorrelation terms of the u terms endogenously, but does not apply any finite-sample correction, contrary to the first device. The latter device also reflects the state of art as concerns the variance estimation method, while the second one uses an older procedure. Last, the third device leads to a finite-sample test, but the DW statistic's "ideal" value of 2 is asymptotic[61]. Moreover, when calculated in models containing autoregressive terms, the DW statistics may be biased towards 2. In sum, our approach must be viewed as rather pragmatic. We aimed by no means to find a better testing procedure than the standard one. Our approach consisted above all in trying to slightly shock the test statistics in order to assess the robustness of our results. As will be shown in the next section, the battery of tests that were performed (3 tests for each kind of estimation, rolling or recursive) indeed permitted us to qualify our results, especially when they were ambiguous.

Last, we tried to take into account the initial handicap of the service series with respect to the industry ones, notably due to the fact that a significant part of the monthly service series derives from interpolation[62], by considering (together with standard thresholds) higher thresholds as concerns the comparison of models including services with models excluding them.

More precisely, we summarise the results of the tests using the following asymmetric classification:

1) If the sign of a t statistic suggests a possibly better forecast accuracy of a model including service variables with respect to a model excluding service variables, the contribution of the former model is considered to be:

H: Highly significant if the P-value of the test is lower than 0.005
S: very significant if 0.005 < P-value $\leq$ 0.01
2: significant at the 2.5% threshold (but not at the 1% one: 0.01< P-value $\leq$ 0.025)
5: significant at the 5% threshold (but not at the 2.5% one: 0.025< P-value $\leq$ 0.05)

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[61] We tried to take these properties into account and, since we worked on small samples, we accepted DWs comprised between 1.5 and 2.5.

[62] The fact that the service survey is much more recent than the industry survey and was subject to notable evolutions within the period under analysis, while the industry survey experienced less notable changes, may be considered to be another source of handicap as far as the tests of predictive accuracy for the service survey are concerned. This source of handicap involves both the monthly and quarterly data.

T: significant at the 10% threshold (but not at the 5% one: 0.05 < P-value ≤ 0.10)
L: "limit 10%", i.e. close to significance at the 10% threshold (0.10 < P-value ≤ 0.15)
A: ambiguous (0.15 < P-value ≤ 0.20)
N: clearly non-significant

2) Else, with respect to the model excluding service variables, the model including service variables is considered to perform:

1: significantly less well at the 1% threshold
2: significantly less well at the 2.5% threshold (but not at the 1% one)
5: significantly less well at the 5% threshold (but not at the 2.5% one)
T: significantly less well at the 10% threshold (but not at the 5% one)
U: non-significantly less well (P-value > 0.10).

In the case of a test aiming to assess the significance of the contribution of industry variables to GDP forecasting, conversely, the 'L' and 'A' results can be less ambiguously read as "non-significant"'. Besides, the comparison of two models of the same kind (for instance a VAR model with industry and service variables and a multistep model also including industry and service variables[63]) also requires a symmetric treatment of the positive and negative values of the tests statistics (in the example given, we broke up the U case defined in the negative *t*-stat case into the three cases L, A, and N introduced in the positive *t*-stat case).

[63] This kind of comparison was also carried out - cf sub-section III.2.3 below.

III - Main Results

III.1 In-Sample Analysis

The in-sample analysis was performed on the period 1988Q1-2008Q4, using the last available releases of both the quarterly GDP growth rate and the survey variables at the moment when the empirical work was carried out.

First, we calculated the simple correlations with the quarterly GDP growth rate of all survey subseries relating to *mi* (*i* = 1 to 4), as well as their first four lags. Not surprisingly, for a given survey variable (balance or common factor), the more available piece of information (i.e. the higher index *i* in month *mi*, *i* = 1 to 4), the higher the correlations with GDP growth. Similarly, current levels show higher correlations with GDP growth than lagged variables. Moreover, the second, third and fourth lags show rather low correlations with GDP growth in most cases. As expected, the balances relating to the near future tend to be more highly correlated with GDP growth than the other balances in early months[64], while, in month *m*4, some balances relating to the recent past show high correlations. Nonetheless, a few balances dealing with expectations still perform well in late months, as well as their first lags. On average, the variables that show the highest correlations with GDP growth refer to industry, especially in month *m*3. The balance concerning expected production proves to be quite regular in this respect, as well as the one relating to expected demand, when it is available. The three common factors in industries are also rather highly correlated with GDP growth, especially in the late months. As far as the service variables are concerned, the non-weighted balances derived from non-completed individual responses show slightly higher correlations with GDP growth than the corresponding published balances, especially in months *m*1 to *m*3[65] (see remark 1 at the end of the present sub-section for some comments). Within the subset of non-weighted service variables, the balances relating to general expectations[66] and expected demand (and, to a slightly lesser extent those relating to expected turnover and expected or past operating profit) are those which show the highest correlation with GDP growth, together with the dynamic or static common factor, depending on the months - see the first two columns of tables 2.1.1 to 2.1.4 in Appendix 2.

Second, we estimated AR models of GDP growth *g* as well as unrestricted VAR models with two variables, *g* and *IND* (VAR2i) or *g* and *SER* (VAR2s), determining the number of lags in the VARs carefully. The comparison of AR and VAR2 models shows that the inclusion of a survey variable (whatever it is) results in a clear drop in the root-mean-square-error (RMSE) with respect to AR models. On the whole, the variables that show the highest correlations with GDP growth are also those that lead to the lowest RMSE in the VARs with two variables. Note, however, that the balances (especially those relating to the near future) tend to lead to higher RMSEs in the survey-variable equation of the VARs than the common factors. A causality analysis shows that the survey variable (whatever it is, either industry or service) generally causes GDP growth without ambiguity, most often at the 1% threshold, both instantaneously and non-instantaneously (see columns 3, 4 and 6 of tables 2.1.1 to 2.1.4 in Appendix 2). Note that the VARs including an industry variable (especially a common factor) are more likely to be subject to a limited risk of multicollinearity than the VARs including a service variable (higher condition indices for VAR2i than for VAR2s, except for month *m*2, where the condition indices are of the same order of magnitude for the two kinds of models) (cf. column 5 of tables 2.1.1 to 2.1.4 in Appendix 2). In this respect, the models relating to the “non-quarterly” months (i.e. to months *m*2 and - especially for VAR2i-

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64 Early (resp. late) months refer especially to *m*1 (resp. *m*4) and, to a lesser extent *m*2 (resp. *m*3).

65 The slight superiority of the non-weighted and non-completed variables is not observed in the case of the industry variables.

66 The balance on general expectations was included in the in-sample analysis for information only, since the short length of the series (available from June 2000 onwards only) did not permit us to use it in the out-of-sample analysis. The fact that this balance showed the highest correlations with GDP growth among the set of service variables explained that we checked the reason for this result: was it the variable itself that outperformed the others or the fact that it was the only published balance that was non-weighted and non-completed? The answer is: both. In particular, the balance on general expectations might be a useful variable for the forecasting of GDP growth when the length of the series is sufficiently high.

*m*3) are those that are subject to the highest multicollinearity risks. As for the VAR2s models, this result may be related to the quasi-linear interpolation of the quarterly service series before June 2000. In fact, for the VAR2s models, the risk of multicollinearity is nil in months *m*1 and *m*4, whereas the collinearity diagnosis is more ambiguous in months *m*2 and *m*3. As was already stressed, this interpolation of service variables in months *m*2 and *m*3 may constitute a serious handicap for the service BTS, which should be kept in mind when interpreting the results of the predictive accuracy tests in the next sub-sections.

Third, we estimated unrestricted VARs with three variables (VAR3), again determining the number of lags in the VARs carefully. In order to limit the number of VAR3 models to estimate, we preselected the survey variables *IND* and *SER* in the (large) subsets of industry and service variables that led to the lowest RMSEs in the GDP equations of the VARs with two variables. We carried out a causality analysis on the VAR3 models, which led to the following results (see last three columns of tables 2.1.1 to 2.1.4 in Appendix 2). On the whole, most survey variables that perform well in the VAR2 models cause GDP growth significantly in the VAR3 models. However, for early months (especially month *m*1), no service variable causes GDP growth non-instantaneously in the presence of the balance relating to either expected production or expected demand in industry. More generally, the service variables tend to cause GDP growth instantaneously more than non-instantaneously in the presence of an industry variable in the early months. In the late months, conversely, both survey variables generally cause GDP growth instantaneously and non-instantaneously in the presence of another survey variable. Besides, the RMSEs of the VAR3 models are on average slightly lower than those of the VAR2 models. Within the set of VAR2 models, those including an industry variable show on average RMSEs of the same order of magnitude as those including a service variable (0.31 for VAR2i versus 0.32 for VAR2s - see Table 2.1.5 in Appendix 2).

Remarks

1) The non-weighted service balances based on non-completed individual data tend to outperform the weighted balances very slightly (the monthly ones being also based on completed individual data). Both the weighting scheme and the completion procedure may have an impact on the correlation with GDP growth.

- Aggregating individual responses using weights based on firm and sector sizes may have a negative effect if some very big service firms or sectors[67] gave imprecise, inaccurate or partial answers at times within the period under analysis. The fact that the non-weighted balances tend to be smoother than the weighted balances since they are less sensitive to the fluctuations of the responses given by the few biggest surveyed firms may also be at stake as such. Although the series of GDP growth from the quarterly accounts are less smooth than balance series derived from survey data, smoother balances might lead to slightly better results than less smooth ones *on average*. Finally, the impact on the result of more specific configurations occurring during the period under analysis cannot be excluded[68]. In the latter configurations, the slightly better performances of the non-weighted service balances in the in-sample analysis might be the consequence of a specific phenomenon within the given period under analysis while in the former configurations, this result might derive from more general properties of the non-weighted balances.

[67] Such as temporary work, for instance, which is a highly concentrated sector whose responses weigh notably on the overall (weighted) results of the service survey.

[68] For instance, in 1998, the sector coverage of the service survey was modified with the addition of a number of new sectors (see table 1 in sub-section II.1 above) representing a + 25 % increase in the service-survey coverage as measured by the total turnover of the surveyed. The impact on the non-weighted balances should intuitively be lower than that on the weighted ones since the number of the surveyed firms increased by a little more than + 10 % only. However, as no visible break in the series occurred at that time (see figures 1.2 in Appendix 1), it is not clear whether this increase in the sector coverage of the service survey within the period under analysis had any differentiated effect depending on the weighting scheme underlying the calculation of the balances.

- By replacing a missing response with an answer given to a previous survey, the "constant-sample" completion method[69] may induce some lag in the monthly series, which may also lead to slightly lower correlations with GDP growth. However, the completion method is only applied to the monthly parts of the data that have not remained quarterly after June 2000 (in particular the parts of the series before mid 2000 are not concerned by the completion method). Moreover, since the moment when the service and industry surveys became compulsory (i.e. from January 2004 onwards), the response rates of the two BTS have significantly increased, especially for big firms, and the extent to which the "constant-sample" completion procedure had to be applied has decreased accordingly[70]. Intuitively, the impact of the completion method might, therefore, be more limited than that of the weighting scheme.

2) The in-sample analysis permits us to select several VAR3 models for each month *m*1 to *m*4 showing *relatively* low RMSEs[71] and in which both the industry and the service variables cause GDP growth at least instantaneously (see column 9 of tables 2.1.1 to 2.1.4 in Appendix 2). It is noteworthy that the VAR3 models that can be selected at this stage of the empirical work are much more numerous in the case of "quarterly" months *m*1 and *m*4 (resp. 12 and 13 models) than in "non-quarterly" months *m*2 and *m*3 (6 models for each of these two months). This is due to the fact that fewer service variables cause GDP growth in the presence of an industry variable in months *m*2 and *m*3 than in months *m*1 and *m*4. This result, again, suggests that the short length of the observed monthly service series might lead to fragile results as far as "non-quarterly" months are concerned. In any case, the VAR models used in the out-of-sample analysis derive from this selection in the sense that they are based on the same couples of survey variables. However, they differ from the VARs studied in the in-sample analysis in so far as they are restricted VARs that are estimated taking their adjustment properties into account not only on the whole period 1988Q1-2008Q4 but also on the other sub-periods on which the simulations are carried out. For instance, the VARs estimated with two or three lags on the whole period allow four lags in the out-of-sample analysis since the test of the number of lags on early subperiods demands four lags (cf above, sub-section II.2.1). The number of necessary lags being generally higher on early subperiods than on the whole period, restricted VARs were preferred to non-restricted ones in the out-of-sample analysis, as was, again, explained in sub-section II.2.1 above. The in-sample analysis also influenced the preselection of the balances within the multistep models, as was mentioned in sub-section II.2.2.

III.2 Out-of-Sample Analysis

III.2.1 Comparing the Root-Mean-Square-Forecast-Errors of the Different Kinds of Models

Let us first examine the root-mean-square-forecast-errors (RMSFEs) of the models used (cf tables in Appendix 4). These RMSFEs tend to be of the same order of magnitude or slightly higher than the corresponding RMSEs for close forecast horizons, but significantly higher at the three- and four-quarter forecast horizons. The RMSFEs are high for the three and four-quarter horizons and far from negligible at the one and two-quarter horizons with respect to the orders of magnitude of GDP growth. This result is in line with those of other recent studies on the same kinds of data (for instance Hansson et al., 2005, among many others - cf section I above).

[69] Cf footnote 31 above, for a description of the method.

[70] A preliminary analysis by Bardaji et al. (2009) suggests that the increase in the response rates has not been obtained to the detriment of the quality of the responses. This preliminary analysis, however, was carried out on the industry survey alone at this stage.

[71] "Relatively" i.e. with respect to the other VAR3 models that were estimated. Conversely, in accordance with the literature (cf section I above), we find RMSEs that are high with respect to the orders of magnitude of the variable to be forecast.

At close forecast horizons (i.e. at the one and, to a lesser extent, two-quarter horizons), the models based on BTS variables most often lead to lower RMSFEs than the AR models on the whole simulation period. This is especially true in month *m*1. Moreover, the VARs relating to month *m*1 (as well as some relating to month *m*4) most often show RMSFEs that drop when the number of variables in the VARs increases from two to three variables. This is less clear in the case of models relating to the "non-quarterly" months *m*3 and, to a lesser extent *m*2, where the VAR3 models often lead to RMSFEs of the same order of magnitude as those resulting from the VAR2 models, if not slightly higher. The VARs including an industry variable (VAR2i) often show slightly lower RMSFEs than those including a service variable (VAR2s), even though some exceptions are observed. At distant forecast horizons (e.g. at the three and four-quarter horizons), the most parsimonious models often show lower RMSFEs than the less parsimonious models, whatever the kind of models (VARs or univariate multistep models). This result is in line with Clark and West (2007).

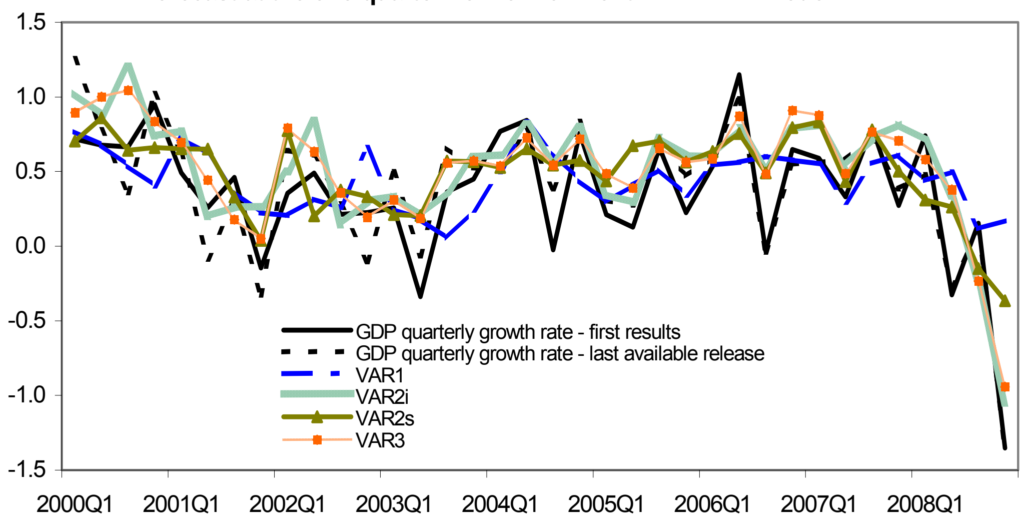
It deserves to be stressed that the RMSFEs tend to be lower on the simulation subperiod ending in 2005Q4 than on that ending in 2008Q4 whatever the kind of model and forecast horizon. This result does not seem to stem mainly from the fact that the French quarterly accounts are definitive on the shorter subperiod and still liable to experience revisions at the end of the longer period. In fact, it still holds when the benchmark is the series of the GDP growth rates corresponding to the successive first releases of the national accounts. In other terms, the GDP growth rate seemed to be less easy to forecast on the basis of the industry and service surveys on average on the subperiod 2006Q1-2008Q4 than on the first half of the present decade.

These results are observed for both recursive and rolling estimation techniques.

Figures 1 and 2, below, give a few illustrative examples of the different forecast series, depending on both the models and the month in the quarter. The figures clearly suggest that the models including variables from one or two BTS perform significantly better than the AR models. The results of the horse race between the models including either both service and industry variables or variables from one survey only are less clear. In this respect, we need to examine the results of the predictive accuracy tests. The latter are presented in Appendix 5.

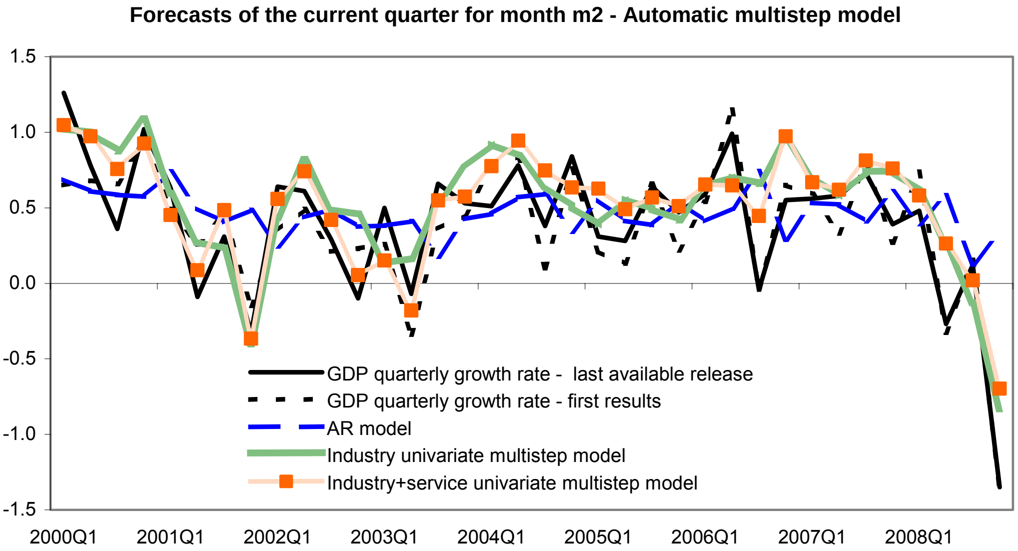
Figure 1: Example from VAR Models

Forecast at the one-quarter horizon for month m4 - VAR model M4i



Sources: French quarterly accounts and industry and service surveys. Authors' calculations.

Figure 2: Example from Multistep Models



Note: in figure 2, the forecasts relating to August are represented in order to avoid breaks in the curves. However, these August forecasts are not taken into account in the predictive accuracy tests since they derive from fictive survey observations calculated as simple means of the July and September survey results.
Sources: French quarterly accounts and industry and service surveys. Authors' calculations.

III.2.2 Comparing the Predictive Accuracy of Models Including Survey Variables to that of AR Models of GDP Growth

The comparison tests (Modified Diebold-Mariano tests or Clark-West tests, depending on the kind of models: nested or not) confirm that the models including BTS variables clearly outperform the AR models for every month in the quarter in terms of predictive accuracy at least for the forecasting of the current quarter (which corresponds to the two-quarter horizon in month *m*1 and the one-quarter horizon in the other months) and perform at least as well at more distant forecast horizons. Most models relating to month *m*4 as well as most VARs provide more accurate forecasts of GDP growth than the AR models up to the two or three-quarter horizon. Conversely, the models including survey variables fail to outperform the AR models at distant horizons (namely the four-quarter horizon for the VARs relating to month *m*4 and the three-quarter horizon for most other VARs, especially the less parsimonious ones and those relating to months *m*2 and *m*3). These results hold whatever BTS taken into account (sole service or industry survey or both surveys) and benchmark GDP series (first results or last available release).

III.2.3 Taking the Industry Survey as the "Benchmark" Survey and the Service Survey as the "Additive" Survey

The results lead to overall encouraging conclusions as concerns the contribution of the service survey to the short-term forecasting of GDP in addition to the industry survey. At least for forecasts of the current quarter, if not of the next quarter for some models (especially in month *m*4), the models using both industry and service surveys tend to outperform the models based on the industry survey only and this, whatever the kind of models used (multistep models or VARs). It is not clear whether the contribution of the service survey is better established when the benchmark GDP series refers to the first results or, alternatively, the last available update. Conversely, modified Diebold-Mariano tests confirm that the non-weighted service balances lead to slightly better forecasting models than the weighted balances (see below, sub-section III.2.4).

As far as the models relating to month *m*1 are concerned, the contribution of a service variable to GDP growth forecasting, be it a peculiar balance of opinion or a common factor, is usually more significant when the industry variable is a common factor or the balance relating to general expectations in industry rather than the balance relating to expected production or expected demand. However, the contribution of the non-weighted balance of opinion relating to expected demand in services is clearly significant whatever the industry variable (including that relating to expected production, especially for the forecasting of the current quarter). Modified Diebold-Mariano tests show that the best VAR model for month *m*1 in terms of forecast accuracy of the current quarter is precisely that combining the balances relating to expected production in industry and expected demand in services. This VAR is not significantly outperformed by any other VAR for the forecasting of the other quarters. These results are in conformity with intuition. In fact, in month *m*1, the most leading indicators (e.g. two balances relating to the near future) are needed to calculate the first forecast of GDP growth relating to the current quarter.

Conversely, most models relating to month *m*4 include survey variables relating to the recent past. Most best performing *m*4 models combine survey variables relating to the recent past and to the near future. For instance, as concerns the forecasting of the current quarter, the combination of the balance dealing with expected production in industry and that relating to past turnover in services (non-weighted balance) leads to the most accurate forecast within the VAR models. Similarly, the combination of the balances relating to past production in industry and expected demand in services (non-weighted balance) performs best for the forecasting of the next quarter, again within the set of VARs.

As far as the “non-quarterly” months *m*2 and *m*3 are concerned, we expected disappointing results due to the short length of the observed monthly series and their rough retropolation before June 2000. Indeed, the results seem to be less convincing as regards the contribution of the service survey in these two months, especially in month *m*3. At first sight, the service survey seems to significantly contribute to the forecasting of GDP growth in some models, but not in a majority of them. The picture, however, looks brighter concerning the VARs than the multistep models. In fact, as far as month *m*2 is concerned, the VAR model that performs best for the forecasting of the next quarter and is not outperformed by other VARs at any other horizon is that combining the balance relating to expected production in industry and the dynamic common factor in services based on non-weighted service balances. Similarly, concerning month *m*3, the best VAR model for the forecasting of the current and the next quarters is that combining the balance on overall orders in industry and the dynamic common factor in services based on the non-weighted balances. As for the multistep models, conversely, the positive results seem to be less robust. In fact, for month *m*2, the models based on industry and service variables significantly outperform the models with industry variables only mainly on the subperiod ending in 2005Q4, but not on the whole simulation period. In month *m*3, only two multistep models encompassing non-weighted service balances seem to slightly outperform the models based on industry variables and ARs for the forecasting of the next quarter if, however, the benchmark GDP series is that relating to the last available release exclusively.

The more clearly positive results for the “quarterly” months suggest that the mixed results obtained for months *m*2 and *m*3 are probably due to methodological biases in the monthly analysis. At this stage of the analysis, it is difficult to say whether the rough interpolation method used to alleviate the short length of the monthly series in services should be questioned or whether the very fact of interpolating is at stake. In any case, more clearly positive results as concerns the contribution of the service survey in addition to the industry survey in months *m*2 and, above all, *m*3, can reasonably be expected when longer observed monthly service series are available. This intuition, of course, needs to be confirmed by repeating the out-of-sample analysis on purely observed monthly service series as soon as this exercise is made possible without having to resort to interpolated monthly data.

III.2.4 Comparing the Best Multistep models with the Best VARs

To conclude without ambiguity on the contribution of the service survey in addition to the industry survey, however, we need to compare the best VARs with the best multistep models. In fact, we saw in the previous sub-section that, on the whole and especially in "non-quarterly" months, the multistep models tend to give a less positive picture than the VARs concerning the significance of the service survey's contribution. If we found that the multistep models outperformed the VARs systematically (in conformity with Marcellino, Stock and Watson, 2005), then the overall picture concerning the contribution of the service survey would be much less clear than in the opposite case (which would be in conformity with Hansson et al., 2005).

The results of the comparison of the best models of both kinds using Harvey et al. (1997) tests of predictive accuracy for the forecasting of the current and next quarters are presented in Appendix 6. Note that all best VARs include industry and service variables. In the case of the univariate models, models including the two survey variables were also selected as being the (sometimes slightly) best multistep models prior to the comparison with the VARs, except in month *m*3, where a model with industry variables only was preferred for the forecasting of the current quarter. We find that no set of models (neither the VARs nor the multistep models) performs systematically better than the other. As concerns the forecasting of the current quarter in month *m*3, the multistep model including industry variables only performs at least as well as the best VAR with three variables. In this specific case, therefore, the service survey does not enable one to significantly improve the accuracy of the GDP forecasts.

III.2.5 Taking the Service Survey as the "Benchmark" Survey and the Industry Survey as the "Additive" Survey

It is noteworthy to stress that our assessment of the usefulness of the service survey in the previous two sub-sections is very demanding, much more than in Gayer (2005). In fact, Gayer (2005) compares the predictive accuracy of the confidence indicator in services from the European Commission with that of a naive model of Euro area's GDP growth. On our data, we find without any ambiguity that, like the industry survey, the service survey *considered alone* contributes significantly to the accuracy of the forecast of GDP growth whatever the month considered ("quarterly" or not) - cf sub-section III.2.2. However, in the previous two sub-sections, our point was to go further by showing that the service survey adds some useful piece on information with respect to the industry survey that enables one to improve the accuracy of GDP growth forecasts. This very demanding goal should be kept in mind when considering the results, which are positive at least for the "quarterly" months, for which long enough service series are available, and also for month *m*2 (which corresponds to the months when INSEE updates its forecasts of economic activity).

Finally, it is interesting to complete the assessment of the contribution of the service survey in addition to the industry survey by comparing the results obtained to those resulting from the test of the --less natural-- opposite scheme, in which the service survey is used as the benchmark survey and the industry survey as the additive survey[72]. This reverse scheme is tested systematically in the case of the VARs (cf columns 12 and 13 of the tables in Appendix 5.1). For most VARs, the contribution of the industry variable in addition to the service variable tends to be more systematically significant than that of the service variable in addition to the industry variable. In other terms, the two surveys are not strictly equivalent with respect to the short-term forecasting of GDP growth. The industry survey remains the *first* reference source of advanced indicators for the forecasting GDP growth, while the service survey appears to be a useful *complementary* source of advanced indicators, not a *competing* source with respect to the industry survey.

[72] Considering the industry survey as the benchmark survey is more natural with respect to the usual practice of empirical forecasters, whereas the exploration of the reversed scheme is of less practical impact. In fact, the use of service survey data for short-term forecasting is relatively recent, unlike that of industry survey data.

Conclusion

In this paper, we present the results of a real-time out-of-sample analysis, which establish the significant contribution of the French BTS in industry and services carried out by INSEE to the short-term forecasting of GDP growth. Both surveys provide useful and non-identical pieces of information on GDP growth which can help one obtaining more accurate forecasts of GDP growth up to the two or three-quarter forecast horizon. The study confirms, however, that the industry survey predominates over the service survey as a source of leading indicators of GDP growth. Compared to the industry survey, the service survey appears to be not a competing source of short-term indicators of GDP growth but an interesting *secondary* source.

The issue whether our (rough) interpolation of the missing monthly service observations before June 2000 might influence the results obtained in "non-quarterly" months would deserve further investigation. In fact, while the specific contribution of the service survey with respect to that of the industry survey is clearly established in the months (January, April, July, October) for which relatively long service series are available, especially for the calculation of the first forecast relating to the current quarter, this is less the case in the "non-quarterly" months, particularly in month *m*3. As concerns the imputation method of the missing monthly data in the service survey, some optimisations would probably be possible. The question whether such optimisations would significantly improve the results as concerns the contribution of the service survey to forecasting GDP growth has not been addressed in the paper and might be worth further investigation. One might prefer to circumvent this problem by focusing on the quarterly surveys exclusively[73], which would suppress any controllable potential bias against the service survey from the analysis. By limiting the coverage of the study, this simplification would also enable one to explore further tracks for research that could not be dealt with in this paper due to the high number of cases to be treated[74]. However, we preferred to use all the available data (including the partially monthly service data) because it would have been somewhat frustrating to deprive ourselves of the monthly dimension of the survey data, which is intensively exploited in practice. Moreover, however fragile they may be, the results obtained for month *m*2 are encouraging as such. Above all, the comparison between the results obtained for "quarterly" and "non-quarterly" months gives useful clues suggesting, indeed, that the results obtained for "non-quarterly" months should be considered with caution but, also, that more clearly positive results as concerns the contribution of the service survey in addition to the industry survey can reasonably be expected when longer observed monthly service series are available. This intuition needs to be confirmed by repeating the out-of-sample analysis on purely observed monthly service series as soon as this exercise is made possible without having to resort to interpolated monthly data.

Another technical point deserves to be noted. We cannot completely exclude that some of our results might be subject to data snooping. As defined by White (2000), data snooping occurs when a given set of data is used more than once for purpose of inference or model selection; when such data reuse occurs, there is always the possibility that any satisfactory result obtained may be due to chance rather than to the merit inherent to the method yielding the results. White adds that this problem is practically unavoidable in the analysis of time series data. White (2000) and subsequent Hansen (2004) propose two related methodologies based on resampling[75] that aim data snooping to be undertaken "with some degree of confidence that one will not mistake results that could have been generated by

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[73] This would require focusing on months *m*1 and *m*4 and estimating multistep models based on quarterly first differences of balances rather than monthly ones.

[74] For instance, we did not address the question whether a pooling of our miscellaneous forecasts would enable us to better assess the contribution of the service survey for forecasting or not. Even though not fundamental to our study, this question might be worth some attention. For introductions to forecast combination methods and surveys of the large literature in this respect, see Diebold and Lopez (1996), Newbold and Harvey (2002), and Hendry and Clements (2004). For an example of the pooling of numerous forecasts, see Stock and Watson (2004). For an illustration of the advantages of pooling forecasts, see Dreger and Schumacher (2005).

[75] The White (2000) methodology is known as "the reality check for data snooping". Hansen (2004) refers to his methodology simply as a "test for superior predictive ability".

chance for genuinely good results" (White, 2000). However, these methodologies deal with the selection of the best possible model within a set of numerous models and focus on the comparison of the potential best model to a sole benchmark (the principle being to check whether the model selected as the best one does perform better than the benchmark). The issue addressed in our paper was different, as well as our testing scheme: for given month (*mi*) and forecast horizon (*h*), each set of competing models consisted of at most three or four competing models). We, therefore, tried to limit the risks of data snooping differently, adopting a very pragmatic approach consisting in controlling the robustness of our results through the comparison of several methodologies, both in simulation (recursive and rolling estimation) and in testing (three tests per couple of forecasts to be compared). Even though this approach is without doubt imperfect, the rather satisfactory homogeneity of the results derived from the six tests performed per couple of models tested in most cases is rather reassuring in so far as the repetition of a result should limit the risk that it might be due to chance.

As was mentioned in the previous paragraph, the question of model optimization was beyond the scope of our study: we intended by no means to find the best possible forecast model for GDP growth. In this respect, a lot of work would need to be done. Many methodological issues have not been assessed in the paper that might be of importance in the perspective of model optimization, such as the quantification of the qualitative BTS for instance. Besides, model optimization would require to take several kinds of data into account. As far as BTS data are concerned, we justified our focusing on industry and service data by the result obtained by Bouton and Erkel-Rousse (2003-2004) according to which the BTS in other sectors of activity do not add any significant piece of information with respect to the industry survey in macroeconomic models of GDP growth. However, it would be interesting to check whether this result still holds on more recent data and in an out-of-sample context. A recent paper by Charpin (2009) based on the use of the LARS methodology[76] suggests that the construction survey might usefully contribute to the short-term forecasting of GDP growth in addition to the industry survey. Moreover, non-BTS data could be taken into account as well, such as quantitative indicators for the real economy and financial data. This would lead one to estimate other kinds of models, such as that à la Giannone, Reichlin, and Simonelli (2006), which provides one with another way of dealing with series of different periodicities. This kind of approach goes far beyond the aim of the present paper but might lead to quite useful additional results.

[76] LARS = Least Angle Regression Stepwise - cf Efron et al. (2004).

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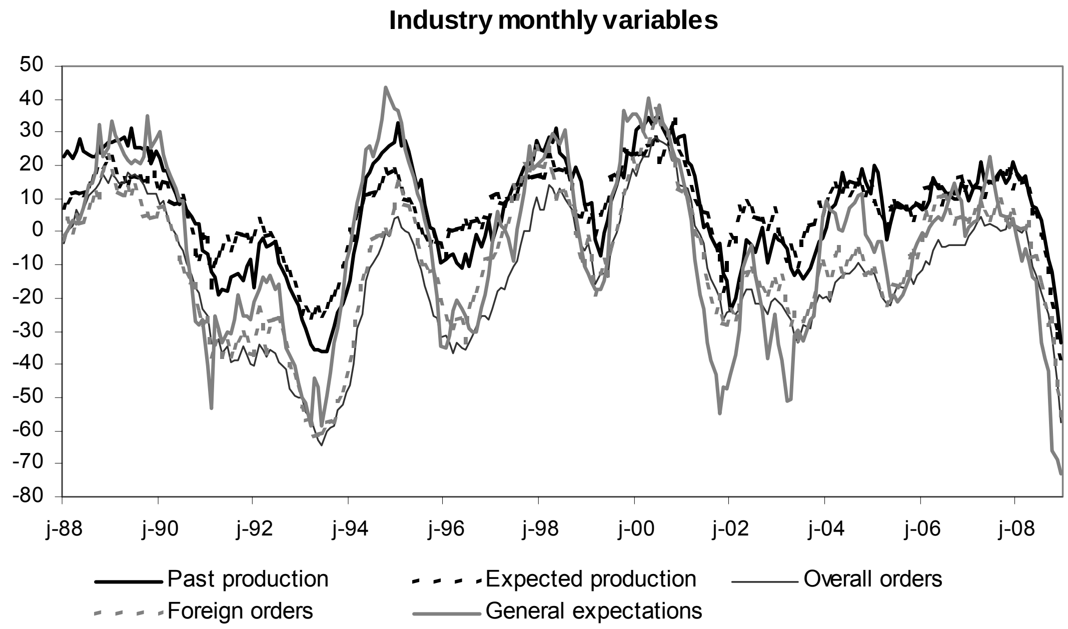
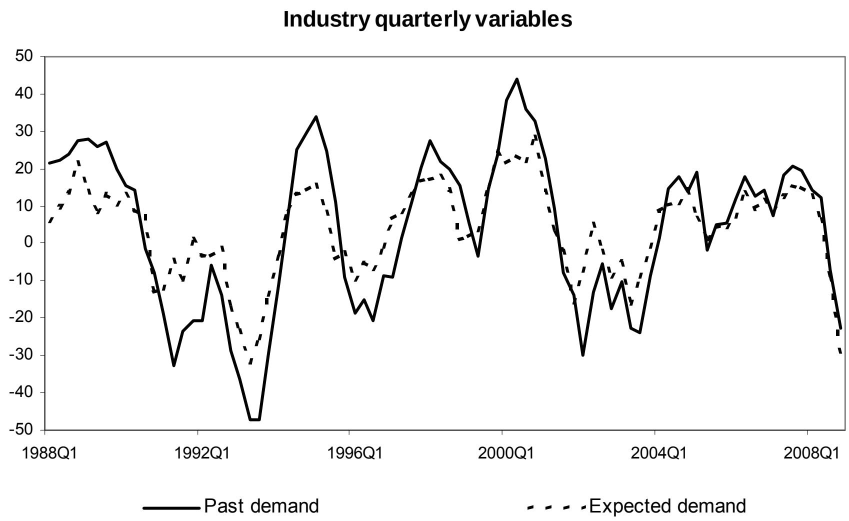
Appendix 1: The Series under Analysis

1.1) Last available releases when the empirical work was performed

The last available releases of the industry and service surveys were those relating to February 2009. That of the quarterly accounts corresponded to the 2008Q4 first results.

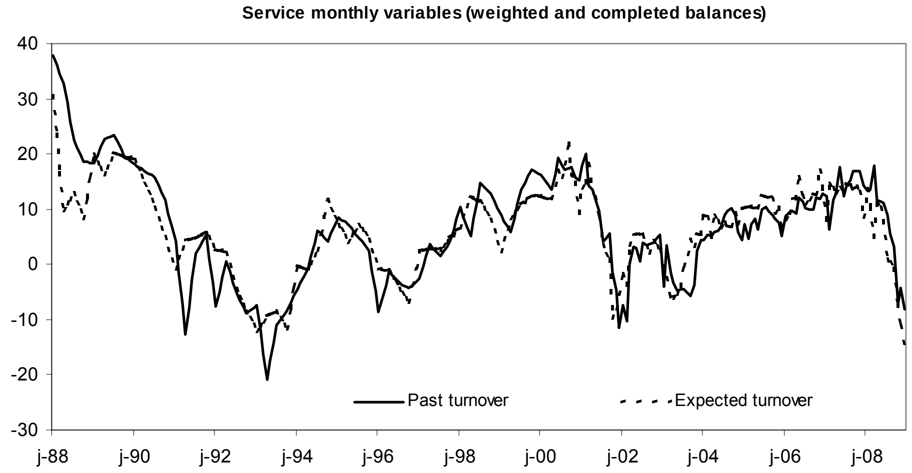
Figures 1.1: The Industry Balances of Opinion under Analysis

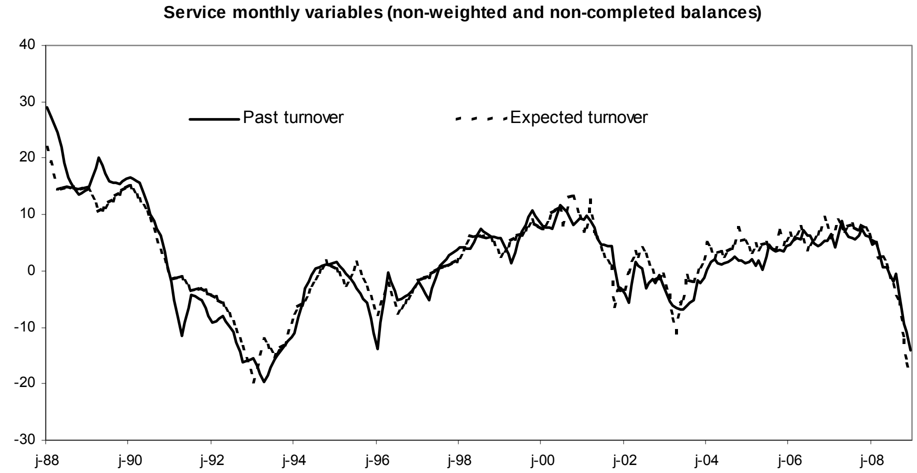


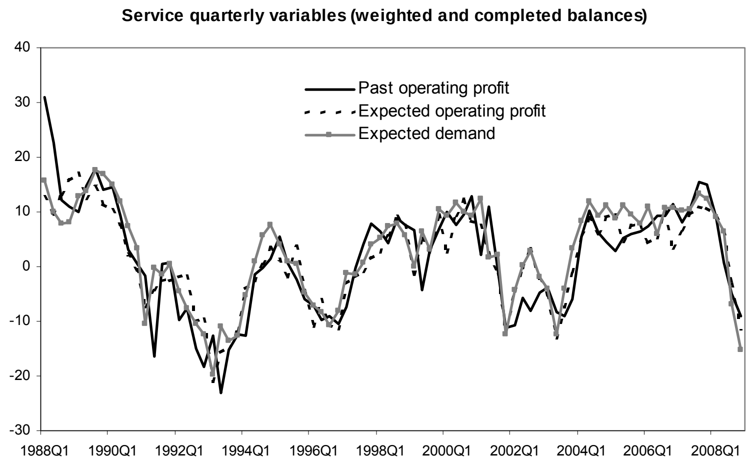


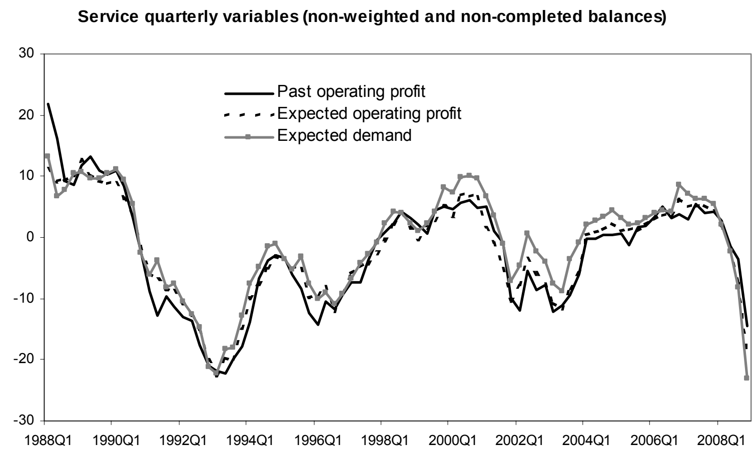
Note: on the first graph, *j-yy* = January of year *yy*. Source: INSEE industry survey.

Figures 1.2: The Service Balances of Opinion under Analysis



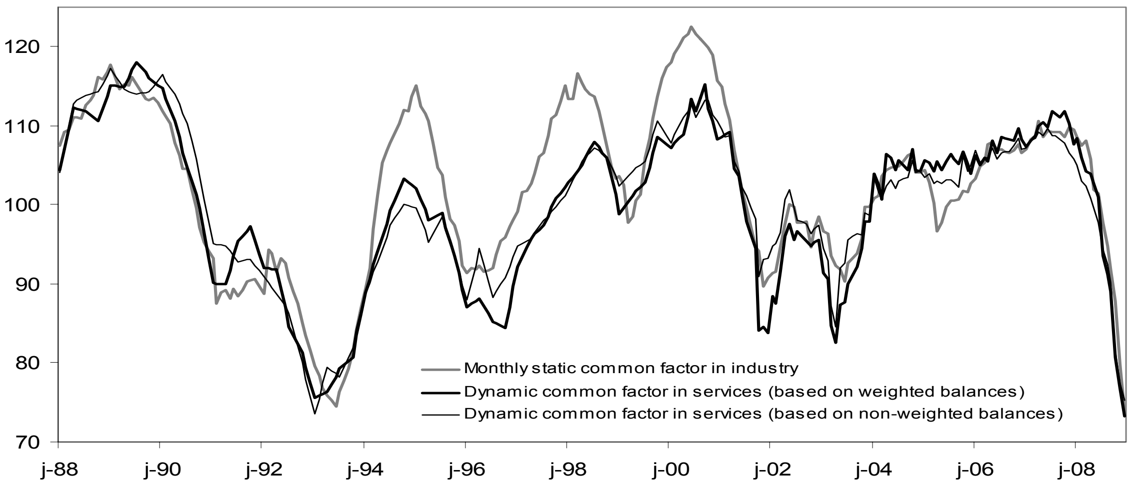






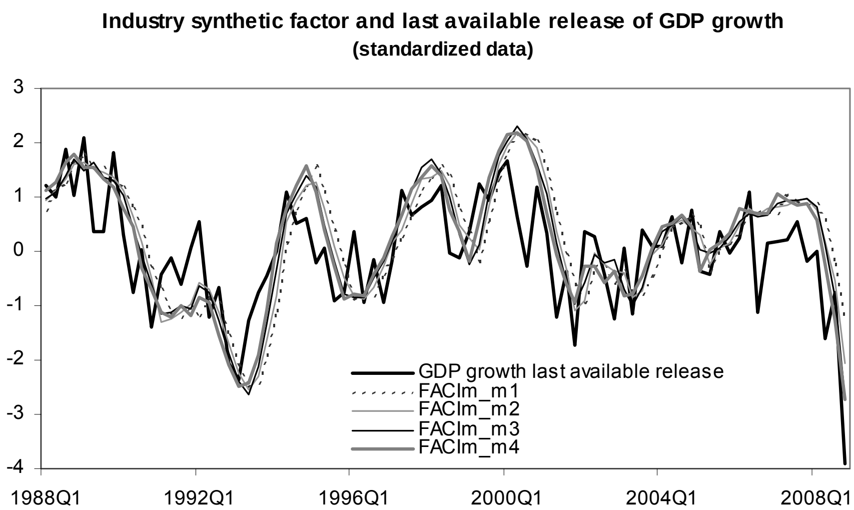
Note: on the first two graphs, *j-yy* = January of year *yy*. Source: INSEE service survey.

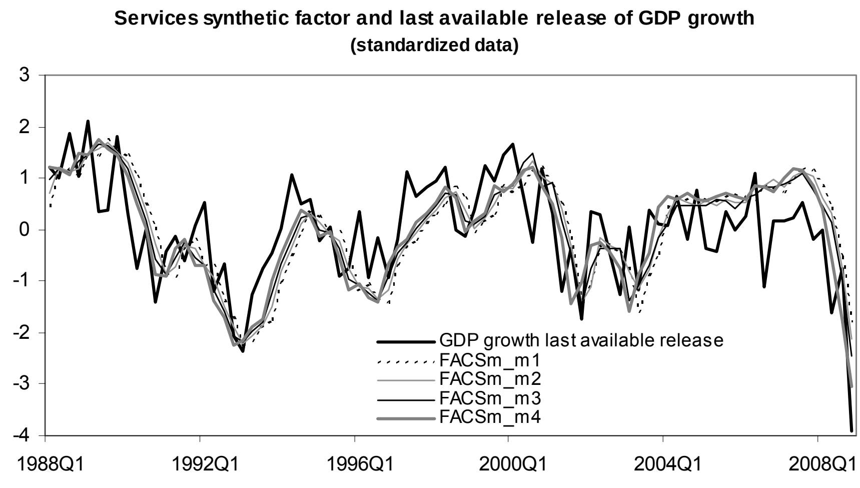
Figure 1.3: Main monthly synthetic indicators



Note: on this graph only, the common factors are represented as the standardized ones (that are used in the empirical work) multiplied by 10 plus 100 (as is the case in published INSEE reports). *j-yy* = January of year *yy*.
Sources: INSEE industry and service surveys, authors' calculations.

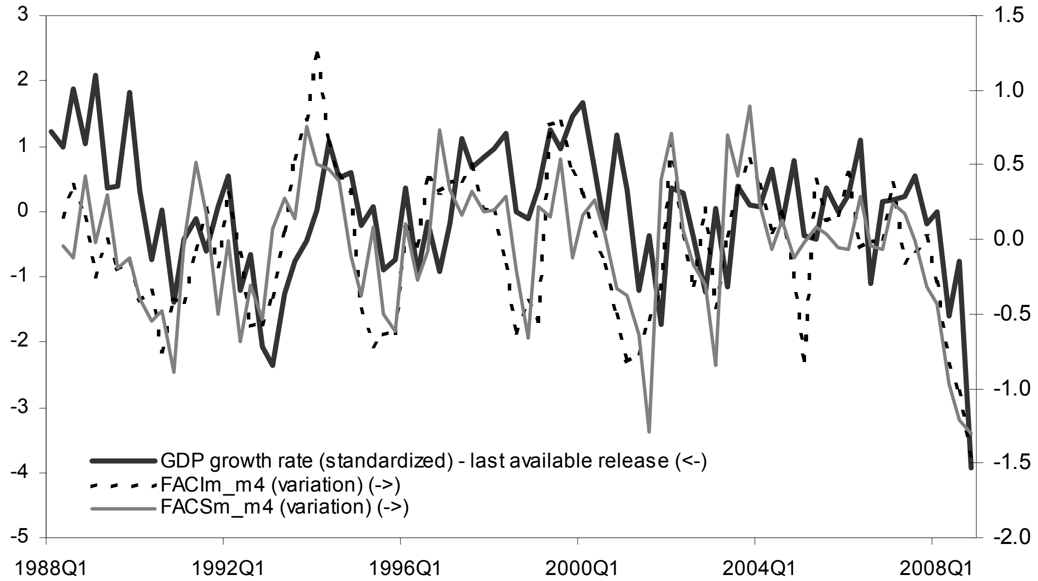
Figures 1.4: Subseries Derived from the Published Synthetic Indicators and GDP Growth





Note: the subseries relating to the late months are slightly more leading than the subseries relating to the early months. Sources: French quarterly accounts and industry and service surveys. Authors' calculations.

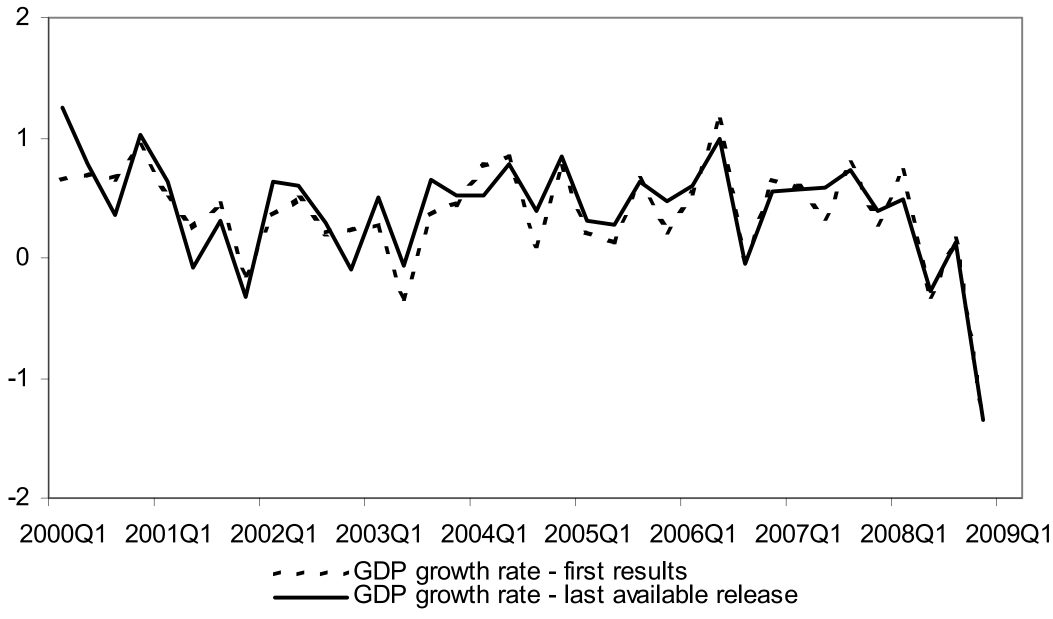
Figure 1.5: *m*4 Subseries Derived from the Published Synthetic Indicators and GDP Growth



Sources: INSEE industry and service surveys, authors' calculations.

1.2) Data Revisions over Time

Figure 1.6: First and Last Available Releases of the Quarterly Growth Rate of GDP (%)



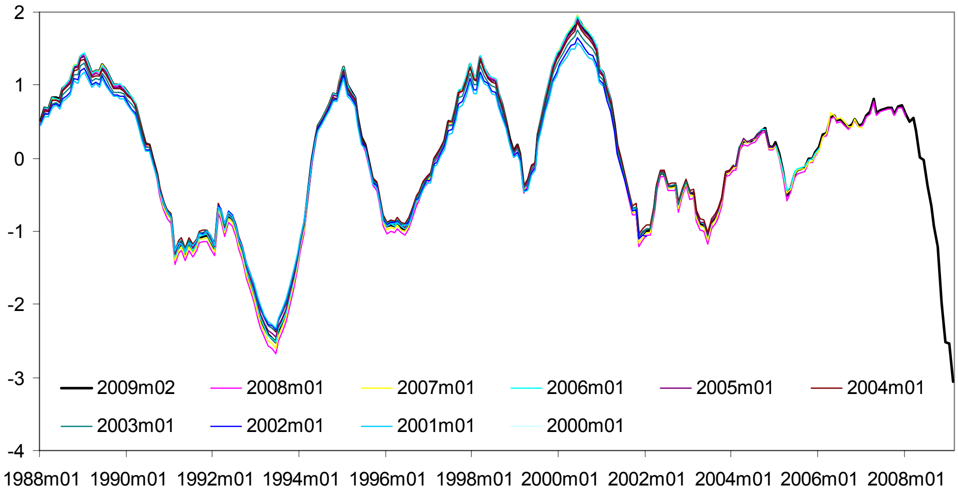
Notes: these two series are used as the benchmark series of GDP growth in the out-of-sample analysis. Like in the rest of the paper, the "last available release" is the one that was available at the moment when the empirical study was performed. The two series are expressed in constant prices[77].

Sources: INSEE, French Quarterly Accounts.

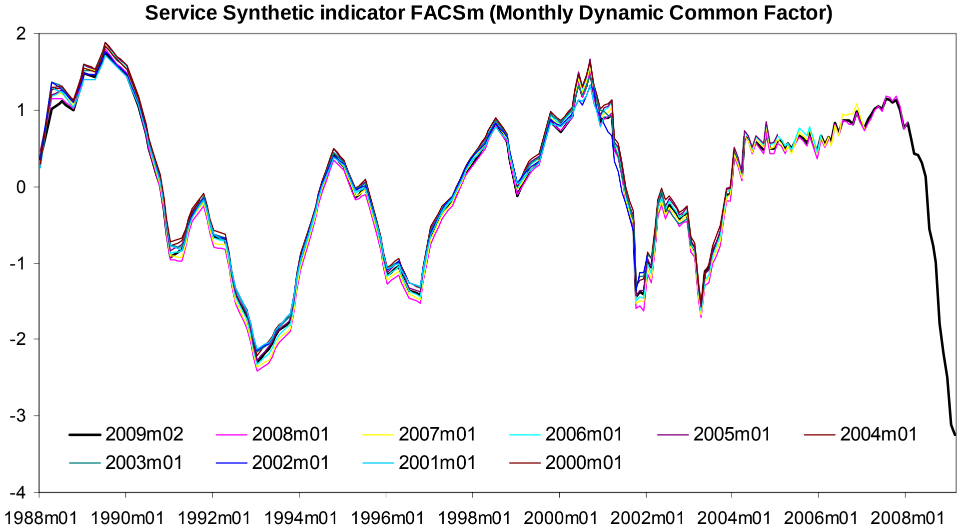
[77] The French quarterly accounts have been released in chained-prices since May 2007. Therefore, most GDP releases considered in this paper are defined as constant-price ones. That is why, for homogeneity purpose, we chose to work on constant-price series, which have still been available since May 2007.

Figures 1.7: Some Releases of the Main Common Factors

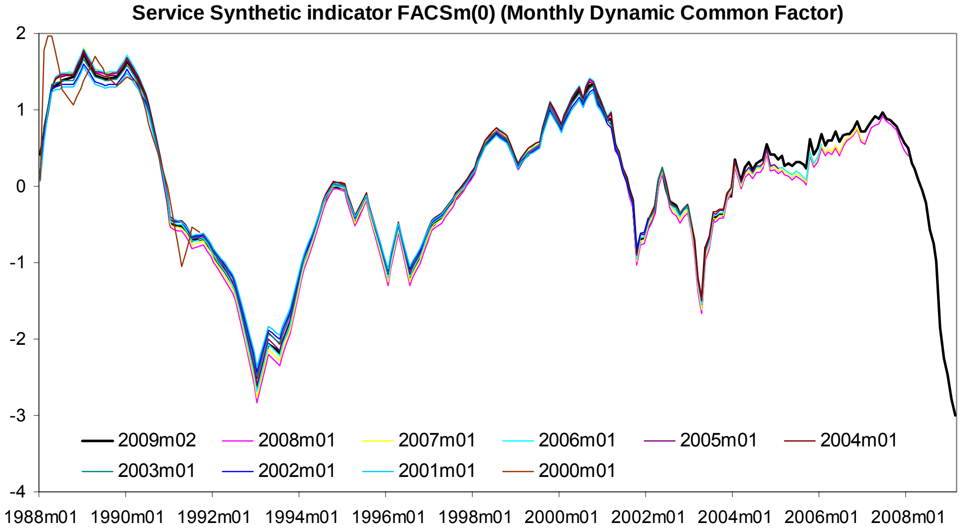
Industry Synthetic indicator FACIm (Monthly Static Common Factor)



Service Synthetic indicator FACSm (Monthly Dynamic Common Factor)



Service Synthetic indicator FACSm(0) (Monthly Dynamic Common Factor)



Note: the names of the series refer to the last observation taken into account in the estimation of the common factor (yyyym01 = January of year yyyy). Sources: INSEE industry and service surveys, authors' calculations.

Appendix 2: Main Results of the In-Sample Analysis

In this appendix, for the sake of notation simplicity, we omit to mention that every variable appearing in a table relating to month *mi* is a *mi* sub-series (*i* = 1 to 4).

2.1) VAR Models

The in-sample results given in the next four tables 2.1 to 2.4 result from estimations on the whole period 1988Q1-2008Q4.

Notation	Meaning	Periodicity
g	GDP quarterly growth rate (National accounts)	quarterly
$PROI^{pa}$	Balance relating to past production in industry	monthly
$PROI^{ex}$	Balance relating to expected production in industry	monthly
$DEMI^{pa}$	Balance relating to past demand in industry	quarterly
$DEMI^{ex}$	Balance relating to expected demand in industry	quarterly
OORI	Balance relating to overall orders in industry	monthly
FORI	Balance relating to foreign orders in industry	monthly
$GENI^{ex}$	Balance relating to general expectations in industry	monthly
$FACI^{m}$	Static common factor in industry based on 6 monthly balances	monthly
$FACI^{q}$	Static common factor in industry based on 8 balances	quarterly
$FACI^{md}$	Dynamic common factor in industry based on 8 balances	monthly
$DEMS^{ex}$	Balance relating to expected demand in services (1)	quarterly
$DMMS^{ex}$	Balance relating to expected demand in services (2)	monthly
$TOVS^{pa}$	Balance relating to past turnover in services	monthly
$TOVS^{ex}$	Balance relating to expected turnover in services	monthly
$OPPS^{pa}$	Balance relating to past operating profit in services	quarterly
$OPPS^{ex}$	Balance relating to expected operating profit in services	quarterly
$GENS^{ex}$	Balance relating to general expectations in services	monthly
$FACS^{m}$	Dynamic common factor in services	monthly
$FACS^{q}$	Static common factor in services	quarterly
IND	Industry variable included in a VAR model	monthly or quarterly, depending on the variable (4)
SER	Service variable included in a VAR model	
SER(0)	Same service variable as *SER* but based on non-completed individual data and identical weighting aggregation scheme (3)	
sv	Survey variable (either *IND* or *SER*) included in a VAR model	

(1) and (2): the question relating to expected demand in the service survey became monthly in September 2004. (1) results from the seasonal adjustment of the quarterly raw series on the whole period 1988Q1-2008Q4. (2) derives from the seasonal adjustment of the monthly raw series from September 2004 onwards and is set equal to (1) on the previous subperiod.

(3): The published balance relating to general expectations in services $GENS^{ex}$ is equal to $GENS^{ex}(0)$. Due to the short length of this series (the corresponding question was introduced in the questionnaire of the service survey in June 2000), this variable could not be used in the out-of-sample analysis. However, as this is the service variable that is most correlated with GDP growth on the subperiod on which it is observed, we present some correlation and VAR2s estimation results with this variable for indication only. In the following four tables, the results relating to this variable were obtained using an econometrically retropolated variable on the whole period 1988Q1-2008Q4 using non-weighted balances and common factors as regressors. Conversely, only the observed part of the $GENS^{ex}$ series is used in the estimation of the dynamic common factor in services $FACS^{m}(0)$.

(4): monthly versions of $OPPS^{ex}(0)$ and $OPPS^{pa}(0)$ were used in the "non-quarterly" months *m*2 and *m*3. The series relating to *m*2 and *m*3 were derived from the regression of the corresponding quarterly service balances on monthly service variables from June 2000 onwards and from simple quasi-linear interpolation using the SAS procedure EXPAND before June 2000.

Table 2.1.1 Selection of VAR Models for the Out-of-Sample Analysis: In-Sample Results for Month *m*1 (Unrestricted VARs)

Highest correlations of *IND* with *g* (1)	Highest correlations of *SER* with *g* (1)	VAR2i: RMSEs of (*g*, *IND*) equations (2)	VAR2s: RMSEs of (*g*, *SER*) equations (2)	Risks of collinearity in *g* equation of VAR2 (3)	Causality of *sv* in *g* equation VAR2 (4)	VAR3 models: RMSEs of (*g*, *IND*, *SER*) equations	VAR3: Nb of lags (5)	Instantaneous Causality of *IND - SER* in *g* equation (P-values)	Non-Instantaneous Causality of *IND - SER* in *g* equation (P-values)	Overall Causality of *IND - SER* in *g* equation (P-values)
$DEMI^{ex}$ (0.72) $PROI^{ex}$ (0.68) $GENI^{ex}$ (0.65) $FACI^{q}$ (0.59) $FACI^{m}$ (0.58) $FACI^{md}$ (0.58)	$DEMS^{ex}(0)$ (0.64) $DMMS^{ex}(0)$ (0.63) $TOVS^{ex}(0)$ (0.62) $FACS^{q}(0)$ (0.62) $GENS^{ex}$ (0.61) $OPPS^{ex}(0)$ (0.61) $DEMS^{ex}$ (0.61) $FACS^{m}(0)$ (0.60) $DMMS^{ex}$ (0.60) $FACS^{q}$ (0.59) $FACS^{m}$ (0.58) $OPPS^{ex}$ (0.57)	$PROI^{ex}$ (0.284-0.452) $DEMI^{ex}$ (0.285-0.477) $GENI^{ex}$ (0.321-0.425) $FACI^{m}$ (0.327-0.270) $FACI^{q}$ (0.327-0.281) $FACI^{md}$ (0.329-0.255) *OORI* (0.346-0.233) $DEMI^{pa}$ (0.360-0.295)	$DEMS^{ex}(0)$ (0.314-0.451) $DMMS^{ex}(0)$ (0.315-0.447) $FACS^{q}(0)$ (0.319-0.380) $GENS^{ex}$ (0.320-0.367) $FACS^{m}(0)$ (0.323-0.364) $TOVS^{ex}(0)$ (0.325-0.421) $OPPS^{ex}(0)$ (0.326-0.402) $FACS^{m}$ (0.340-0.359)	Industry models: higher condition indices close to ambiguity for $FACI^{m}$ (20-18) $FACI^{q}$ (17-15) $FACI^{md}$ (20-18) *OORI* (24-22) Service models: No risk of collinearity	Industry: Povc < 1% Pinc < 1% Pnic < 1% Services: Povc < 1% Pinc < 1% Pnic < 1% except: $DEMS^{ex}$ (0.013) $OPPS^{ex}$ (0.034)	**$PROI^{ex}$ - $DEMS^{ex}(0)$** (0.282-0.445-0.433)	2	0.000-0.007	0.002-0.318	0.000-0.014
						$PROI^{ex}$ - $TOVS^{ex}(0)$ (0.282-0.443-0.407)	2	0.000-0.012	0.000-0.458	0.000-0.015
						$PROI^{ex}$ - $FACS^{q}(0)$ (0.282-0.443-0.369)	2	0.000-0.017	0.000-0.412	0.000-0.015
						$DEMI^{ex}$ - $TOVS^{ex}(0)$ (0.283-0.474-0.399)	2	0.000-0.022	0.001-0.687	0.000-0.024
						$DEMI^{ex}$ - $FACS^{q}(0)$ (0.283-0.475-0.362)	2	0.000-0.030	0.002-0.608	0.000-0.026
						$DEMI^{ex}$ - $FACS^{m}(0)$ (0.284-0.473-0.349)	2	0.000-0.024	0.009-0.633	0.000-0.029
						$PROI^{ex}$ - $OPPS^{ex}(0)$ (0.284-0.444-0.387)	2	0.000-0.049	0.000-0.470	0.000-0.025
						$DEMI^{ex}$ - $OPPS^{ex}(0)$ (0.284-0.475-0.378)	2	0.000-0.040	0.002-0.697	0.000-0.033
						$GENI^{ex}$ - $OPPS^{ex}$ (0.302-0.418-0.439)	4	0.000-0.294	0.000-0.025	0.000-0.026
						$FACI^{m}$ - $DEMS^{ex}(0)$ (0.304-0.267-0.445)	2	0.005-0.000	0.020-0.084	0.014-0.000
						$FACI^{q}$ - $DEMS^{ex}(0)$ (0.306-0.284-0.443)	2	0.005-0.000	0.029-0.063	0.019-0.000
						$GENI^{ex}$ - $FACS^{m}(0)$ (0.308-0.415-0.354)	2	0.017-0.016	0.095-0.281	0.096-0.002

Notes: in columns 1 to 7, the elements are presented in descending order of « quality » with respect to the studied criterion (either correlation or adjustment accuracy - as measured by the inverse of the RMSE of the GDP equation). The elements in columns 8 to 11refer to the models in column 7. The estimation was carried out on the GDP series relating to the first results of 2008Q4 and the surveys published in February 2009. ***(1)*** *simple correlations calculated on the whole period under analysis - no interpolation of the survey data in August, only the correlations superior or equal to 0.57 are represented. All represented survey variables are current ones.* ***(2)*** *the VARs with two variables have at most 4 lags.* ***(3)*** *In parenthesis : condition indices relating to the g and sv equations (centred models). The threshold beyond which a risk of collinearity occurs is lower than in non-centred models - ambiguous diagnosis from condition indices of about 15-20, probable collinearity from about 25. Models with no risk of collinearity (condition indices lower than 15) are not represented.* ***(4)*** *Povc, Pinc, Pnic : P-values relating to tests of, respectively, overall causality, instantaneous causality, and non-instantaneous causality.* ***(5)*** *Determination of the number of lags on the basis of exhaustive tests on models with i lags versus models with j lags, ∀i = 1 to 7, ∀j = 1 to i-1.*

Table 2.1.2 Selection of VAR Models for the Out-of-Sample Analysis: In-Sample Results for Month *m*2 (Unrestricted VARs)

Highest correlations of *IND* with *g* (1)	Highest correlations of *SER* with *g* (1)	VAR2i: RMSEs of (*g*, *IND*) equations (2)	VAR2s: RMSEs of (*g*, *SER*) equations (2)	Risks of collinearity in *g* equation of VAR2 (3)	Causality of *sv* in *g* equation VAR2 (4)	VAR3 models: RMSEs of (*g*, *IND*, *SER*) equations	VAR3: Nb of lags (5)	Instantaneous Causality of *IND - SER* in *g* equation (P-values)	Non-Instantaneous Causality of *IND - SER* in *g* equation (P-values)	Overall Causality of *IND - SER* in *g* equation (P-values)
$PROI^{e}$ (0.78) $GENI^{ex}$ (0.73) $FACI^{m}$ (0.72) $FACI^{md}$ (0.71) $PROI^{pa}$ (0.69) $FORI$ (0.67) $OORI$ (0.66)	$DMMS^{ex}(0)$ (0.71) $DMMS^{ex}$ (0.70) $GENS^{ex}$ (0.69) $FACS^{m}$ (0.69) $TOVS^{ex}(0)$ (0.68) $OPPS^{ex}(0)$ (0.68) $OPPS^{ex}$ (0.68) $FACS^{m}(0)$ (0.68) $TOVS^{ex}$ (0.66)	$FACI^{m}$ (0.268-0.278) $PROI^{ex}$ (0.269-0.469) $FACI^{md}$ (0.277-0.271) $OORI$ (0.295-0.260) $PROI^{pa}$ (0.299-0.320) $FORI$ (0.318-0.310) $GENI^{ex}$ (0.321-0.394)	$FACS^{m}(0)$ (0.294-0.274) $FACS^{q}(0)$ (0.294-0.273) $GENS^{ex}$ (0.294-0.278) $DMMS^{ex}(0)$ (0.297-0.318) $TOVS^{ex}(0)$ (0.300-0.296) $OPPS^{ex}(0)$ (0.307-0.293) $FACS^{m}$ (0.317-0.293) $FACS^{q}$ (0.321-0.308) $DMMS^{ex}$ (0.323-0.366) $OPPS^{ex}$ (0.332-0.353) $TOVS^{ex}$ (0.336-0.412)	Industry models: $FACI^{m}$ (25-22) $FACI^{md}$ (23-21) $OORI$ (25-22) $PROI^{pa}$ (15-14) $FORI$ (18-15) Service models: $FACS^{m}(0)$ (25-21) $FACS^{q}(0)$ (24-21) $GENS^{ex}$ (24-20) $DMMS^{ex}(0)$ (19-17) $TOVS^{ex}(0)$ (21-18) $OPPS^{ex}(0)$ (21-18) $FACS^{m}$ (24-20) $FACS^{q}$ (21-17) $DMMS^{ex}$ (15-13) $OPPS^{ex}$ (16-14)	Industry: Povc < 1% Pinc < 1% Pnic < 1% except $GENI^{ex}$ (0.012). Services: Povc < 1% Pinc < 1% Pnic < 1%	**$PROI^{ex}$ - $FACS^{m}(0)$** (0.263-0.442-0.268) **$FACI^{m}$ - $TOVS^{ex}(0)$** (0.265-0.248-0.295) **$FACI^{m}$ - $FACS^{m}(0)$** (0.267-0.263-0.274) **$OORI$ - $FACS^{m}(0)$** (0.273-0.243-0.272) **$PROI^{pa}$ - $DMMS^{ex}(0)$** (0.273-0.267-0.326) **$PROI^{pa}$ - $OPPS^{ex}(0)$** (0.285-0.275-0.291)	2 2 2 2 3 2	0.000-0.068 0.000-0.010 0.000-0.016 0.001-0.001 0.000-0.000 0.000-0.000	0.010-0.595 0.000-0.487 0.007-0.340 0.017-0.097 0.089-0.013 0.015-0.018	0.001-0.028 0.000-0.019 0.002-0.028 0.008-0.002 0.012-0.001 0.002-0.000

Notes: in columns 1 to 7, the elements are presented in descending order of « quality » with respect to the studied criterion (either correlation or adjustment accuracy - as measured by the inverse of the RMSE of the GDP equation). The elements in columns 8 to 11refer to the models in column 7. The estimation was carried out on the GDP series relating to the first results of 2008Q4 and the surveys published in February 2009. ***(1)*** *simple correlations calculated on the whole period under analysis - no interpolation of the survey data in August, only the correlations superior or equal to 0.66 are represented. All represented survey variables are current ones.* ***(2)*** *the VARs with two variables have at most 4 lags.* ***(3)*** *In parenthesis : condition indices relating to the g and sv equations (centred models). The threshold beyond which a risk of collinearity occurs is lower than in non-centred models - ambiguous diagnosis from condition indices of about 15-20, probable collinearity from about 25. Models with no risk of collinearity (condition indices lower than 15) are not represented.* ***(4)*** *Povc, Pinc, Pnic : P-values relating to tests of, respectively, overall causality, instantaneous causality, and non-instantaneous causality.* ***(5)*** *Determination of the number of lags on the basis of exhaustive tests on models with i lags versus models with j lags, $\forall i = 1$ to 7, $\forall j = 1$ to $i-1$.*

Table 2.1.3 Selection of VAR Models for the Out-of-Sample Analysis: In-Sample Results for <u>Month *m*3</u> (Unrestricted VARs)

Highest correlations of *IND* with *g* (1)	Highest correlations of *SER* with *g* (1)	VAR2i: RMSEs of (*g*, *IND*) equations (2)	VAR2s: RMSEs of (*g*, *SER*) equations (2)	Risks of collinearity in *g* equation of VAR2 (3)	Causality of *sv* in *g* equation VAR2 (4)	VAR3 models: RMSEs of (*g*, *IND*, *SER*) equations	VAR3: Nb of lags (5)	Instantaneous Causality of *IND - SER* in *g* equation (P-values)	Non-Instantaneous Causality of *IND - SER* in *g* equation (P-values)	Overall Causality of *IND - SER* in *g* equation (P-values)
$PROI^{ex}$ (0.75) $FACI^{m}$ (0.72) $FACI^{md}$ (0.71) $PROI^{pa}$ (0.71) $GENI^{ex}$ (0.71) *FORI* (0.67) *OORI* (0.67)	$DMMS^{ex}$(0) (0.69) $GENS^{ex}$ (0.69) $OPPS^{ex}$ (0.68) $FACS^{m}$(0) (0.68) $TOVS^{ex}$(0) (0.68) $FACS^{m}$ (0.68) $OPPS^{ex}$(0) (0.67) $DMMS^{ex}$ (0.67) $TOVS^{pa}$(0) (0.65) $TOVS^{ex}$ (0.64) $OPPS^{pa}$(0) (0.64)	$PROI^{pa}$ (0.253-0.324) $FACI^{md}$ (0.263-0.263) $FACI^{m}$ (0.265-0.280) $PROI^{ex}$ (0.278-0.497) *OORI* (0.290-0.280) $GENI^{ex}$ (0.304-0.458) *FORI* (0.312-0.336)	$GENS^{ex}$ (0.296-0.315) $FACS^{m}$(0) (0.298-0.313) $DMMS^{ex}$(0) (0.302-0.380) $OPPS^{pa}$(0) (0.302-0.281) $TOVS^{pa}$ (0.304-0.306) $TOVS^{ex}$(0) (0.304-0.385) $OPPS^{ex}$(0) (0.306-0.341) $FACS^{m}$ (0.311-0.357) $OPPS^{ex}$ (0.323-0.418) $DMMS^{ex}$ (0.329-0.410) $TOVS^{ex}$ (0.335-0.516)	Industry models: $PROI^{pa}$ (22-20) $FACI^{md}$ (33-30) $FACI^{m}$ (30-27) *OORI* (27-25) *FORI* (19-25) Service models: $GENS^{ex}$ (19-18) $FACS^{m}$(0) (20-18) $DMMS^{ex}$(0) (15-13) $OPPS^{pa}$(0) (22-20) $TOVS^{pa}$ (19-17) $TOVS^{ex}$(0) (14-13) $OPPS^{ex}$(0) (17-15) $FACS^{m}$ (17-15)	Industry: Povc < 1% Pinc < 1% except $GENI^{ex}$ (< 2%) Pnic < 1% Services: Povc < 1% Pinc < 1% Pnic < 1% except $OPPS^{ex}$ (0.011) $DMMS^{ex}$ (0.029) $TOVS^{ex}$ (0.045)	**$PROI^{pa}$ - $OPPS^{pa}$(0)** (0.251-0.329-0.281) **$FACI^{m}$ - $TOVS^{pa}$(0)** (0.271-0.258-0.275) **$PROI^{ex}$ - $OPPS^{pa}$(0)** (0.265-0.459-0.251) **OORI - $TOVS^{pa}$(0)** (0.276-0.269-0.300) **OORI - $FACS^{m}$(0)** (0.278-0.247-0.307) **$PROI^{ex}$ - $FACS^{m}$(0)** (0.285-0.457-0.301)	2 2 3 2 2 2	0.000-0.037 0.000-0.008 0.009-0.001 0.000-0.001 0.001-0.025 0.095-0.019	0.000-0.022 0.001-0.032 0.060-0.051 0.000-0.005 0.021-0.361 0.204-0.354	0.000-0.016 0.000-0.020 0.001-0.012 0.000-0.001 0.006-0.022 0.031-0.027

<u>Notes</u>: in columns 1 to 7, the elements are presented in descending order of « quality » with respect to the studied criterion (either correlation or adjustment accuracy - as measured by the inverse of the RMSE of the GDP equation). The elements in columns 8 to 11refer to the models in column 7. The estimation was carried out on the GDP series relating to the first results of 2008Q4 and the surveys published in February 2009. ***(1)*** *simple correlations calculated on the whole period under analysis - no interpolation of the survey data in August, only the correlations superior or equal to 0.64 are represented. All represented survey variables are current ones.* ***(2)*** *the VARs with two variables have at most 4 lags.* ***(3)*** *In parenthesis : condition indices relating to the g and sv equations (centred models). The threshold beyond which a risk of collinearity occurs is lower than in non-centred models - ambiguous diagnosis from condition indices of about 15-20, probable collinearity from about 25. Models with no risk of collinearity (condition indices lower than 15) are not represented.* ***(4)*** *Povc, Pinc, Pnic : P-values relating to tests of, respectively, overall causality, instantaneous causality, and non-instantaneous causality.* ***(5)*** *Determination of the number of lags on the basis of exhaustive tests on models with i lags versus models with j lags, $\forall i$ = 1 to 7, $\forall j$ = 1 to i-1.*

Table 2.1.4 Selection of VAR Models for the Out-of-Sample Analysis: In-Sample Results for Month *m*4 (Unrestricted VARs)

Highest correlations of *IND* with *g* (1)	Highest correlations of *SER* with *g* (1)	VAR2i: RMSEs of (*g*, *IND*) equations (2)	VAR2s: RMSEs of (*g*, *SER*) equations (2)	Risks of collinearity in *g* equation of VAR2 (3)	Causality of *sv* in *g* equation VAR2 (4)
$FACI^{q}$ (0.77) $DEMI^{pa}$ (0.77) $FACI^{md}$ (0.76) $FACI^{m}$ (0.75) $DEMI^{ex}$ (0.75) $PROI^{ex}$ (0.75) $GENI^{ex}$ (0.74) $PROI^{pa}$ (0.74) $DEMI^{ex}_{-1}$ (0.72) *OORI* (0.71) *FORI* (0.71) $PROI^{ex}_{-1}$ (0.69)	$OPPS^{ex}$ (0.74) $FACS^{q}$ (0.73) $FACS^{m}$ (0.72) $GENS^{ex}$ (0.72) $DEMS^{ex}$ (0.71) $FACS^{m}$(0) (0.71) $FACS^{q}$(0) (0.70) $TOVS^{ex}$(0) (0.70) $TOVS^{pa}$(0) (0.70) $DMMS^{ex}$(0) (0.70) $DEMS^{ex}$(0) (0.70) $OPPS^{pa}$(0) (0.69) $DMMS^{ex}$ (0.69) $TOVS^{ex}$ (0.69) $OPPS^{ex}$(0) (0.68) $TOVS^{pa}$ (0.67)	$DEMI^{pa}$ (0.259-0.422) $FACI^{q}$ (0.265-0.354) $FACI^{md}$ (0.270-0.312) $DEMI^{ex}$ (0.270-0.497) $PROI^{ex}$ (0.271-0.476) $PROI^{pa}$ (0.275-0.437) $FACI^{m}$ (0.278-0.320) $GENI^{ex}$ (0.296-0.473) *OORI* (0.300-0.273) *FORI* (0.305-0.385)	$DEMS^{ex}$(0) (0.292-0.496) $DMMS^{ex}$(0) (0.293-0.493) $GENS^{ex}$ (0.294-0.399) $FACS^{q}$(0) (0.295-0.427) $FACS^{m}$(0) (0.296-0.396) $TOVS^{ex}$(0) (0.298-0.477) $OPPS^{pa}$(0) (0.302-0.366) $FACS^{q}$ (0.302-0.446) $OPPS^{ex}$ (0.303-0.559) $OPPS^{ex}$(0) (0.304-0.436) $FACS^{m}$ (0.306-0.397) $TOVS^{pa}$(0) (0.309-0.421) $TOVS^{ex}$ (0.309-0.529) $DEMS^{ex}$ (0.311-0.526)	Industry models: $FACI^{q}$ (17-16) $FACI^{md}$ (20-19) $FACI^{m}$ (20-19 *OORI* (24.22) Service models : No risk of collinearity	Industry: Povc < 1% Pinc < 1% Pnic < 1% Services: Povc < 1% Pinc < 1% Pnic < 1% except $FACS^{q}$ (0.043) $OPPS^{ex}$ (0.035) $FACS^{m}$ (0.042) $TOVS^{pa}$(0) (0.033) $TOVS^{ex}$ (0.032) $DEMS^{ex}$ (0.038)

VAR3 models: RMSEs of (*g*, *IND*, *SER*) equations	VAR3: Nb of lags (5)	Instantaneous Causality of *IND - SER* in *g* equation (P-values)	Non-Instantaneous Causality of *IND - SER* in *g* equation (P-values)	Overall Causality of *IND - SER* in *g* equation (P-values)
$DEMI^{pa}$ - $TOVS^{pa}$(0) (0.247-0.403-0.429)	4	0.000-0.051	0.008-0.051	0.000-0.047
$DEMI^{ex}$ - $OPPS^{pa}$(0) (0.251-0.494-0.330)	3	0.410-0.000	0.000-0.090	0.000-0.005
$PROI^{ex}$ - $OPPS^{pa}$(0) (0.253-0.466-0.330)	3	0.382-0.001	0.001-0.110	0.000-0.005
$DEMI^{ex}$ - $TOVS^{pa}$(0) (0.257-0.504-0.391)	2	0.255-0.000	0.000-0.020	0.000-0.000
$DEMI^{pa}$ - $TOVS^{ex}$(0) (0.257-0.373-0.474)	3	0.000-0.334	0.012-0.111	0.000-0.025
$FACI^{q}$ - $TOVS^{pa}$(0) (0.259-0.354-0.406)	2	0.003-0.005	0.009-0.053	0.000-0.002
$PROI^{pa}$ - $TOVS^{pa}$(0) (0.259-0.413-0.430)	4	0.000-0.006	0.002-0.059	0.000-0.025
$FACI^{q}$ - $OPPS^{pa}$(0) (0.261-0.353-0.359)	2	0.004-0.009	0.017-0.016	0.000-0.003
$PROI^{ex}$ - $TOVS^{pa}$(0) (0.262-0.480-0.384)	2	0.195-0.000	0.000-0.025	0.000-0.001
$FACI^{m}$ - $OPPS^{pa}$(0) (0.264-0.427-0.373)	3	0.041-0.002	0.012-0.015	0.000-0.002
$PROI^{pa}$ - $OPPS^{pa}$(0) (0.267-0.315-0.356)	2	0.001-0.001	0.015-0.052	0.000-0.007
$PROI^{pa}$ - $DEMS^{ex}$(0) (0.268-0.344-0.495)	3	0.003-0.052	0.135-0.104	0.008-0.015
$PROI^{pa}$ - $FACS^{m}$ (0.282-0.349-0.392)	2	0.000-0.007	0.086-0.651	0.000-0.022

<u>Notes</u>: in columns 1 to 7, the elements are presented in descending order of « quality » with respect to the studied criterion (either correlation or adjustment accuracy - as measured by the inverse of the RMSE of the GDP equation). The elements in columns 8 to 11refer to the models in column 7. The estimation was carried out on the GDP series relating to the first results of 2008Q4 and the surveys published in February 2009. ***(1)*** *simple correlations calculated on the whole period under analysis - no interpolation of the survey data in August, only the correlations superior or equal to 0.66 are represented. All represented survey variables are current ones, unless otherwise stated (-1 = one-quarter lagged variable).* ***(2)*** *the VARs with two variables have at most 4 lags.* ***(3)*** *In parenthesis : condition indices relating to the g and sv equations (centred models). The threshold beyond which a risk of collinearity occurs is lower than in non-centred models - ambiguous diagnosis from condition indices of about 15-20, probable collinearity from about 25. Models with no risk of collinearity (condition indices lower than 15) are not represented.* ***(4)*** *Povc, Pinc, Pnic : P-values relating to tests of, respectively, overall causality, instantaneous causality, and non-instantaneous causality.* ***(5)*** *Determination of the number of lags on the basis of exhaustive tests on models with i lags versus models with j lags, ∀i = 1 to 7, ∀j = 1 to i-1.*

Table 2.1.5 Descriptive Statistics on the RMSEs of the restricted VARs used in the Out-of-Sample Analysis (1)

Model	Type	Means	Min	Max	StdDev	Model	Type	Means	Min	Max	StdDev
M1a	AR	0.41	0.34	0.49	0.05	M1g	AR	0.41	0.34	0.49	0.05
M1a	VAR2i	0.32	0.26	0.37	0.03	M1g	VAR2i	0.32	0.26	0.37	0.03
M1a	VAR2s	0.34	0.26	0.40	0.04	M1g	VAR2s	0.34	0.25	0.40	0.04
M1a	VAR3	0.30	0.25	0.35	0.03	M1g	VAR3	0.30	0.25	0.36	0.02
M1b	AR	0.41	0.34	0.49	0.05	M1h	AR	0.41	0.34	0.49	0.04
M1b	VAR2i	0.32	0.26	0.37	0.03	M1h	VAR2i	0.31	0.24	0.39	0.03
M1b	VAR2s	0.34	0.26	0.41	0.04	M1h	VAR2s	0.33	0.26	0.40	0.04
M1b	VAR3	0.31	0.26	0.37	0.03	M1h	VAR3	0.29	0.23	0.34	0.03
M1c	AR	0.41	0.34	0.49	0.05	M1i	AR	0.41	0.34	0.49	0.04
M1c	VAR2i	0.32	0.26	0.37	0.03	M1i	VAR2i	0.34	0.28	0.41	0.03
M1c	VAR2s	0.34	0.25	0.40	0.04	M1i	VAR2s	0.37	0.27	0.46	0.05
M1c	VAR3	0.31	0.25	0.36	0.03	M1i	VAR3	0.32	0.25	0.39	0.04
M1d	AR	0.41	0.34	0.49	0.04	M1j	AR	0.41	0.34	0.49	0.05
M1d	VAR2i	0.31	0.24	0.39	0.03	M1j	VAR2i	0.33	0.28	0.38	0.03
M1d	VAR2s	0.34	0.26	0.42	0.04	M1j	VAR2s	0.34	0.26	0.40	0.04
M1d	VAR3	0.30	0.23	0.36	0.03	M1j	VAR3	0.31	0.25	0.36	0.03
M1e	AR	0.41	0.34	0.49	0.04	M1k	AR	0.41	0.34	0.49	0.05
M1e	VAR2i	0.31	0.24	0.39	0.03	M1k	VAR2i	0.33	0.28	0.38	0.03
M1e	VAR2s	0.34	0.26	0.41	0.04	M1k	VAR2s	0.34	0.26	0.40	0.04
M1e	VAR3	0.30	0.22	0.36	0.03	M1k	VAR3	0.31	0.24	0.36	0.03
M1f	AR	0.41	0.34	0.49	0.05	M1l	AR	0.41	0.34	0.49	0.04
M1f	VAR2i	0.31	0.23	0.38	0.03	M1l	VAR2i	0.36	0.28	0.44	0.04
M1f	VAR2s	0.34	0.27	0.39	0.03	M1l	VAR2s	0.34	0.27	0.39	0.03
M1f	VAR3	0.30	0.22	0.36	0.03	M1l	VAR3	0.33	0.27	0.37	0.03
M2a	AR	0.41	0.34	0.49	0.04	M2d	AR	0.41	0.34	0.49	0.04
M2a	VAR2i	0.29	0.22	0.33	0.03	M2d	VAR2i	0.32	0.27	0.38	0.03
M2a	VAR2s	0.32	0.25	0.37	0.03	M2d	VAR2s	0.31	0.24	0.36	0.03
M2a	VAR3	0.28	0.21	0.33	0.03	M2d	VAR3	0.30	0.25	0.35	0.03
M2b	AR	0.41	0.34	0.49	0.04	M2e	AR	0.41	0.34	0.49	0.04
M2b	VAR2i	0.30	0.24	0.35	0.03	M2e	VAR2i	0.32	0.26	0.36	0.03
M2b	VAR2s	0.32	0.23	0.38	0.04	M2e	VAR2s	0.32	0.24	0.38	0.04
M2b	VAR3	0.29	0.22	0.34	0.03	M2e	VAR3	0.30	0.24	0.35	0.03
M2c	AR	0.41	0.34	0.49	0.04	M2f	AR	0.41	0.34	0.49	0.04
M2c	VAR2i	0.31	0.26	0.38	0.03	M2f	VAR2i	0.32	0.26	0.36	0.03
M2c	VAR2s	0.31	0.24	0.36	0.03	M2f	VAR2s	0.32	0.23	0.38	0.04
M2c	VAR3	0.30	0.24	0.35	0.03	M2f	VAR3	0.29	0.22	0.33	0.03
M3a	AR	0.41	0.34	0.49	0.05	M3d	AR	0.41	0.34	0.49	0.05
M3a	VAR2i	0.29	0.24	0.32	0.02	M3d	VAR2i	0.31	0.23	0.38	0.03
M3a	VAR2s	0.31	0.22	0.35	0.04	M3d	VAR2s	0.31	0.23	0.35	0.03
M3a	VAR3	0.27	0.22	0.31	0.03	M3d	VAR3	0.29	0.21	0.33	0.03
M3b	AR	0.41	0.34	0.49	0.05	M3e	AR	0.41	0.34	0.49	0.04
M3b	VAR2i	0.31	0.24	0.37	0.03	M3e	VAR2i	0.32	0.23	0.38	0.03
M3b	VAR2s	0.31	0.23	0.35	0.03	M3e	VAR2s	0.31	0.22	0.37	0.04
M3b	VAR3	0.28	0.22	0.31	0.03	M3e	VAR3	0.30	0.22	0.36	0.03
M3c	AR	0.41	0.34	0.49	0.04	M3f	AR	0.41	0.34	0.49	0.04
M3c	VAR2i	0.31	0.22	0.38	0.03	M3f	VAR2i	0.31	0.22	0.38	0.03
M3c	VAR2s	0.31	0.22	0.36	0.04	M3f	VAR2s	0.32	0.22	0.37	0.04
M3c	VAR3	0.28	0.20	0.32	0.03	M3f	VAR3	0.30	0.20	0.36	0.04

Notes : see next page.

Table 2.1.5 Descriptive Statistics on the RMSEs of the restricted VARs used * in the Out-of-Sample Analysis (2)

Model	Type	Means	Min	Max	StdDev	Model	Type	Means	Min	Max	StdDev
M4a	AR	0.41	0.34	0.49	0.04	M4h	AR	0.41	0.34	0.49	0.04
M4a	VAR2i	0.27	0.21	0.32	0.02	M4h	VAR2i	0.29	0.24	0.35	0.02
M4a	VAR2s	0.30	0.22	0.35	0.03	M4h	VAR2s	0.30	0.21	0.34	0.04
M4a	VAR3	0.25	0.19	0.30	0.02	M4h	VAR3	0.26	0.20	0.30	0.02
M4b	AR	0.41	0.34	0.49	0.04	M4i	AR	0.41	0.34	0.49	0.04
M4b	VAR2i	0.30	0.22	0.37	0.03	M4i	VAR2i	0.30	0.22	0.37	0.03
M4b	VAR2s	0.30	0.21	0.34	0.04	M4i	VAR2s	0.30	0.22	0.35	0.03
M4b	VAR3	0.26	0.19	0.29	0.02	M4i	VAR3	0.27	0.20	0.30	0.02
M4c	AR	0.41	0.34	0.49	0.04	M4j	AR	0.41	0.34	0.49	0.04
M4c	VAR2i	0.30	0.22	0.37	0.03	M4j	VAR2i	0.30	0.25	0.37	0.03
M4c	VAR2s	0.30	0.21	0.34	0.04	M4j	VAR2s	0.30	0.21	0.34	0.04
M4c	VAR3	0.27	0.20	0.31	0.03	M4j	VAR3	0.27	0.21	0.32	0.03
M4d	AR	0.41	0.34	0.49	0.04	M4k	AR	0.41	0.34	0.49	0.05
M4d	VAR2i	0.30	0.22	0.37	0.03	M4k	VAR2i	0.30	0.25	0.34	0.02
M4d	VAR2s	0.30	0.22	0.35	0.03	M4k	VAR2s	0.30	0.21	0.35	0.04
M4d	VAR3	0.25	0.19	0.29	0.02	M4k	VAR3	0.27	0.21	0.31	0.02
M4e	AR	0.41	0.34	0.49	0.04	M4l	AR	0.41	0.34	0.49	0.04
M4e	VAR2i	0.28	0.22	0.33	0.02	M4l	VAR2i	0.30	0.25	0.35	0.02
M4e	VAR2s	0.31	0.22	0.37	0.04	M4l	VAR2s	0.32	0.24	0.38	0.03
M4e	VAR3	0.27	0.21	0.31	0.02	M4l	VAR3	0.29	0.23	0.34	0.02
M4f	AR	0.41	0.34	0.49	0.04	M4m	AR	0.41	0.34	0.49	0.04
M4f	VAR2i	0.29	0.24	0.36	0.03	M4m	VAR2i	0.30	0.25	0.35	0.02
M4f	VAR2s	0.30	0.22	0.35	0.03	M4m	VAR2s	0.32	0.22	0.40	0.04
M4f	VAR3	0.26	0.21	0.30	0.02	M4m	VAR3	0.28	0.22	0.33	0.02
M4g	AR	0.41	0.34	0.49	0.05	All	AR	0.41	0.41	0.42	0.00
M4g	VAR2i	0.30	0.25	0.34	0.02	All	VAR2i	0.31	0.27	0.36	0.02
M4g	VAR2s	0.30	0.22	0.35	0.03	All	VAR2s	0.32	0.30	0.37	0.02
M4g	VAR3	0.27	0.22	0.31	0.02	All	VAR3	0.29	0.25	0.33	0.02

Notes:

Column 1: the variables included in the models "Mij" are given in Appendix 3.1. They result directly from the in-sample analysis on unrestricted VARs (cf tables 2.1 to 2.4 in this appendix).

Column 2:

AR = Restricted autoregressive model of GDP growth

VAR2i = Restricted VAR with 4 lags and two variables, GDP growth and an industry variable *IND*

VAR2s = Restricted VAR with 4 lags and two variables, GDP growth and an industry variable *SER*

VAR3 = Restricted VAR with 4 lags and three variables, GDP growth, *IND* and *SER*,[78]

Column 3: Means of the RMSEs of the GDP growth equation in the model defined by column "Model" × column "Type" that was estimated on the N/2 different subperiods considered in the out-of-sample analysis (recursive and rolling estimations are mixed together, therefore the number of RMSEs is equal to N). N equals 74 (resp. 56, 72, and 74) for month *m*1 (resp. *m*2, *m*3, and *m*4) models.

Column 4: Minimum value of these N RMSEs

Column 5: Maximum value of these N RMSEs

Column 6: Standard deviation of these N RMSEs

Sources: French quarterly accounts and industry and service surveys. Authors' calculations.

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[78] Reminder: *IND* and *SER* are defined in Appendix 3.1. VAR3 encompasses the other models, while VAR2i and VAR2s encompass the AR model.

2.2) Multistep Models

The two tables below present the adjusted R2 (R²a) and root-mean-square errors (RMSE) resulting from the estimation of the multistep models that have been selected for the out-of-sample analysis (cf details on these models in Appendix 3) on the period 1988Q1-2006Q4. At the moment when the empirical work was carried out, the GDP data were at least semi-definitive on this subperiod.

Notation: Forecast = 1 (forecast of the current quarter), Forecast = 2 (forecast of the next quarter), Forecast = 3 (forecast of the next-to-next quarter).

Table 2.2.1 Adjustment Statistics Relating to the Multistep Models
(1) Weighted Service Balances Based on Completed Individual Responses

		AR model		Manual model*				Automatic model			
				Industry		Industry + Services		Industry		Industry + Services	
Forecast	Month	R²a	RMSE	R²a	RMSE	R²a	RMSE	R²a	RMSE	R²a	RMSE
1	*m*1	0.17	0.38	0.57	0.27	0.59	0.26	0.59	0.26	0.63	0.24
1	*m*2	0.17	0.38	0.60	0.26	0.63	0.24	0.64	0.24	0.70	0.22
1	*m*3	0.17	0.38	0.63	0.25	0.63	0.24	0.64	0.24	0.64	0.24
1	*m*4	0.17	0.38	0.65	0.24	0.67	0.24	0.63	0.25	0.65	0.24
2	*m*1	0.17	0.38	0.34	0.33	0.39	0.32	0.43	0.30	0.46	0.29
2	*m*2	0.17	0.38	0.33	0.33	0.39	0.32	0.41	0.31	0.50	0.28
2	*m*3	0.17	0.38	0.45	0.30	0.49	0.29	0.45	0.30	0.49	0.29
2	*m*4	0.17	0.38	0.58	0.27	0.60	0.25	0.59	0.26	0.63	0.24
3	*m*1	0.17	0.38	0.14	0.38	0.23	0.36	0.32	0.33	0.38	0.31
3	*m*2	0.17	0.38	0.16	0.38	0.36	0.32	0.39	0.31	0.46	0.29
3	*m*3	0.17	0.38	0.19	0.37	0.33	0.33	0.25	0.35	0.40	0.31
3	*m*4	0.17	0.38	0.30	0.34	0.42	0.30	0.43	0.30	0.46	0.29

(*) except for the next-to-next forecast: in this case, two automatic models are presented.
Sources: French quarterly accounts and industry and service surveys. Authors' calculations.

Table 2.2.2 Adjustment Statistics Relating to the Multistep Models
(2) Non-Weighted Service Balances Based on Non-Completed Individual Responses

		AR model		Manual model*				Automatic model			
				Industry		Industry + Services		Industry		Industry + Services	
Forecast	Month	R²a	RMSE	R²a	RMSE	R²a	RMSE	R²a	RMSE	R²a	RMSE
1	*m*1	0.17	0.38	0.58	0.27	0.59	0.26	0.59	0.26	-	-
1	*m*2	0.17	0.38	0.60	0.26	0.68	0.23	0.64	0.24	0.71	0.22
1	*m*3	0.17	0.38	0.63	0.25	0.67	0.23	0.64	0.24	0.69	0.22
1	*m*4	0.17	0.38	0.65	0.24	0.68	0.23	0.63	0.25	0.67	0.23
2	*m*1	0.17	0.38	0.34	0.33	0.37	0.32	0.43	0.30	0.49	0.27
2	*m*2	0.17	0.38	0.33	0.33	0.41	0.31	0.41	0.31	0.48	0.29
2	*m*3	0.17	0.38	0.45	0.30	0.52	0.28	0.45	0.30	0.56	0.27
2	*m*4	0.17	0.38	0.58	0.27	0.59	0.26	0.59	0.26	-	-
3	*m*1	0.17	0.38	0.14	0.38	0.22	0.35	0.32	0.33	0.35	0.32
3	*m*2	0.17	0.38	0.16	0.38	0.22	0.36	0.39	0.31	0.43	0.30
3	*m*3	0.17	0.38	0.19	0.37	0.27	0.35	0.25	0.35	0.29	0.34
3	*m*4	0.17	0.38	0.30	0.34	0.37	0.32	0.43	0.30	0.49	0.27

(*) except for the next-to-next forecast: in this case, two automatic models are presented.
Sources: French quarterly accounts and industry and service surveys. Authors' calculations.

Appendix 3: VAR3 and Multistep Models - Selected Variables

3.1) VAR3 Models

Table 3.1 Variables *IND* and *SER* in the VAR3 Models

Models	Month $m1$ ($i=1$)	Month $m2$ ($i=2$)	Month $m3$ ($i=3$)	Month $m4$ ($i=4$)
Mia	$IND = PROI^{ex}_{m1}$ $SER = DEMS^{ex}_{m1}$ (0)	$IND = PROI^{ex}_{m2}$ $SER = FACS^{m}_{m2}$ (0)	$IND = PROI^{pa}_{m3}$ $SER = OPPS^{pa}_{m3}$ (0)	$IND = DEMI^{pa}_{m4}$ $SER = TOVS^{pa}_{m4}$ (0)
Mib	$IND = PROI^{ex}_{m1}$ $SER = TOVS^{ex}_{m1}$ (0)	$IND = FACI^{m}_{m2}$ $SER = TOVS^{ex}_{m2}$ (0)	$IND = FACI^{m}_{m3}$ $SER = TOVS^{pa}_{m3}$ (0)	$IND = DEMI^{ex}_{m4}$ $SER = OPPS^{pa}_{m4}$ (0)
Mic	$IND = PROI^{ex}_{m1}$ $SER = FACS^{q}_{m1}$ (0)	$IND = FACI^{m}_{m2}$ $SER = FACS^{m}_{m2}$ (0)	$IND = PROI^{ex}_{m3}$ $SER = OPPS^{pa}_{m3}$ (0)	$IND = PROI^{ex}_{m4}$ $SER = OPPS^{pa}_{m4}$ (0)
Mid	$IND = DEMI^{ex}_{m1}$ $SER = TOVS^{ex}_{m1}$ (0)	$IND = OORI_{m2}$ $SER = FACS^{m}_{m2}$ (0)	$IND = OORI_{m3}$ $SER = TOVS^{pa}_{m3}$ (0)	$IND = DEMI^{ex}_{m4}$ $SER = TOVS^{pa}_{m4}$ (0)
Mie	$IND = DEMI^{ex}_{m1}$ $SER = FACS^{q}_{m1}$ (0)	$IND = PROI^{pa}_{m2}$ $SER = DMMS^{m}_{m2}$ (0)	$IND = OORI_{m3}$ $SER = FACS^{m}_{m3}$ (0)	$IND = DEMI^{pa}_{m4}$ $SER = TOVS^{ex}_{m4}$ (0)
Mif	$IND = DEMI^{ex}_{m1}$ $SER = FACS^{m}_{m1}$ (0)	$IND = PROI^{pa}_{m2}$ $SER = OPPS^{ex}_{m2}$ (0)	$IND = PROI^{ex}_{m3}$ $SER = FACS^{m}_{m3}$ (0)	$IND = FACI^{q}_{m4}$ $SER = TOVS^{pa}_{m4}$ (0)
Mig	$IND = PROI^{ex}_{m1}$ $SER = OPPS^{ex}_{m1}$ (0)			$IND = PROI^{pa}_{m4}$ $SER = TOVS^{pa}_{m4}$ (0)
Mih	$IND = DEMI^{ex}_{m1}$ $SER = OPPS^{ex}_{m1}$ (0)			$IND = FACI^{q}_{m4}$ $SER = OPPS^{pa}_{m4}$ (0)
Mii	$IND = GENI^{ex}_{m1}$ $SER = OPPS^{ex}_{m1}$			$IND = PROI^{ex}_{m4}$ $SER = TOVS^{pa}_{m4}$ (0)
Mij	$IND = FACI^{m}_{m1}$ $SER = DEMS^{ex}_{m1}$ (0)			$IND = FACI^{m}_{m4}$ $SER = OPPS^{pa}_{m4}$ (0)
Mik	$IND = FACI^{q}_{m1}$ $SER = DEMS^{ex}_{m1}$ (0)			$IND = PROI^{pa}_{m4}$ $SER = OPPS^{pa}_{m4}$ (0)
Mil	$IND = GENI^{ex}_{m1}$ $SER = FACS^{m}_{m1}$ (0)			$IND = PROI^{pa}_{m4}$ $SER = DEMS^{ex}_{m4}$ (0)
Mim				$IND = PROI^{pa}_{m4}$ $SER = FACS^{m}_{m4}$

Sources: INSEE, industry and service surveys and French quarterly accounts. Authors' calculations. Note that all VAR models used in the out-of-sample analysis are restricted models with 4 lags. The higher number of lags than in the in-sample analysis stems for the significance of some fourth lags on the early subperiods 1988Q1-200yQ4, with $y \leq 1$ (such as, for instance, the fourth lag of GDP growth in the GDP growth equation). Definition of the variables: see Notation Table in Appendix 2 above.

3.2) Univariate Multistep Models

Specific notations relating to the tables of Appendix 3.2):
1) Lagts(*n*, name of a quarterly time series) = n^{th} quarterly lag of the time series
2) *sv*_m*i* = subseries derived from the survey variable *sv* relating to month *mi* ($sv\_mi \equiv sv_{mi}$)

Table 3.2.1 Univariate Models Used to Forecast the Current Quarter Weighted Service Balances Based on Completed Individual Responses

Month	Model	Industry	Industry + Services	Nested or not
*m*1	Manual (M111)	Intercept PROI_m1 DEMI^{ex}_m1 - Lagts(DEMI^{ex}_m1)	Intercept PROI^{ex}_m1 DEMI^{ex}_m1 - Lagts(DEMI^{ex}_m1) DEMS^{ex}_m1 - Lagts(DEMS^{ex}_m1)	Nested
	Automatic (M112)	Intercept PROI^{ex}_m1 - Lagts(PROI^{ex}_m3) Lagts(PROI^{ex}_m3) - Lagts(PROI^{ex}_m2) DEMI^{ex}_m1	Intercept PROI^{ex}_m1 - Lagts(PROI^{ex}_m3) Lagts(PROI^{ex}_m3) - Lagts(PROI^{ex}_m2) DEMI^{ex}_m1 TOVS^{pa}_m1 - Lagts(TOVS^{pa}_m3) TOVS^{ex}_m1 - Lagts(TOVS^{ex}_m3)	Nested
*m*2	Manual (M211)	Intercept PROI^{pa}_m2 PROI^{ex}_m1 - Lagts(PROI^{ex}_m3) DEMI^{ex}_m1 - Lagts(DEMI^{ex}_m1)	Intercept PROI^{pa}_m2 PROI^{ex}_m1 - Lagts(PROI^{ex}_m3) DEMI^{ex}_m1 - Lagts(DEMI^{ex}_m1) TOVS^{pa}_m2 - TOVS^{pa}_m1 Lagts(OPPS^{pa}_m1)	Nested
	Automatic (M212)	Intercept PROI^{pa}_m2 - PROI^{pa}_m1 PROI^{pa}_m1 - Lagts(PROI^{pa}_m3) PROI^{ex}_m2 PROI^{ex}_m1 - Lagts(PROI^{ex}_m3)	Intercept PROI^{pa}_m2 - PROI^{pa}_m1 PROI^{pa}_m1 - Lagts(PROI^{pa}_m3) PROI^{ex}_m2 PROI^{ex}_m1 - Lagts(PROI^{ex}_m3) TOVS^{ex}_m1 - Lagts(TOVS^{ex}_m3) TOVS^{pa}_m1 - Lagts(TOVS^{pa}_m3) Lagts(OPPS^{pa}_m1)	Nested
*m*3	Manual (M311)	Intercept PROI^{pa}_m3 - PROI^{pa}_m1 PROI^{pa}_m1 - Lagts(PROI^{pa}_m1) PROI^{ex}_m1	Intercept PROI^{pa}_m3 PROI^{pa}_m3 - PROI^{pa}_m1 PROI^{pa}_m1 - Lagts(PROI^{pa}_m1) DEMI^{ex}_m1 - Lagts(DEMI^{ex}_m1) TOVS^{ex}_m1	Non-nested
	Automatic (M312)	Intercept PROI^{pa}_m3 PROI^{pa}_m3 - PROI^{pa}_m2 PROI^{ex}_m2 PROI^{ex}_m1 - Lagts(PROI^{ex}_m3) DEMI^{pa}_m1 Lagts(DEMI^{ex}_m1)	Intercept PROI^{pa}_m3 PROI^{ex}_m2 Lagts(DEMI^{ex}_m1) TOVS^{ex}_m1 - Lagts(TOVS^{ex}_m3) Lagts(OPPS^{pa}_m1)	Non-nested
*m*4	Manual (M411)	Intercept PROI^{ex}_m1 Lagts(-1,DEMI^{pa}_m1) - DEMI^{pa}_m1	Intercept PROI^{ex}_m1 Lagts(-1,DEMI^{pa}_m1) - DEMI^{pa}_m1 Lagts(-1, OPPS^{ex}_m1)	Nested
	Automatic (M412)	Intercept Lagts(-1,DEMI^{pa}_m1) DEMI^{pa}_m1 DEMI^{ex}_m1	Intercept Lagts(-1,DEMI^{pa}_m1) DEMI^{pa}_m1 DEMI^{ex}_m1 Lagts(-1,OPPS^{ex}_m1)	Nested

Table 3.2.2 Univariate Models Used to Forecast the Next Quarter Weighted Service Balances Based on Completed Individual Responses

Month	Model	Industry	Industry + Services	Nested or not
*m*1	Manual (M121)	Intercept Lagts(OORI_m1) Lagts(PROI^{ex}_m1) - Lagts(2,PROI^{ex}_m3) Lagts(DEMI^{pa}_m1) - Lagts(2,DEMI^{pa}_m1)	Intercept Lagts(PROI^{ex}_m1) - Lagts(2,PROI^{ex}_m3) Lagts(DEMI^{pa}_m1) - Lagts(2,DEMI^{pa}_m1) Lagts(OPPS^{pa}_m1)	Non-nested
	Automatic (M122)	Intercept Lagts(PROI^{pa}_m1) - Lagts(2,PROI^{pa}_m3) Lagts(2,PROI^{pa}_m3) - Lagts(2,PROI^{pa}_m2) Lagts(PROI^{ex}_m1) Lagts(PROI^{ex}_m1) - Lagts(2,PROI^{ex}_m3) Lagts(OORI_m1) Lagts(DEMI^{pa}_m1) - Lagts(2,DEMI^{pa}_m1) Lagts(DEMI^{ex}_m1) - Lagts(2,DEMI^{ex}_m1)	Intercept Lagts(PROI^{pa}_m1) - Lagts(2,PROI^{pa}_m3) Lagts(PROI^{ex}_m1) - Lagts(2,PROI^{ex}_m3) Lagts(DEMI^{pa}_m1 - Lagts(2,DEMI^{pa}_m1) Lagts(TOVS^{ex}_m1) Lagts(2,TOVS^{ex}_m3) -Lagts(2,TOVS^{ex}_m2) Lagts(OPPS^{pa}_m1)	Non-nested
*m*2	Manual (M221)	Intercept Lagts(OORI_m2) Lagts(PROI^{ex}_m1) - Lagts(2,PROI^{ex}_m3) Lagts(DEMI^{pa}_m1) - Lagts(2,DEMI^{pa}_m1)	Intercept Lagts(PROI^{ex}_m1) - Lagts(2,PROI^{ex}_m3) Lagts(TOVS^{ex}_m2) - Lagts(TOVS^{ex}_m1) Lagts(OPPS^{pa}_m1)	Non-nested
	Automatic (M222)	Intercept Lagts(PROI^{pa}_m2) - Lagts(PROI^{pa}_m1) Lagts(OORI_m2) Lagts(DEMI^{pa}_m1) Lagts(DEMI^{ex}_m1) Lagts(DEMI^{ex}_m1) - Lagts(2,DEMI^{ex}_m1)	Intercept Lagts(PROI^{pa}_m2) - Lagts(PROI^{pa}_m1) Lagts(OORI_m2) Lagts(DEMI^{pa}_m1) Lagts(DEMI^{ex}_m1) Lagts(DEMI^{ex}_m1) - Lagts(2,DEMI^{ex}_m1) Lagts(TOVS^{pa}_m2) - Lagts(TOVS^{pa}_m1) Lagts(TOVS^{ex}_m2) - Lagts(TOVS^{ex}_m1)	Nested
*m*3	Manual (M321)	Intercept Lagts(OORI_m3) Lagts(PROI^{ex}_m3) - Lagts(2,PROI^{ex}_m2) Lagts(DEMI^{ex}_m1) - Lagts(2,DEMI^{ex}_m1	Intercept Lagts(PROI^{ex}_m3) - Lagts(2,PROI^{ex}_m2) Lagts(DEMI^{ex}_m1) - Lagts(2,DEMI^{ex}_m1) Lagts(TOVS^{ex}_m3) - Lagts(TOVS^{ex}_m2) Lagts(OPPS^{pa}_m1)	Non-nested
	Automatic (M322)	Intercept Lagts(PROI^{ex}_m3) - Lagts(PROI^{ex}_m2) Lagts(OORI_m3) Lagts(DEMI^{ex}_m1) - Lagts(2,DEMI^{ex}_m1)	Intercept Lagts(PROI^{ex}_m3) - Lagts(PROI^{ex}_m2) Lagts(DEMI^{ex}_m1) - Lagts(2,DEMI^{ex}_m1) Lagts(TOVS^{ex}_m2) - Lagts(TOVS^{ex}_m1) Lagts(OPPS^{pa}_m1)	Non-nested
*m*4	Manual (M421)	Intercept Lagts(PROI^{ex}_m4) DEMI^{ex}_m1 - Lagts(DEMI^{ex}_m1)	Intercept Lagts(PROI^{ex}_m4) DEMI^{ex}_m1 - Lagts(DEMI^{ex}_m1) DEMS^{ex}_m1 - Lagts(DEMS^{ex}_m1) Lagts(OPPS^{pa}_m1)	Nested
	Automatic (M422)	Intercept Lagts(PROI^{ex}_m4) - Lagts(PROI^{ex}_m3) Lagts(PROI^{ex}_m3) - Lagts(PROI^{ex}_m2) DEMI^{ex}_m1	Intercept Lagts(PROI^{ex}_m4) - Lagts(PROI^{ex}_m3) Lagts(PROI^{ex}_m3) - Lagts(PROI^{ex}_m2) DEMI^{ex}_m1 Lagts(TOVS^{ex}_m4) - Lagts(TOVS^{ex}_m3) Lagts(TOVS^{pa}_m4) - Lagts(TOVS^{pa}_m3)	Nested

Table 3.2.3 Univariate Models Used to Forecast the Next-to-Next Quarter Weighted Service Balances Based on Completed Individual Responses

Month	Model	Industry	Industry+Services	Nested or not
*m*1	1st Automatic (M131)	Intercept Lagts(2,$GENI^{ex}$_m1) Lagts(2,$GENI^{ex}$_m1) - Lagts(3,GENIex_m3) Lagts(2,$DEMI^{pa}$_m1)	Intercept Lagts(2,$TOVS^{ex}$_m1) Lagts(2,$OPPS^{pa}$_m1) Lagts(2,$DEMS^{ex}$_m1) - Lagts(3,$DEMS^{ex}$_m1) Only services variables	Non-nested
	2nd Automatic (M132)	Intercept Lagts(3,$PROI^{pa}$_m3) - Lagts(3,$PROI^{pa}$_m2) Lagts(2,OORI_m1) Lagts(2,OORI_m1) - Lagts(3,OORI_m3) Lagts(2,$DEMI^{pa}$_m1) - Lagts(3,$DEMI^{pa}$_m1) Lagts(2,$DEMI^{ex}$_m1)	Intercept Lagts(2,OORI_m1) Lagts(2,OORI_m1) - Lagts(3,OORI_m3) Lagts(2,$DEMI^{ex}$_m1) Lagts(2,$TOVS^{ex}$_m1) Lagts(2,$OPPS^{pa}$_m1) Lagts(2,$OPPS^{ex}$_m1) - Lagts(3,$OPPS^{ex}$_m1)	Non-Nested
*m*2	1st Automatic (M231)	Intercept Lagts(2,FORI_m2) Lagts(2,$GENI^{ex}$_m2) - Lagts(2,$GENI^{ex}$_m1)	Intercept Lagts(2,$GENI^{ex}$_m2) - Lagts(2,$GENI^{ex}$_m1) Lagts(2,$TOVS^{ex}$_m2) Lagts(2,$TOVS^{ex}$_m2) - Lagts(2,$TOVS^{ex}$_m1) Lagts(2,$TOVS^{pa}$_m2) Lagts(2,$TOVS^{pa}$_m1) - Lagts(3,$TOVS^{pa}$_m3) Lagts(2,$DEMS^{ex}$_m1) - Lagts(3,$DEMS^{ex}$_m1)	Non-nested
	2nd Automatic (M232)	Intercept Lagts(2,$PROI^{pa}$_m2) - Lagts(2,$PROI^{pa}$_m1) Lagts(2,$PROI^{pa}$_m1) - Lagts(3,$PROI^{pa}$_m3) Lagts(2,OORI_m2) Lagts(2,OORI_m1) - Lagts(3,OORI_m3) Lagts(2,$DEMI^{ex}$_m1	Intercept Lagts(2,$PROI^{pa}$_m2) - Lagts(2,$PROI^{pa}$_m1) Lagts(2,$PROI^{pa}$_m1) - Lagts(3,$PROI^{pa}$_m3) Lagts(2,OORI_m2) Lagts(2,OORI_m1) - Lagts(3,OORI_m3) Lagts(2,$DEMI^{ex}$_m1) Lagts(2,$TOVS^{ex}$_m2) Lagts(2,$TOVS^{ex}$_m2) - Lagts(2,$TOVS^{ex}$_m1) Lagts(2,$OPPS^{ex}$_m1)	Nested
*m*3	1st Automatic (M331)	Intercept Lagts(2,FORI_m3) Lagts(2,$GENI^{ex}$_m2) - Lagts(2,$GENI^{ex}$_m1)	Intercept Lagts(2,$TOVS^{ex}$_m3) Lagts(2,$TOVS^{ex}$_m2) - Lagts(2,$TOVS^{ex}$_m1) Lagts(2,$TOVS^{pa}$_m3) Lagts(2,$DEMS^{ex}$_m1) - Lagts(3,$DEMS^{ex}$_m1) Only services variables	Non-nested
	2nd Automatic (M332)	Intercept Lagts(2,$PROI^{pa}$_m2) - Lagts(2,$PROI^{pa}$_m1) Lagts(2,OORI_m3) Lagts(2,$DEMI^{ex}$_m1)	Intercept Lagts(2,$PROI^{pa}$_m2) - Lagts(2,$PROI^{pa}$_m1) Lagts(2,OORI_m3) Lagts(2,$DEMI^{ex}$_m1) Lagts(2,$TOVS^{ex}$_m3) Lagts(2,$TOVS^{ex}$_m2) - Lagts(2,$TOVS^{ex}$_m1) Lagts(2,$TOVS^{pa}$_m3) Lagts(2,$OPPS^{ex}$_m1) - Lagts(3,$OPPS^{ex}$_m1)	Nested
*m*4	1st Automatic (M431)	Intercept Lagts(2,FORI_m4) Lagts($DEMI^{ex}$_m1) - Lagts(2,$DEMI^{ex}$_m1)	Intercept Lagts($DEMI^{ex}$_m1) - Lagts(2,$DEMI^{ex}$_m1) Lagts(2,$PROI^{ex}$_m4)- Lagts(2,$PROI^{ex}$_m3)-Lagts(2,$PROI^{ex}$_m2) Lagts(2,$TOVS^{ex}$_m4) Lagts($OPPS^{pa}$_m1) Lagts($DEMS^{ex}$_m1) - Lagts(2,$DEMS^{ex}$_m1)	Non-nested
	2nd Automatic (M432)	Intercept Lagts(2,$PROI^{pa}$_m4) - Lagts(2,$PROI^{pa}$_m3) Lagts(2,$PROI^{pa}$_m3) - Lagts(2,$PROI^{pa}$_m2) Lagts(2,$PROI^{ex}$_m4) Lagts(2,$PROI^{ex}$_m4) - Lagts(2,$PROI^{ex}$_m3) Lagts(2,OORI_m4) Lagts($DEMI^{pa}$_m1) - Lagts(2,$DEMI^{pa}$_m1) Lagts($DEMI^{ex}$_m1) - Lagts(2,$DEMI^{ex}$_m1)	Intercept Lagts(2,$PROI^{pa}$_m4) - Lagts(2,$PROI^{pa}$_m3) Lagts(2,$PROI^{ex}$_m4) - Lagts(2,$PROI^{ex}$_m3) Lagts($DEMI^{pa}$_m1) - Lagts(2,$DEMI^{pa}$_m1) Lagts(2,$TOVS^{ex}$_m4) Lagts(2,$TOVS^{ex}$_m3) - Lagts(2,$TOVS^{ex}$_m2) Lagts($OPPS^{pa}$_m1)	Non-nested

Table 3.2.4 Univariate Models Used to Forecast the Current Quarter
Non-Weighted Service Balances Based on Non-Completed Individual Responses*

Month	Model	Industry	Industry + Services	Nested or not
*m*1	Manual (M1110)	Intercept PROI^{ex}_m1 DEMI^{ex}_m1 - Lagts(DEMI^{ex}_m1)	Intercept PROI^{ex}_m1 DEMI^{ex}_m1 - Lagts(DEMI^{ex}_m1 DEMS^{ex} - Lagts(DEMS^{ex}_m1) Lagts(OPPS^{pa}_m1)	Nested
	Automatic (M1120)	Intercept PROI^{ex}_m1 - Lagts(PROI^{ex}_m3) Lagts(PROI^{ex}_m3) - Lagts(PROI^{ex}_m2) DEMI^{ex}_m1	No services variables Same model as Industry alone	
*m*2	Manual (M2110)	Intercept PROI^{pa}_m2 PROI^{ex}_m1 - Lagts(PROI^{ex}_m3) DEMI^{ex}_m1 - Lagts(DEMI^{ex}_m1)	Intercept PROI^{pa}_m2 PROI^{ex}_m1 - Lagts(PROI^{ex}_m3) DEMI^{ex}_m1 - Lagts(DEMI^{ex}_m1) TOVS^{pa}_m2 - TOVS^{pa}_m1 TOVS^{ex}_m1	Nested
	Automatic (M2120)	Intercept PROI^{pa}_m2- PROI^{pa}_m1 PROI^{pa}_m1 - Lagts(PROI^{pa}_m3) PROI^{ex}_m2 PROI^{ex}_m1 - Lagts(PROI^{ex}_m3)	Intercept PROI^{pa}_m2- PROI^{pa}_m1 PROI^{pa}_m1 - Lagts(PROI^{pa}_m3) PROI^{ex}_m2 Lagts(OPPS^{pa}_m1) Lagts(DEMS^{ex}_m1)	Non Nested
*m*3	Manual (M3110)	Intercept PROI^{pa}_m3 - PROI^{pa}_m1 PROI^{pa}_m1 - Lagts(PROI^{pa}_m1) PROI^{ex}_m1	Intercept PROI^{pa}_m3 - PROI^{pa}_m1 PROI^{pa}_m1 - Lagts(PROI^{pa}_m1) PROI^{ex}_m1 TOVS^{pa}_m3 - TOVS^{pa}_m1 TOVS^{ex}_m1	Nested
	Automatic (M3120)	Intercept PROI^{pa}_m3 PROI^{pa}_m3 - PROI^{pa}_m2 PROI^{ex}_m2 PROI^{ex}_m1 - Lagts(PROI^{ex}_m3) DEMI^{pa}_m1 Lagts(DEMI^{ex}_m1)	Intercept PROI^{pa}_m3 PROI^{pa}_m3 - PROI^{pa}_m2 PROI^{ex}_m2 DEMI^{pa}_m1 Lagts(DEMI^{ex}_m1) TOVS^{pa}_m3 - TOVS^{pa}_m1 Lagts(OPPS^{pa}_m1)	Non-nested
*m*4	Manual (M4110)	Intercept PROI^{ex}_m1 Lagts(-1,DEMI^{pa}_m1) - DEMI^{pa}_m1	Intercept PROI^{ex}_m1 Lagts(-1,DEMI^{pa}_m1 - DEMI^{pa}_m1 TOVS^{pa}_m4 - TOVS^{pa}_m1	Nested
	Automatic (M4120)	Intercept Lagts(-1,DEMI^{pa}_m1) DEMI^{pa}_m1 DEMI^{ex}_m1	Intercept Lagts(-1,DEMI^{pa}_m1) DEMI^{pa}_m1 DEMI^{ex}_m1 Lagts(-1,OPPS^{pa}_m1) OPPS^{pa}_m1	Nested

* In this table, for the sake of notation simplicity, the subscript (0) has been omitted in the names of the service balances.

Table 3.2.5 Univariate Models Used to Forecast the Next Quarter Non-Weighted Service Balances Based on Non-Completed Individual Responses*

Month	Model	Industry	Industry + Services	Nested or not
*m*1	Manual (M1210)	Intercept Lagts(OORI_m1) Lagts(PROI^{ex}_m1) - Lagts(2,PROI^{ex}_m3) Lagts(DEMI^{pa}_m1) - Lagts(2,DEMI^{pa}_m1)	Intercept Lagts(PROI^{ex}_m1) - Lagts(2,PROI^{ex}_m3) Lagts(DEMI^{pa}_m1) - Lagts(2,DEMI^{pa}_m1) Lagts(OPPS^{pa}_m1)	Non-nested
	Automatic (M1220)	Intercept Lagts(PROI^{pa}_m1) - Lagts(2,PROI^{pa}_m3) Lagts(2,PROI^{pa}_m3) - Lagts(2,PROI^{pa}_m2) Lagts(PROI^{ex}_m1) Lagts(PROI^{ex}_m1) - Lagts(2,PROI^{ex}_m3) Lagts(OORI_m1) Lagts(DEMI^{pa}_m1) - Lagts(2,DEMI^{pa}_m1) Lagts(DEMI^{ex}_m1) - Lagts(2,DEMI^{ex}_m1)	Intercept Lagts(PROI^{pa}_m1) - Lagts(2,PROI^{pa}_m3) Lagts(2,PROI^{pa}_m3) - Lagts(2,PROI^{pa}_m2) Lagts(PROI^{ex}_m1) Lagts(PROI^{ex}_m1) - Lagts(2,PROI^{ex}_m3) Lagts(OORI_m1) Lagts(DEMI^{pa}_m1) - Lagts(2,DEMI^{pa}_m1) Lagts(DEMI^{ex}_m1) - Lagts(2,DEMI^{ex}_m1) Lagts(TOVS^{ex}_m2) Lagts(TOVS^{ex}_m1) - Lagts(2,TOVS^{ex}_m3) Lagts(OPPS^{pa}_m1) - Lagts(2,OPPS^{pa}_m1) Lagts(OPPS^{ex}_m1) Lagts(OPPS^{ex}_m1) - Lagts(2,OPPS^{ex}_m1)	Nested
*m*2	Manual (M2210)	Intercept Lagts(OORI_m2) Lagts(PROI^{ex}_m1) - Lagts(2,PROI^{ex}_m3) Lagts(DEMI^{pa}_m1) - Lagts(2,DEMI^{pa}_m1)	Intercept Lagts(PROI^{ex}_m1) - Lagts(2,PROI^{ex}_m3) Lagts(TOVS^{pa}_m2) - Lagts(TOVS^{pa}_m1) Lagts(OPPS^{pa}_m1)	Non-nested
	Automatic (M2220)	Intercept Lagts(PROI^{pa}_m2) - Lagts(PROI^{pa}_m1) Lagts(OORI_m2) Lagts(DEMI^{pa}_m1) Lagts(DEMI^{ex}_m1) Lagts(DEMI^{ex}_m1) - Lagts(2,DEMI^{ex}_m1)	Intercept Lagts(DEMI^{ex}) - Lagts(2,DEMI^{ex}) Lagts(TOVS^{ex}_m2) - Lagts(TOVS^{ex}_m1) Lagts(OPPS^{ex}_m1)	Non-nested
*m*3	Manual (M3210)	Intercept Lagts(OORI_m3) Lagts(PROI^{ex}_m3) - Lagts(2,PROI^{ex}_m2) Lagts(DEMI^{ex}_m1) - Lagts(2,DEMI^{ex}_m1)	Intercept Lagts(PROI^{ex}_m3) - Lagts(2,PROI^{ex}_m2) Lagts(DEMI^{ex}_m1) - Lagts(2,DEMI^{ex}_m1) Lagts(TOVS^{ex}_m3) - Lagts(TOVS^{ex}_m1) Lagts(OPPS^{pa}_m1)	Non-nested
	Automatic (M3220)	Intercept Lagts(PROI^{ex}_m3) - Lagts(PROI^{ex}_m2) Lagts(OORI_m3) Lagts(DEMI^{ex}_m1) - Lagts(2,DEMI^{ex}_m1)	Intercept Lagts(PROI^{ex}_m3) - Lagts(PROI^{ex}_m2) Lagts(DEMI^{ex}_m1) - Lagts(2,DEMI^{ex}_m1) Lagts(TOVS^{pa}_m2) - Lagts(TOVS^{pa}_m1) Lagts(OPPS^{pa}_m1) - Lagts(2,OPPS^{pa}_m1) Lagts(OPPS^{ex}_m1)	Non-nested
*m*4	Manual (M4210)	Intercept Lagts(PROI^{ex}_m4) DEMI^{ex} - Lagts(DEMI^{ex})	Intercept Lagts(PROI^{ex}_m4) DEMI^{ex} - Lagts(DEMI^{ex}) DEMS^{ex} - Lagts(DEMS^{ex})	Nested
	Automatic (M4220)	Intercept Lagts(PROI^{ex}_m4) - Lagts(PROI^{ex}_m3) Lagts(PROI^{ex}_m3) - Lagts(PROI^{ex}_m2) DEMI^{ex}_m1	No services variables Same model as Industry alone	

* In this table, for the sake of notation simplicity, the subscript (0) has been omitted in the names of the service balances.

Table 3.2.6 Univariate Models Used to Forecast the Next-to-Next Quarter Non-Weighted Service Balances Based on Non-Completed Individual Responses*

Month	Model	Industry	Industry + Services	Nested or not
*m*1	1st Automatic (M1310)	Intercept Lagts(2,GENI^{ex}_m1) Lagts(2,GENI^{ex}_m1) - Lagts(3,GENI^{ex}_m3) Lagts(2,DEMI^{pa}_m1)	Intercept Lagts(2,GENI^{ex}_m1) Lagts(2,GENI^{ex}_m1) - Lagts(3,GENI^{ex}_m3) Lagts(2,DEMI^{pa}_m1) Lagts(2,TOVS^{ex}_m1) Lagts(2,OPPS^{ex}_m1)	Nested
	2nd Automatic (M1320)	Intercept Lagts(3,PROI^{pa}_m3) - Lagts(3,PROI^{pa}_m2) Lagts(2,OORI_m1) Lagts(2,OORI_m1) - Lagts(3,OORI_m3) Lagts(2,DEMI^{pa}_m1) - Lagts(3,DEMI^{pa}_m1 Lagts(2,DEMI^{ex}_m1)	Intercept Lagts(3,PROI^{pa}_m3) - Lagts(3,PROI^{pa}_m2) Lagts(2,OORI_m1) Lagts(2,OORI_m1) - Lagts(3,OORI_m3) Lagts(2,DEMI^{pa}_m1) - Lagts(3,DEMI^{pa}_m1) Lagts(2,DEMI^{ex}_m1) Lagts(2,TOVS^{ex}_m1) Lagts(2,OPPS^{ex}_m1)	Nested
*m*2	1st Automatic (M2310)	Intercept Lagts(2,FORI_m2) Lagts(2,GENI^{ex}_m2) - Lagts(2,GENI^{ex}_m1)	Intercept Lagts(2,GENI^{ex}_m2) - Lagts(2,GENI^{ex}_m1) Lagts(2,OPPS^{ex})	Non-nested
	2nd Automatic (M2320)	Intercept Lagts(2,PROI^{pa}_m2) - Lagts(2,PROI^{pa}_m1) Lagts(2,PROI^{pa}_m1) - Lagts(3,PROI^{pa}_m3) Lagts(2,OORI_m2) Lagts(2,OORI_m1) - Lagts(3,OORI_m3) Lagts(2,DEMI^{ex}_m1)	Intercept Lagts(2,PROI^{pa}_m2) - Lagts(2,PROI^{pa}_m1) Lagts(2,PROI^{pa}_m1) - Lagts(3,PROI^{pa}_m3) Lagts(2,OORI_m2) Lagts(2,OORI_m1) - Lagts(3,OORI_m3) Lagts(2,DEMI^{ex}_m1) Lagts(2,OPPS^{ex}_m1) Lagts(2,DEMS^{ex}_m1)	Nested
*m*3	1st Automatic (M3310)	Intercept Lagts(2,FORI_m3) Lagts(2,GENI^{ex}_m2) - Lagts(2,GENI^{ex}_m1)	Intercept Lagts(2,GENI^{ex}_m2) - Lagts(2,GENI^{ex}_m1) Lagts(2,TOVS^{pa}_m3) - Lagts(2,TOVS^{pa}_m2) Lagts(2,OPPS^{pa}_m3)	Non-nested
	2nd Automatic (M3320)	Intercept Lagts(2,PROI^{pa}_m2) - Lagts(2,PROI^{pa}_m1) Lagts(2,OORI_m3) Lagts(2,DEMI^{ex}_m1)	Intercept Lagts(2,PROI^{pa}_m2) - Lagts(2,PROI^{pa}_m1) Lagts(2,OORI_m3) Lagts(2,DEMI^{ex}_m1) Lagts(2,OPPS^{ex}_m1) Lagts(2,DEMS^{ex}_m1)	Nested
*m*4	1st Automatic (M4310)	Intercept Lagts(2,FORI_m4) Lagts(DEMI^{ex}_m1 - Lagts(2,DEMI^{ex}_m1)	Intercept Lagts(DEMI^{ex}_m1) - Lagts(2,DEMI^{ex}_m1) Lagts(OPPS^{pa}_m1) Lagts(DEMS^{ex}_m1)	Non-nested
	2nd Automatic (M4320)	Intercept Lagts(2,PROI^{pa}_m4) - Lagts(2,PROI^{pa}_m3) Lagts(2,PROI^{pa}_m3) - Lagts(2,PROI^{pa}_m2) Lagts(PROI^{ex}_m4) Lagts(2,PROI^{ex}_m4) - Lagts(2,PROI^{ex}_m3) Lagts(2,OORI_m4) Lagts(DEMI^{pa}_m1) - Lagts(2,DEMI^{pa}_m1) Lagts(DEMI^{ex}_m1) - Lagts(2,DEMI^{ex}_m1)	Intercept Lagts(2,PROI^{pa}_m4) - Lagts(2,PROI^{pa}_m3) Lagts(2,PROI^{pa}_m3) - Lagts(2,PROI^{pa}_m2) Lagts(PROI^{ex}_m4) Lagts(2,PROI^{ex}_m4) - Lagts(2,PROI^{ex}_m3) Lagts(2,OORI_m4) Lagts(DEMI^{pa}_m1) - Lagts(2,DEMI^{pa}_m1) Lagts(DEMI^{ex}_m1) - Lagts(2,DEMI^{ex}_m1) Lagts(2,TOVS^{ex}_m4) Lagts(2,TOVS^{pa}_m4) - Lagts(2,TOVS^{pa}_m3) Lagts(OPPS^{pa}_m1) - Lagts(2,OPPS^{pa}_m1) Lagts(OPPS^{ex}_m1) Lagts(OPPS^{ex}_m1) - Lagts(2,OPPS^{ex}_m1)	Nested

* In this table, for the sake of notation simplicity, the subscript (0) has been omitted in the names of the service balances.

Appendix 4: Out-of-Sample Results - RMSFEs

4.1) RMSFEs - VAR Models

Notations and sources (common to tables 4.1.1 to 4.1.4 next pages):

First column:	the variables included in the models “Mij” are given in Appendix 3.1.
Second column:	Forecast horizon (from 1 to 4 quarters) to which the forecasts under analysis are relating.
Third column:	End of period taken into account in the calculation of the RMSFEs. The subperiod ending in 2005Q4 takes definitive account results only in the case when the benchmark series is the last available update.
Fourth column:	Number of simulations on which the RMSFEs are based.
Last eight columns:	First figure = RMSFE derived from recursive estimations. Second figure = RFMSFE derived from rolling estimations.

AR =	Restricted autoregressive model of GDP growth
VAR2i =	Restricted VAR with four lags and two variables, GDP growth and an industry variable *IND**
VAR2s =	Restricted VAR with four lags and two variables, GDP growth and an industry variable *SER**
VAR3 =	Restricted VAR with four lags and three variables, GDP growth, *IND* and *SER*

* Reminder: *IND* and *SER* are defined in Appendix 3.1 above. VAR3 encompasses the other models, while VAR2i and VAR2s encompass the AR model.

Sources:	INSEE French quarterly accounts and industry and service surveys. Authors’ calculations.

Table 4.1.1 VAR Models Relating to Month *m*1 (1)

Model	Horizon	End	Nobs	AR		VAR2i		VAR2s		VAR3	
				1st result	Last update	1st result	Last update	1st result	Last update	1st result	Last update
M1a	1	05Q4	25	0.29-0.29	0.36-0.36	0.27-0.24	0.26-0.25	0.31-0.31	0.31-0.33	0.30-0.28	0.27-0.28
	1	08Q4	37	0.40-0.40	0.43-0.43	0.33-0.30	0.31-0.30	0.34-0.34	0.33-0.34	0.33-0.31	0.29-0.29
	2	05Q4	24	0.31-0.31	0.36-0.36	0.26-0.24	0.27-0.27	0.31-0.31	0.30-0.32	0.27-0.25	0.25-0.26
	2	08Q4	37	0.40-0.40	0.43-0.43	0.32-0.30	0.31-0.30	0.33-0.33	0.32-0.31	0.30-0.29	0.28-0.28
	3	05Q4	23	0.33-0.33	0.34-0.34	0.42-0.41	0.46-0.45	0.42-0.43	0.48-0.48	0.43-0.44	0.47-0.48
	3	08Q4	37	0.47-0.47	0.46-0.46	0.50-0.50	0.51-0.51	0.49-0.51	0.52-0.53	0.50-0.54	0.52-0.55
	4	05Q4	22	0.37-0.37	0.36-0.36	0.46-0.46	0.51-0.51	0.46-0.48	0.48-0.50	0.48-0.49	0.51-0.53
	4	08Q4	37	0.48-0.48	0.47-0.47	0.56-0.55	0.57-0.57	0.53-0.55	0.54-0.55	0.55-0.57	0.56-0.58
M1b	1	05Q4	25	0.29-0.29	0.36-0.36	0.27-0.24	0.26-0.25	0.31-0.30	0.33-0.34	0.29-0.29	0.27-0.30
	1	08Q4	37	0.40-0.40	0.43-0.43	0.33-0.30	0.31-0.30	0.36-0.36	0.36-0.36	0.33-0.32	0.31-0.31
	2	05Q4	24	0.31-0.31	0.36-0.36	0.26-0.24	0.27-0.27	0.30-0.30	0.32-0.31	0.26-0.24	0.25-0.25
	2	08Q4	37	0.40-0.40	0.43-0.43	0.32-0.30	0.31-0.30	0.36-0.34	0.35-0.33	0.32-0.29	0.30-0.28
	3	05Q4	23	0.33-0.33	0.34-0.34	0.42-0.41	0.46-0.45	0.42-0.43	0.47-0.47	0.42-0.45	0.46-0.48
	3	08Q4	37	0.47-0.47	0.46-0.46	0.50-0.50	0.51-0.51	0.49-0.50	0.52-0.52	0.49-0.51	0.51-0.52
	4	05Q4	22	0.37-0.37	0.36-0.36	0.46-0.46	0.51-0.51	0.45-0.48	0.47-0.50	0.46-0.50	0.50-0.54
	4	08Q4	37	0.48-0.48	0.47-0.47	0.56-0.55	0.57-0.57	0.54-0.54	0.54-0.55	0.55-0.57	0.56-0.58
M1c	1	05Q4	25	0.29-0.29	0.36-0.36	0.27-0.24	0.26-0.25	0.30-0.31	0.32-0.34	0.29-0.29	0.27-0.30
	1	08Q4	37	0.40-0.40	0.43-0.43	0.33-0.30	0.31-0.30	0.36-0.36	0.35-0.36	0.33-0.32	0.31-0.31
	2	05Q4	24	0.31-0.31	0.36-0.36	0.26-0.24	0.27-0.27	0.29-0.29	0.30-0.31	0.25-0.23	0.25-0.25
	2	08Q4	37	0.40-0.40	0.43-0.43	0.32-0.30	0.31-0.30	0.35-0.34	0.34-0.33	0.31-0.29	0.30-0.28
	3	05Q4	23	0.33-0.33	0.34-0.34	0.42-0.41	0.46-0.45	0.40-0.42	0.46-0.46	0.41-0.44	0.45-0.47
	3	08Q4	37	0.47-0.47	0.46-0.46	0.50-0.50	0.51-0.51	0.49-0.49	0.51-0.51	0.49-0.51	0.51-0.52
	4	05Q4	22	0.37-0.37	0.36-0.36	0.46-0.46	0.51-0.51	0.44-0.46	0.46-0.48	0.46-0.50	0.49-0.53
	4	08Q4	37	0.48-0.48	0.47-0.47	0.56-0.55	0.57-0.57	0.53-0.54	0.54-0.54	0.55-0.57	0.56-0.58
M1d	1	05Q4	25	0.29-0.29	0.37-0.37	0.28-0.26	0.28-0.28	0.29-0.29	0.32-0.33	0.31-0.31	0.30-0.30
	1	08Q4	37	0.41-0.41	0.44-0.44	0.31-0.30	0.30-0.30	0.35-0.34	0.35-0.35	0.33-0.33	0.31-0.31
	2	05Q4	24	0.30-0.30	0.37-0.37	0.27-0.27	0.28-0.28	0.29-0.29	0.31-0.31	0.30-0.29	0.29-0.28
	2	08Q4	37	0.41-0.41	0.44-0.44	0.31-0.30	0.29-0.29	0.35-0.34	0.34-0.33	0.32-0.31	0.30-0.29
	3	05Q4	23	0.33-0.33	0.36-0.36	0.35-0.36	0.38-0.40	0.40-0.42	0.46-0.47	0.40-0.43	0.44-0.46
	3	08Q4	37	0.47-0.47	0.47-0.47	0.44-0.47	0.45-0.48	0.48-0.49	0.51-0.52	0.47-0.51	0.49-0.52
	4	05Q4	22	0.35-0.35	0.34-0.34	0.40-0.43	0.43-0.47	0.45-0.47	0.47-0.49	0.47-0.51	0.50-0.53
	4	08Q4	37	0.48-0.48	0.46-0.46	0.49-0.52	0.50-0.54	0.53-0.54	0.54-0.54	0.54-0.57	0.54-0.58
M1e	1	05Q4	25	0.29-0.29	0.37-0.37	0.28-0.26	0.28-0.28	0.29-0.31	0.31-0.33	0.32-0.31	0.30-0.31
	1	08Q4	37	0.41-0.41	0.44-0.44	0.31-0.30	0.30-0.30	0.35-0.35	0.35-0.35	0.34-0.33	0.31-0.31
	2	05Q4	24	0.30-0.30	0.37-0.37	0.27-0.27	0.28-0.28	0.28-0.29	0.30-0.31	0.29-0.28	0.29-0.28
	2	08Q4	37	0.41-0.41	0.44-0.44	0.31-0.30	0.29-0.29	0.34-0.34	0.34-0.33	0.32-0.31	0.31-0.29
	3	05Q4	23	0.33-0.33	0.36-0.36	0.35-0.36	0.38-0.40	0.39-0.42	0.45-0.46	0.40-0.43	0.44-0.46
	3	08Q4	37	0.47-0.47	0.47-0.47	0.44-0.47	0.45-0.48	0.48-0.49	0.51-0.51	0.47-0.51	0.49-0.52
	4	05Q4	22	0.35-0.35	0.34-0.34	0.40-0.43	0.43-0.47	0.44-0.46	0.46-0.48	0.46-0.50	0.48-0.52
	4	08Q4	37	0.48-0.48	0.46-0.46	0.49-0.52	0.50-0.54	0.53-0.53	0.53-0.54	0.53-0.57	0.54-0.57
M1f	1	05Q4	25	0.29-0.29	0.36-0.36	0.29-0.26	0.29-0.28	0.30-0.32	0.35-0.36	0.31-0.30	0.32-0.31
	1	08Q4	37	0.40-0.40	0.43-0.43	0.33-0.31	0.31-0.30	0.35-0.36	0.36-0.37	0.34-0.33	0.33-0.32
	2	05Q4	24	0.31-0.31	0.36-0.36	0.28-0.26	0.29-0.28	0.28-0.30	0.31-0.33	0.26-0.25	0.29-0.28
	2	08Q4	37	0.40-0.40	0.43-0.43	0.32-0.30	0.31-0.29	0.34-0.34	0.34-0.34	0.31-0.29	0.31-0.29
	3	05Q4	23	0.33-0.33	0.34-0.34	0.36-0.36	0.39-0.40	0.39-0.41	0.44-0.45	0.37-0.40	0.42-0.44
	3	08Q4	37	0.47-0.47	0.46-0.46	0.45-0.47	0.46-0.49	0.46-0.48	0.49-0.49	0.45-0.49	0.47-0.50
	4	05Q4	22	0.37-0.37	0.36-0.36	0.42-0.43	0.45-0.47	0.44-0.47	0.47-0.51	0.45-0.49	0.47-0.52
	4	08Q4	37	0.48-0.48	0.47-0.47	0.52-0.53	0.53-0.55	0.52-0.54	0.54-0.55	0.52-0.56	0.53-0.57

Table 4.1.1 VAR Models Relating to Month *m*1 (2)

Model	Horizon	End	Nobs	AR		VAR2i		VAR2s		VAR3	
				1st result	Last update	1st result	Last update	1st result	Last update	1st result	Last update
M1g	1	05Q4	25	0.29-0.29	0.36-0.36	0.27-0.24	0.26-0.25	0.30-0.32	0.31-0.33	0.28-0.30	0.25-0.28
	1	08Q4	37	0.40-0.40	0.43-0.43	0.33-0.30	0.31-0.30	0.37-0.38	0.36-0.37	0.34-0.33	0.31-0.31
	2	05Q4	24	0.31-0.31	0.36-0.36	0.26-0.24	0.27-0.27	0.29-0.30	0.30-0.32	0.25-0.25	0.24-0.25
	2	08Q4	37	0.40-0.40	0.43-0.43	0.32-0.30	0.31-0.30	0.36-0.35	0.36-0.35	0.32-0.30	0.30-0.29
	3	05Q4	23	0.33-0.33	0.34-0.34	0.42-0.41	0.46-0.45	0.40-0.42	0.45-0.46	0.40-0.44	0.44-0.47
	3	08Q4	37	0.47-0.47	0.46-0.46	0.50-0.50	0.51-0.51	0.50-0.50	0.52-0.51	0.49-0.51	0.51-0.52
	4	05Q4	22	0.37-0.37	0.36-0.36	0.46-0.46	0.51-0.51	0.44-0.46	0.45-0.48	0.44-0.50	0.47-0.52
	4	08Q4	37	0.48-0.48	0.47-0.47	0.56-0.55	0.57-0.57	0.54-0.54	0.55-0.55	0.55-0.57	0.56-0.57
M1h	1	05Q4	25	0.29-0.29	0.37-0.37	0.28-0.26	0.28-0.28	0.30-0.33	0.31-0.35	0.32-0.32	0.30-0.31
	1	08Q4	37	0.41-0.41	0.44-0.44	0.31-0.30	0.30-0.30	0.36-0.38	0.35-0.38	0.35-0.35	0.31-0.32
	2	05Q4	24	0.30-0.30	0.37-0.37	0.27-0.27	0.28-0.28	0.29-0.32	0.30-0.34	0.30-0.29	0.28-0.28
	2	08Q4	37	0.41-0.41	0.44-0.44	0.31-0.30	0.29-0.29	0.35-0.36	0.35-0.36	0.33-0.32	0.30-0.30
	3	05Q4	23	0.33-0.33	0.36-0.36	0.35-0.36	0.38-0.40	0.39-0.43	0.44-0.47	0.40-0.43	0.44-0.47
	3	08Q4	37	0.47-0.47	0.47-0.47	0.44-0.47	0.45-0.48	0.49-0.52	0.51-0.53	0.48-0.51	0.49-0.52
	4	05Q4	22	0.35-0.35	0.34-0.34	0.40-0.43	0.43-0.47	0.42-0.46	0.44-0.47	0.45-0.50	0.46-0.51
	4	08Q4	37	0.48-0.48	0.46-0.46	0.49-0.52	0.50-0.54	0.53-0.53	0.53-0.53	0.53-0.56	0.53-0.56
M1i	1	05Q4	25	0.29-0.29	0.37-0.37	0.25-0.25	0.27-0.28	0.34-0.32	0.39-0.38	0.32-0.32	0.30-0.32
	1	08Q4	37	0.41-0.41	0.44-0.44	0.32-0.34	0.32-0.34	0.41-0.43	0.43-0.44	0.35-0.37	0.33-0.35
	2	05Q4	24	0.30-0.30	0.37-0.37	0.26-0.26	0.27-0.27	0.34-0.34	0.38-0.39	0.31-0.33	0.31-0.34
	2	08Q4	37	0.41-0.41	0.44-0.44	0.33-0.35	0.32-0.34	0.41-0.43	0.43-0.45	0.35-0.38	0.34-0.37
	3	05Q4	23	0.33-0.33	0.36-0.36	0.30-0.32	0.38-0.38	0.40-0.41	0.44-0.44	0.40-0.41	0.43-0.44
	3	08Q4	37	0.47-0.47	0.47-0.47	0.43-0.46	0.46-0.48	0.48-0.50	0.50-0.51	0.47-0.50	0.49-0.51
	4	05Q4	22	0.35-0.35	0.34-0.34	0.34-0.35	0.40-0.41	0.44-0.46	0.44-0.45	0.48-0.48	0.49-0.49
	4	08Q4	37	0.48-0.48	0.46-0.46	0.46-0.49	0.49-0.52	0.53-0.53	0.52-0.52	0.54-0.53	0.54-0.53
M1j	1	05Q4	25	0.29-0.29	0.36-0.36	0.29-0.26	0.28-0.28	0.31-0.31	0.31-0.33	0.30-0.28	0.28-0.29
	1	08Q4	37	0.40-0.40	0.43-0.43	0.39-0.38	0.38-0.37	0.34-0.34	0.33-0.34	0.35-0.32	0.31-0.30
	2	05Q4	24	0.31-0.31	0.36-0.36	0.26-0.24	0.29-0.28	0.31-0.31	0.30-0.32	0.25-0.24	0.24-0.26
	2	08Q4	37	0.40-0.40	0.43-0.43	0.38-0.37	0.38-0.37	0.33-0.33	0.32-0.31	0.32-0.30	0.29-0.29
	3	05Q4	23	0.33-0.33	0.34-0.34	0.37-0.36	0.42-0.41	0.42-0.43	0.48-0.48	0.37-0.38	0.43-0.44
	3	08Q4	37	0.47-0.47	0.46-0.46	0.49-0.49	0.50-0.51	0.49-0.51	0.52-0.53	0.48-0.51	0.51-0.53
	4	05Q4	22	0.37-0.37	0.36-0.36	0.37-0.37	0.44-0.44	0.46-0.48	0.48-0.50	0.39-0.41	0.46-0.47
	4	08Q4	37	0.48-0.48	0.47-0.47	0.52-0.52	0.55-0.55	0.53-0.55	0.54-0.55	0.52-0.53	0.55-0.55
M1k	1	05Q4	25	0.29-0.29	0.36-0.36	0.30-0.26	0.28-0.26	0.31-0.31	0.31-0.33	0.31-0.28	0.28-0.28
	1	08Q4	37	0.40-0.40	0.43-0.43	0.40-0.38	0.37-0.36	0.34-0.34	0.33-0.34	0.35-0.33	0.31-0.31
	2	05Q4	24	0.31-0.31	0.36-0.36	0.28-0.25	0.30-0.28	0.31-0.31	0.30-0.32	0.27-0.25	0.25-0.25
	2	08Q4	37	0.40-0.40	0.43-0.43	0.39-0.37	0.38-0.37	0.33-0.33	0.32-0.31	0.33-0.31	0.29-0.29
	3	05Q4	23	0.33-0.33	0.34-0.34	0.40-0.37	0.45-0.42	0.42-0.43	0.48-0.48	0.40-0.41	0.46-0.46
	3	08Q4	37	0.47-0.47	0.46-0.46	0.50-0.50	0.52-0.51	0.49-0.51	0.52-0.53	0.49-0.52	0.52-0.54
	4	05Q4	22	0.37-0.37	0.36-0.36	0.36-0.36	0.43-0.44	0.46-0.48	0.48-0.50	0.42-0.45	0.47-0.49
	4	08Q4	37	0.48-0.48	0.47-0.47	0.51-0.52	0.54-0.55	0.53-0.55	0.54-0.55	0.52-0.54	0.54-0.56
M1l	1	05Q4	25	0.29-0.29	0.37-0.37	0.21-0.23	0.29-0.31	0.27-0.29	0.30-0.32	0.26-0.33	0.28-0.35
	1	08Q4	37	0.41-0.41	0.44-0.44	0.32-0.34	0.34-0.36	0.33-0.34	0.33-0.34	0.33-0.35	0.32-0.35
	2	05Q4	24	0.30-0.30	0.37-0.37	0.22-0.23	0.28-0.30	0.27-0.28	0.28-0.30	0.25-0.30	0.26-0.33
	2	08Q4	37	0.41-0.41	0.44-0.44	0.32-0.34	0.34-0.35	0.33-0.33	0.33-0.33	0.33-0.35	0.32-0.35
	3	05Q4	23	0.33-0.33	0.36-0.36	0.30-0.33	0.36-0.37	0.36-0.38	0.41-0.42	0.37-0.40	0.42-0.45
	3	08Q4	37	0.47-0.47	0.47-0.47	0.42-0.45	0.44-0.46	0.45-0.47	0.47-0.48	0.45-0.49	0.47-0.51
	4	05Q4	22	0.35-0.35	0.34-0.34	0.36-0.37	0.39-0.39	0.41-0.43	0.45-0.47	0.44-0.48	0.47-0.51
	4	08Q4	37	0.48-0.48	0.46-0.46	0.47-0.50	0.47-0.50	0.50-0.52	0.52-0.53	0.52-0.55	0.53-0.57

Table 4.1.2 VAR Models Relating to Month *m*2

Model	Horizon	End	Nobs	AR		VAR2i		VAR2s		VAR3	
				1st result	Last update	1st result	Last update	1st result	Last update	1st result	Last update
M2a	1	05Q4	18	0.28-0.28	0.37-0.37	0.29-0.29	0.29-0.32	0.31-0.33	0.35-0.37	0.33-0.33	0.34-0.36
	1	08Q4	28	0.43-0.43	0.46-0.46	0.32-0.33	0.32-0.33	0.34-0.35	0.34-0.34	0.34-0.35	0.33-0.35
	2	05Q4	17	0.30-0.30	0.28-0.28	0.35-0.35	0.36-0.37	0.34-0.33	0.34-0.32	0.32-0.32	0.33-0.33
	2	08Q4	28	0.34-0.34	0.32-0.32	0.35-0.35	0.35-0.36	0.35-0.35	0.33-0.32	0.33-0.33	0.33-0.32
	3	05Q4	17	0.36-0.36	0.39-0.39	0.47-0.48	0.54-0.55	0.44-0.47	0.50-0.52	0.43-0.48	0.49-0.55
	3	08Q4	28	0.53-0.53	0.53-0.53	0.59-0.60	0.61-0.63	0.54-0.58	0.56-0.60	0.55-0.59	0.57-0.61
	4	05Q4	16	0.31-0.31	0.33-0.33	0.43-0.43	0.44-0.45	0.36-0.36	0.37-0.37	0.38-0.39	0.39-0.41
	4	08Q4	28	0.47-0.47	0.47-0.47	0.53-0.54	0.53-0.54	0.48-0.49	0.48-0.50	0.49-0.52	0.49-0.52
M2b	1	05Q4	18	0.28-0.28	0.37-0.37	0.30-0.28	0.29-0.28	0.32-0.33	0.36-0.38	0.35-0.30	0.33-0.33
	1	08Q4	28	0.43-0.43	0.46-0.46	0.34-0.31	0.30-0.29	0.35-0.35	0.36-0.36	0.36-0.31	0.33-0.31
	2	05Q4	17	0.30-0.30	0.28-0.28	0.38-0.37	0.40-0.39	0.30-0.30	0.33-0.32	0.35-0.33	0.37-0.36
	2	08Q4	28	0.34-0.34	0.32-0.32	0.39-0.39	0.39-0.39	0.32-0.32	0.34-0.32	0.36-0.35	0.37-0.36
	3	05Q4	17	0.36-0.36	0.39-0.39	0.42-0.42	0.51-0.51	0.47-0.49	0.52-0.55	0.46-0.48	0.52-0.55
	3	08Q4	28	0.53-0.53	0.53-0.53	0.57-0.57	0.60-0.61	0.57-0.58	0.59-0.60	0.58-0.58	0.60-0.61
	4	05Q4	16	0.31-0.31	0.33-0.33	0.41-0.40	0.42-0.41	0.41-0.43	0.41-0.43	0.43-0.42	0.42-0.43
	4	08Q4	28	0.47-0.47	0.47-0.47	0.54-0.53	0.55-0.54	0.53-0.52	0.52-0.51	0.55-0.51	0.55-0.52
M2c	1	05Q4	18	0.28-0.28	0.37-0.37	0.25-0.24	0.26-0.26	0.31-0.32	0.34-0.35	0.32-0.31	0.31-0.32
	1	08Q4	28	0.43-0.43	0.46-0.46	0.31-0.28	0.28-0.27	0.34-0.34	0.33-0.33	0.33-0.32	0.31-0.30
	2	05Q4	17	0.30-0.30	0.28-0.28	0.34-0.33	0.35-0.35	0.34-0.33	0.34-0.33	0.35-0.35	0.36-0.35
	2	08Q4	28	0.34-0.34	0.32-0.32	0.36-0.36	0.36-0.36	0.35-0.34	0.34-0.33	0.36-0.36	0.35-0.35
	3	05Q4	17	0.36-0.36	0.39-0.39	0.38-0.39	0.46-0.47	0.48-0.52	0.53-0.56	0.47-0.50	0.53-0.56
	3	08Q4	28	0.53-0.53	0.53-0.53	0.53-0.55	0.56-0.58	0.58-0.61	0.60-0.63	0.57-0.60	0.60-0.63
	4	05Q4	16	0.31-0.31	0.33-0.33	0.39-0.38	0.37-0.37	0.42-0.44	0.42-0.43	0.43-0.44	0.42-0.43
	4	08Q4	28	0.47-0.47	0.47-0.47	0.51-0.51	0.51-0.51	0.52-0.53	0.52-0.53	0.53-0.54	0.52-0.54
M2d	1	05Q4	18	0.28-0.28	0.37-0.37	0.31-0.29	0.32-0.31	0.31-0.32	0.34-0.35	0.32-0.33	0.32-0.34
	1	08Q4	28	0.43-0.43	0.46-0.46	0.36-0.33	0.35-0.31	0.34-0.34	0.33-0.33	0.34-0.33	0.32-0.31
	2	05Q4	17	0.30-0.30	0.28-0.28	0.35-0.35	0.38-0.37	0.34-0.33	0.34-0.32	0.34-0.34	0.34-0.33
	2	08Q4	28	0.34-0.34	0.32-0.32	0.38-0.37	0.38-0.37	0.35-0.35	0.33-0.32	0.36-0.36	0.34-0.34
	3	05Q4	17	0.36-0.36	0.39-0.39	0.38-0.38	0.47-0.46	0.44-0.47	0.50-0.52	0.41-0.44	0.47-0.50
	3	08Q4	28	0.53-0.53	0.53-0.53	0.54-0.55	0.58-0.58	0.55-0.59	0.57-0.60	0.54-0.57	0.56-0.60
	4	05Q4	16	0.31-0.31	0.33-0.33	0.39-0.38	0.39-0.38	0.35-0.36	0.37-0.37	0.35-0.36	0.36-0.36
	4	08Q4	28	0.47-0.47	0.47-0.47	0.53-0.52	0.53-0.52	0.47-0.50	0.48-0.50	0.49-0.50	0.49-0.51
M2e	1	05Q4	18	0.28-0.28	0.37-0.37	0.29-0.28	0.33-0.32	0.32-0.32	0.34-0.35	0.30-0.31	0.33-0.33
	1	08Q4	28	0.43-0.43	0.46-0.46	0.35-0.34	0.36-0.34	0.34-0.33	0.33-0.33	0.33-0.34	0.33-0.33
	2	05Q4	17	0.30-0.30	0.28-0.28	0.37-0.35	0.39-0.38	0.34-0.33	0.36-0.34	0.33-0.31	0.36-0.34
	2	08Q4	28	0.34-0.34	0.32-0.32	0.39-0.38	0.40-0.39	0.35-0.35	0.35-0.34	0.35-0.33	0.35-0.33
	3	05Q4	17	0.36-0.36	0.39-0.39	0.42-0.43	0.50-0.51	0.47-0.50	0.52-0.54	0.46-0.48	0.52-0.54
	3	08Q4	28	0.53-0.53	0.53-0.53	0.57-0.57	0.60-0.61	0.57-0.60	0.59-0.61	0.56-0.60	0.59-0.63
	4	05Q4	16	0.31-0.31	0.33-0.33	0.38-0.36	0.37-0.37	0.43-0.44	0.41-0.42	0.42-0.42	0.41-0.41
	4	08Q4	28	0.47-0.47	0.47-0.47	0.53-0.51	0.52-0.52	0.53-0.53	0.52-0.52	0.52-0.52	0.52-0.51
M2f	1	05Q4	18	0.28-0.28	0.37-0.37	0.29-0.27	0.33-0.31	0.32-0.35	0.36-0.40	0.32-0.33	0.34-0.36
	1	08Q4	28	0.43-0.43	0.46-0.46	0.35-0.34	0.36-0.34	0.36-0.38	0.37-0.39	0.35-0.35	0.35-0.36
	2	05Q4	17	0.30-0.30	0.28-0.28	0.37-0.35	0.39-0.38	0.32-0.31	0.34-0.33	0.31-0.29	0.34-0.31
	2	08Q4	28	0.34-0.34	0.32-0.32	0.39-0.38	0.40-0.39	0.35-0.34	0.36-0.33	0.34-0.33	0.35-0.33
	3	05Q4	17	0.36-0.36	0.39-0.39	0.42-0.42	0.50-0.51	0.47-0.49	0.51-0.52	0.46-0.47	0.51-0.53
	3	08Q4	28	0.53-0.53	0.53-0.53	0.56-0.57	0.60-0.61	0.59-0.60	0.60-0.61	0.58-0.59	0.60-0.61
	4	05Q4	16	0.31-0.31	0.33-0.33	0.38-0.36	0.37-0.36	0.40-0.41	0.40-0.41	0.41-0.40	0.40-0.41
	4	08Q4	28	0.47-0.47	0.47-0.47	0.52-0.51	0.52-0.51	0.54-0.53	0.54-0.53	0.54-0.52	0.54-0.52

Table 4.1.3 VAR Models Relating to Month *m*3

Model	Horizon	End	Nobs	AR		VAR2i		VAR2s		VAR3	
				1st result	Last update	1st result	Last update	1st result	Last update	1st result	Last update
M3a	1	05Q4	24	0.30-0.30	0.35-0.35	0.21-0.21	0.23-0.24	0.35-0.36	0.32-0.34	0.30-0.31	0.27-0.30
	1	08Q4	36	0.41-0.41	0.42-0.42	0.26-0.27	0.26-0.26	0.36-0.36	0.33-0.33	0.31-0.31	0.28-0.29
	2	05Q4	23	0.32-0.32	0.36-0.36	0.34-0.34	0.41-0.40	0.34-0.36	0.40-0.42	0.36-0.37	0.42-0.43
	2	08Q4	36	0.41-0.41	0.43-0.43	0.44-0.45	0.47-0.47	0.45-0.46	0.48-0.48	0.46-0.45	0.49-0.48
	3	05Q4	22	0.34-0.34	0.36-0.36	0.36-0.36	0.41-0.41	0.40-0.43	0.43-0.45	0.40-0.43	0.44-0.47
	3	08Q4	36	0.48-0.48	0.47-0.47	0.49-0.49	0.51-0.51	0.51-0.52	0.52-0.53	0.52-0.52	0.54-0.54
	4	05Q4	21	0.37-0.37	0.36-0.36	0.41-0.40	0.42-0.42	0.41-0.44	0.41-0.43	0.43-0.46	0.43-0.46
	4	08Q4	36	0.49-0.49	0.47-0.47	0.54-0.53	0.54-0.53	0.55-0.55	0.54-0.54	0.57-0.56	0.57-0.55
M3b	1	05Q4	24	0.30-0.30	0.35-0.35	0.29-0.30	0.27-0.29	0.29-0.30	0.30-0.32	0.31-0.31	0.29-0.31
	1	08Q4	36	0.41-0.41	0.42-0.42	0.31-0.31	0.28-0.29	0.32-0.32	0.32-0.31	0.32-0.31	0.29-0.29
	2	05Q4	23	0.32-0.32	0.36-0.36	0.28-0.29	0.34-0.35	0.32-0.35	0.39-0.41	0.30-0.33	0.37-0.38
	2	08Q4	36	0.41-0.41	0.43-0.43	0.39-0.40	0.41-0.41	0.43-0.44	0.46-0.46	0.41-0.42	0.44-0.43
	3	05Q4	22	0.34-0.34	0.36-0.36	0.36-0.36	0.41-0.41	0.39-0.43	0.42-0.45	0.38-0.41	0.43-0.45
	3	08Q4	36	0.48-0.48	0.47-0.47	0.46-0.47	0.48-0.49	0.50-0.51	0.50-0.52	0.49-0.49	0.51-0.51
	4	05Q4	21	0.37-0.37	0.36-0.36	0.39-0.38	0.39-0.39	0.42-0.46	0.41-0.44	0.41-0.45	0.42-0.45
	4	08Q4	36	0.49-0.49	0.47-0.47	0.51-0.50	0.50-0.50	0.53-0.54	0.52-0.53	0.53-0.54	0.53-0.53
M3c	1	05Q4	24	0.29-0.29	0.36-0.36	0.30-0.32	0.30-0.33	0.35-0.38	0.32-0.36	0.35-0.38	0.32-0.36
	1	08Q4	36	0.41-0.41	0.43-0.43	0.32-0.35	0.30-0.33	0.36-0.37	0.33-0.34	0.35-0.39	0.31-0.35
	2	05Q4	23	0.32-0.32	0.36-0.36	0.26-0.25	0.32-0.33	0.34-0.38	0.41-0.43	0.33-0.33	0.38-0.39
	2	08Q4	36	0.42-0.42	0.44-0.44	0.34-0.34	0.36-0.36	0.45-0.46	0.48-0.49	0.39-0.38	0.41-0.40
	3	05Q4	22	0.34-0.34	0.36-0.36	0.38-0.38	0.41-0.43	0.40-0.44	0.42-0.46	0.42-0.44	0.45-0.47
	3	08Q4	36	0.48-0.48	0.48-0.48	0.48-0.50	0.49-0.52	0.51-0.53	0.52-0.53	0.50-0.51	0.51-0.51
	4	05Q4	21	0.35-0.35	0.35-0.35	0.40-0.41	0.41-0.44	0.42-0.45	0.42-0.44	0.44-0.46	0.45-0.47
	4	08Q4	36	0.48-0.48	0.46-0.46	0.50-0.51	0.50-0.51	0.55-0.55	0.54-0.54	0.55-0.53	0.55-0.53
M3d	1	05Q4	24	0.30-0.30	0.35-0.35	0.34-0.35	0.36-0.37	0.29-0.30	0.30-0.32	0.33-0.34	0.32-0.34
	1	08Q4	36	0.41-0.41	0.42-0.42	0.35-0.35	0.35-0.35	0.32-0.32	0.32-0.31	0.33-0.33	0.31-0.31
	2	05Q4	23	0.32-0.32	0.36-0.36	0.31-0.32	0.38-0.38	0.32-0.35	0.39-0.41	0.32-0.34	0.38-0.40
	2	08Q4	36	0.41-0.41	0.43-0.43	0.44-0.44	0.46-0.46	0.43-0.44	0.46-0.46	0.44-0.44	0.46-0.46
	3	05Q4	22	0.34-0.34	0.36-0.36	0.37-0.38	0.43-0.44	0.39-0.43	0.42-0.45	0.38-0.42	0.43-0.45
	3	08Q4	36	0.48-0.48	0.47-0.47	0.48-0.48	0.50-0.50	0.50-0.51	0.50-0.52	0.48-0.50	0.50-0.51
	4	05Q4	21	0.37-0.37	0.36-0.36	0.41-0.40	0.42-0.41	0.42-0.46	0.41-0.44	0.41-0.46	0.42-0.45
	4	08Q4	36	0.49-0.49	0.47-0.47	0.53-0.52	0.53-0.51	0.53-0.54	0.52-0.53	0.53-0.54	0.53-0.53
M3e	1	05Q4	24	0.29-0.29	0.36-0.36	0.34-0.36	0.36-0.38	0.33-0.33	0.33-0.34	0.33-0.34	0.33-0.34
	1	08Q4	36	0.41-0.41	0.43-0.43	0.34-0.35	0.34-0.36	0.35-0.36	0.33-0.34	0.33-0.34	0.31-0.32
	2	05Q4	23	0.32-0.32	0.36-0.36	0.31-0.31	0.38-0.38	0.27-0.29	0.32-0.33	0.27-0.28	0.32-0.34
	2	08Q4	36	0.42-0.42	0.44-0.44	0.43-0.43	0.45-0.45	0.36-0.37	0.37-0.38	0.36-0.38	0.37-0.39
	3	05Q4	22	0.34-0.34	0.36-0.36	0.36-0.37	0.41-0.42	0.38-0.42	0.43-0.46	0.39-0.42	0.44-0.47
	3	08Q4	36	0.48-0.48	0.48-0.48	0.47-0.47	0.49-0.49	0.48-0.52	0.50-0.53	0.47-0.51	0.49-0.52
	4	05Q4	21	0.35-0.35	0.35-0.35	0.40-0.39	0.41-0.40	0.42-0.43	0.44-0.45	0.43-0.46	0.45-0.47
	4	08Q4	36	0.48-0.48	0.46-0.46	0.52-0.51	0.52-0.51	0.51-0.52	0.52-0.53	0.52-0.54	0.52-0.54
M3f	1	05Q4	24	0.29-0.29	0.36-0.36	0.30-0.32	0.30-0.33	0.34-0.34	0.34-0.35	0.35-0.35	0.35-0.35
	1	08Q4	36	0.41-0.41	0.43-0.43	0.32-0.35	0.30-0.33	0.36-0.37	0.34-0.35	0.36-0.38	0.33-0.36
	2	05Q4	23	0.32-0.32	0.36-0.36	0.26-0.25	0.32-0.33	0.28-0.29	0.32-0.35	0.29-0.29	0.34-0.37
	2	08Q4	36	0.42-0.42	0.44-0.44	0.34-0.34	0.36-0.36	0.36-0.37	0.37-0.39	0.35-0.36	0.37-0.39
	3	05Q4	22	0.34-0.34	0.36-0.36	0.38-0.38	0.41-0.43	0.38-0.42	0.44-0.47	0.41-0.42	0.46-0.47
	3	08Q4	36	0.48-0.48	0.48-0.48	0.48-0.50	0.49-0.52	0.48-0.52	0.50-0.53	0.49-0.52	0.50-0.54
	4	05Q4	21	0.35-0.35	0.35-0.35	0.40-0.41	0.41-0.44	0.42-0.44	0.44-0.45	0.44-0.45	0.45-0.46
	4	08Q4	36	0.48-0.48	0.46-0.46	0.50-0.51	0.50-0.51	0.51-0.52	0.52-0.53	0.52-0.54	0.52-0.54

Table 4.1.4 VAR Models Relating to Month *m*4 (1)

Model	Horizon	End	Nobs	AR		VAR2i		VAR2s		VAR3	
				1st result	Last update	1st result	Last update	1st result	Last update	1st result	Last update
M4a	1	05Q4	25	0.29-0.29	0.37-0.37	0.33-0.33	0.31-0.31	0.28-0.30	0.30-0.32	0.32-0.33	0.29-0.31
	1	08Q4	37	0.41-0.41	0.44-0.44	0.34-0.36	0.31-0.32	0.33-0.35	0.33-0.34	0.33-0.37	0.30-0.33
	2	05Q4	24	0.30-0.30	0.37-0.37	0.35-0.34	0.38-0.38	0.29-0.30	0.35-0.35	0.35-0.35	0.38-0.37
	2	08Q4	37	0.41-0.41	0.44-0.44	0.42-0.42	0.43-0.43	0.39-0.39	0.42-0.41	0.42-0.42	0.43-0.42
	3	05Q4	23	0.33-0.33	0.36-0.36	0.42-0.42	0.45-0.46	0.32-0.34	0.36-0.37	0.38-0.40	0.41-0.43
	3	08Q4	37	0.47-0.47	0.47-0.47	0.51-0.53	0.52-0.54	0.45-0.47	0.46-0.48	0.47-0.49	0.48-0.50
	4	05Q4	22	0.35-0.35	0.34-0.34	0.44-0.44	0.46-0.46	0.39-0.43	0.41-0.44	0.44-0.46	0.47-0.48
	4	08Q4	37	0.48-0.48	0.46-0.46	0.54-0.55	0.55-0.56	0.50-0.52	0.51-0.52	0.53-0.54	0.54-0.56
M4b	1	05Q4	25	0.29-0.29	0.37-0.37	0.29-0.28	0.28-0.28	0.32-0.34	0.30-0.33	0.32-0.33	0.26-0.29
	1	08Q4	37	0.41-0.41	0.44-0.44	0.31-0.32	0.29-0.30	0.36-0.38	0.33-0.36	0.33-0.35	0.28-0.31
	2	05Q4	24	0.30-0.30	0.37-0.37	0.27-0.26	0.27-0.28	0.29-0.31	0.35-0.37	0.26-0.25	0.26-0.27
	2	08Q4	37	0.41-0.41	0.44-0.44	0.31-0.30	0.29-0.29	0.39-0.40	0.42-0.42	0.31-0.29	0.30-0.29
	3	05Q4	23	0.33-0.33	0.36-0.36	0.36-0.36	0.38-0.39	0.33-0.37	0.37-0.40	0.34-0.38	0.35-0.40
	3	08Q4	37	0.47-0.47	0.47-0.47	0.43-0.46	0.43-0.46	0.45-0.47	0.47-0.48	0.42-0.47	0.42-0.47
	4	05Q4	22	0.35-0.35	0.34-0.34	0.35-0.37	0.39-0.41	0.40-0.43	0.42-0.44	0.38-0.42	0.41-0.45
	4	08Q4	37	0.48-0.48	0.46-0.46	0.46-0.49	0.47-0.50	0.52-0.52	0.52-0.52	0.48-0.52	0.49-0.53
M4c	1	05Q4	25	0.29-0.29	0.37-0.37	0.27-0.26	0.27-0.28	0.32-0.34	0.30-0.33	0.30-0.31	0.25-0.29
	1	08Q4	37	0.41-0.41	0.44-0.44	0.30-0.29	0.29-0.30	0.36-0.38	0.33-0.36	0.32-0.33	0.28-0.30
	2	05Q4	24	0.30-0.30	0.37-0.37	0.25-0.23	0.26-0.28	0.30-0.35	0.36-0.39	0.24-0.25	0.25-0.30
	2	08Q4	37	0.41-0.41	0.44-0.44	0.30-0.29	0.30-0.31	0.41-0.44	0.43-0.45	0.31-0.31	0.31-0.33
	3	05Q4	23	0.33-0.33	0.36-0.36	0.38-0.38	0.41-0.42	0.34-0.39	0.37-0.42	0.34-0.40	0.36-0.42
	3	08Q4	37	0.47-0.47	0.47-0.47	0.46-0.46	0.47-0.48	0.47-0.51	0.49-0.51	0.45-0.46	0.45-0.47
	4	05Q4	22	0.35-0.35	0.34-0.34	0.41-0.42	0.45-0.47	0.41-0.47	0.43-0.47	0.41-0.47	0.43-0.49
	4	08Q4	37	0.48-0.48	0.46-0.46	0.52-0.52	0.53-0.54	0.54-0.57	0.55-0.56	0.53-0.55	0.54-0.56
M4d	1	05Q4	25	0.29-0.29	0.37-0.37	0.29-0.28	0.28-0.28	0.28-0.30	0.30-0.32	0.27-0.28	0.24-0.26
	1	08Q4	37	0.41-0.41	0.44-0.44	0.31-0.32	0.29-0.30	0.33-0.35	0.33-0.34	0.30-0.31	0.27-0.29
	2	05Q4	24	0.30-0.30	0.37-0.37	0.27-0.26	0.27-0.28	0.29-0.30	0.35-0.35	0.28-0.26	0.29-0.28
	2	08Q4	37	0.41-0.41	0.44-0.44	0.31-0.30	0.29-0.29	0.39-0.39	0.42-0.41	0.32-0.30	0.32-0.30
	3	05Q4	23	0.33-0.33	0.36-0.36	0.36-0.36	0.38-0.39	0.32-0.34	0.36-0.37	0.35-0.33	0.37-0.36
	3	08Q4	37	0.47-0.47	0.47-0.47	0.43-0.46	0.43-0.46	0.45-0.47	0.46-0.48	0.42-0.43	0.43-0.44
	4	05Q4	22	0.35-0.35	0.34-0.34	0.35-0.37	0.39-0.41	0.39-0.43	0.41-0.44	0.38-0.39	0.42-0.45
	4	08Q4	37	0.48-0.48	0.46-0.46	0.46-0.49	0.47-0.50	0.50-0.52	0.51-0.52	0.47-0.49	0.49-0.51
M4e	1	05Q4	25	0.29-0.29	0.37-0.37	0.28-0.30	0.27-0.28	0.35-0.35	0.33-0.34	0.30-0.31	0.28-0.28
	1	08Q4	37	0.41-0.41	0.44-0.44	0.31-0.33	0.28-0.30	0.36-0.37	0.33-0.34	0.32-0.35	0.28-0.31
	2	05Q4	24	0.30-0.30	0.37-0.37	0.33-0.32	0.34-0.34	0.29-0.28	0.30-0.30	0.30-0.32	0.30-0.31
	2	08Q4	37	0.41-0.41	0.44-0.44	0.40-0.41	0.40-0.41	0.33-0.33	0.33-0.32	0.34-0.36	0.32-0.33
	3	05Q4	23	0.33-0.33	0.36-0.36	0.40-0.39	0.41-0.42	0.39-0.40	0.44-0.45	0.45-0.46	0.49-0.49
	3	08Q4	37	0.47-0.47	0.47-0.47	0.48-0.50	0.49-0.51	0.47-0.50	0.49-0.52	0.49-0.52	0.51-0.53
	4	05Q4	22	0.35-0.35	0.34-0.34	0.41-0.41	0.41-0.42	0.42-0.42	0.45-0.45	0.44-0.45	0.47-0.48
	4	08Q4	37	0.48-0.48	0.46-0.46	0.51-0.52	0.51-0.52	0.51-0.51	0.52-0.51	0.51-0.53	0.52-0.54

Table 4.1.4 VAR Models Relating to Month *m*4 (2)

Model	Horizon	End	Nobs	AR		VAR2i		VAR2s		VAR3	
				1st result	Last update	1st result	Last update	1st result	Last update	1st result	Last update
M4f	1	05Q4	25	0.29-0.29	0.37-0.37	0.26-0.25	0.24-0.25	0.28-0.30	0.30-0.32	0.26-0.28	0.24-0.26
	1	08Q4	37	0.41-0.41	0.44-0.44	0.30-0.30	0.27-0.27	0.33-0.35	0.33-0.34	0.29-0.31	0.26-0.28
	2	05Q4	24	0.30-0.30	0.37-0.37	0.26-0.24	0.27-0.27	0.29-0.30	0.35-0.35	0.27-0.27	0.29-0.29
	2	08Q4	37	0.41-0.41	0.44-0.44	0.35-0.35	0.34-0.35	0.39-0.39	0.42-0.41	0.37-0.37	0.37-0.37
	3	05Q4	23	0.33-0.33	0.36-0.36	0.35-0.35	0.37-0.37	0.32-0.34	0.36-0.37	0.33-0.35	0.36-0.37
	3	08Q4	37	0.47-0.47	0.47-0.47	0.45-0.46	0.46-0.47	0.45-0.47	0.46-0.48	0.44-0.44	0.46-0.45
	4	05Q4	22	0.35-0.35	0.34-0.34	0.34-0.35	0.36-0.37	0.39-0.43	0.41-0.44	0.39-0.43	0.42-0.45
	4	08Q4	37	0.48-0.48	0.46-0.46	0.48-0.49	0.48-0.49	0.50-0.52	0.51-0.52	0.51-0.51	0.52-0.52
M4g	1	05Q4	25	0.29-0.29	0.36-0.36	0.24-0.26	0.28-0.30	0.30-0.32	0.31-0.33	0.26-0.30	0.28-0.32
	1	08Q4	37	0.40-0.40	0.43-0.43	0.30-0.31	0.30-0.32	0.35-0.36	0.34-0.34	0.30-0.33	0.30-0.33
	2	05Q4	24	0.31-0.31	0.36-0.36	0.27-0.26	0.34-0.33	0.30-0.32	0.37-0.37	0.29-0.30	0.35-0.35
	2	08Q4	37	0.40-0.40	0.43-0.43	0.38-0.37	0.40-0.39	0.40-0.39	0.43-0.41	0.39-0.37	0.41-0.39
	3	05Q4	23	0.33-0.33	0.34-0.34	0.37-0.35	0.41-0.40	0.34-0.36	0.38-0.39	0.35-0.37	0.38-0.40
	3	08Q4	37	0.47-0.47	0.46-0.46	0.49-0.48	0.50-0.49	0.46-0.47	0.47-0.48	0.46-0.46	0.47-0.48
	4	05Q4	22	0.37-0.37	0.36-0.36	0.39-0.38	0.42-0.42	0.41-0.44	0.42-0.45	0.41-0.46	0.43-0.48
	4	08Q4	37	0.48-0.48	0.47-0.47	0.51-0.50	0.51-0.51	0.52-0.53	0.52-0.53	0.51-0.54	0.52-0.54
M4h	1	05Q4	25	0.29-0.29	0.37-0.37	0.25-0.25	0.24-0.25	0.32-0.34	0.30-0.33	0.29-0.31	0.24-0.26
	1	08Q4	37	0.41-0.41	0.44-0.44	0.29-0.30	0.27-0.27	0.36-0.38	0.33-0.35	0.31-0.33	0.26-0.28
	2	05Q4	24	0.30-0.30	0.37-0.37	0.26-0.25	0.27-0.27	0.29-0.31	0.35-0.37	0.26-0.28	0.29-0.30
	2	08Q4	37	0.41-0.41	0.44-0.44	0.35-0.35	0.34-0.35	0.40-0.42	0.42-0.43	0.37-0.38	0.37-0.38
	3	05Q4	23	0.33-0.33	0.36-0.36	0.35-0.36	0.37-0.38	0.33-0.36	0.36-0.39	0.33-0.36	0.36-0.38
	3	08Q4	37	0.47-0.47	0.47-0.47	0.45-0.47	0.46-0.47	0.46-0.48	0.47-0.49	0.47-0.49	0.47-0.49
	4	05Q4	22	0.35-0.35	0.34-0.34	0.34-0.35	0.35-0.36	0.40-0.44	0.42-0.45	0.41-0.45	0.42-0.46
	4	08Q4	37	0.48-0.48	0.46-0.46	0.47-0.49	0.48-0.49	0.53-0.53	0.53-0.53	0.53-0.55	0.54-0.55
M4i	1	05Q4	25	0.29-0.29	0.37-0.37	0.27-0.26	0.27-0.28	0.28-0.30	0.30-0.32	0.26-0.26	0.24-0.27
	1	08Q4	37	0.41-0.41	0.44-0.44	0.30-0.29	0.29-0.30	0.33-0.35	0.33-0.34	0.30-0.29	0.28-0.29
	2	05Q4	24	0.30-0.30	0.37-0.37	0.25-0.23	0.26-0.28	0.30-0.31	0.36-0.37	0.25-0.24	0.27-0.29
	2	08Q4	37	0.41-0.41	0.44-0.44	0.30-0.29	0.30-0.31	0.40-0.39	0.43-0.42	0.32-0.31	0.32-0.34
	3	05Q4	23	0.33-0.33	0.36-0.36	0.38-0.38	0.41-0.42	0.33-0.36	0.37-0.39	0.35-0.36	0.39-0.40
	3	08Q4	37	0.47-0.47	0.47-0.47	0.46-0.46	0.47-0.48	0.45-0.47	0.47-0.49	0.44-0.44	0.46-0.45
	4	05Q4	22	0.35-0.35	0.34-0.34	0.41-0.42	0.45-0.47	0.40-0.45	0.42-0.45	0.42-0.47	0.46-0.51
	4	08Q4	37	0.48-0.48	0.46-0.46	0.52-0.52	0.53-0.54	0.51-0.54	0.52-0.53	0.52-0.54	0.53-0.56
M4j	1	05Q4	25	0.29-0.29	0.37-0.37	0.25-0.25	0.25-0.25	0.32-0.34	0.30-0.33	0.29-0.31	0.25-0.27
	1	08Q4	37	0.41-0.41	0.44-0.44	0.30-0.30	0.28-0.28	0.36-0.38	0.33-0.35	0.31-0.33	0.27-0.29
	2	05Q4	24	0.30-0.30	0.37-0.37	0.24-0.24	0.27-0.27	0.29-0.31	0.35-0.37	0.26-0.28	0.29-0.31
	2	08Q4	37	0.41-0.41	0.44-0.44	0.34-0.35	0.35-0.36	0.40-0.42	0.42-0.43	0.37-0.39	0.38-0.39
	3	05Q4	23	0.33-0.33	0.36-0.36	0.33-0.34	0.35-0.36	0.33-0.36	0.36-0.39	0.32-0.35	0.34-0.37
	3	08Q4	37	0.47-0.47	0.47-0.47	0.45-0.46	0.45-0.46	0.46-0.48	0.47-0.49	0.46-0.48	0.47-0.48
	4	05Q4	22	0.35-0.35	0.34-0.34	0.33-0.35	0.36-0.37	0.40-0.44	0.42-0.45	0.40-0.43	0.41-0.45
	4	08Q4	37	0.48-0.48	0.46-0.46	0.48-0.48	0.49-0.49	0.53-0.53	0.53-0.53	0.53-0.55	0.54-0.55

Table 4.1.4 VAR Models Relating to Month *m*4 (3)

Model	Horizon	End	Nobs	AR		VAR2i		VAR2s		VAR3	
				1st result	Last update	1st result	Last update	1st result	Last update	1st result	Last update
M4k	1	05Q4	25	0.29-0.29	0.36-0.36	0.24-0.26	0.28-0.30	0.34-0.36	0.32-0.34	0.29-0.33	0.27-0.32
	1	08Q4	37	0.40-0.40	0.43-0.43	0.30-0.31	0.30-0.32	0.37-0.39	0.35-0.37	0.33-0.35	0.29-0.32
	2	05Q4	24	0.31-0.31	0.36-0.36	0.27-0.26	0.34-0.33	0.32-0.33	0.37-0.38	0.30-0.32	0.35-0.37
	2	08Q4	37	0.40-0.40	0.43-0.43	0.38-0.37	0.40-0.39	0.42-0.43	0.44-0.44	0.42-0.41	0.43-0.42
	3	05Q4	23	0.33-0.33	0.34-0.34	0.37-0.35	0.41-0.40	0.36-0.38	0.39-0.41	0.36-0.40	0.39-0.43
	3	08Q4	37	0.47-0.47	0.46-0.46	0.49-0.48	0.50-0.49	0.48-0.50	0.49-0.50	0.50-0.51	0.51-0.51
	4	05Q4	22	0.37-0.37	0.36-0.36	0.39-0.38	0.42-0.42	0.41-0.44	0.43-0.45	0.42-0.45	0.43-0.48
	4	08Q4	37	0.48-0.48	0.47-0.47	0.51-0.50	0.51-0.51	0.54-0.55	0.54-0.55	0.55-0.55	0.56-0.56
M4l	1	05Q4	25	0.29-0.29	0.37-0.37	0.23-0.26	0.28-0.30	0.35-0.35	0.32-0.33	0.30-0.33	0.28-0.32
	1	08Q4	37	0.41-0.41	0.44-0.44	0.29-0.32	0.30-0.32	0.35-0.36	0.31-0.32	0.32-0.34	0.29-0.32
	2	05Q4	24	0.30-0.30	0.37-0.37	0.27-0.27	0.34-0.34	0.29-0.30	0.29-0.31	0.27-0.29	0.27-0.30
	2	08Q4	37	0.41-0.41	0.44-0.44	0.36-0.37	0.39-0.39	0.32-0.32	0.30-0.31	0.30-0.31	0.28-0.30
	3	05Q4	23	0.33-0.33	0.36-0.36	0.35-0.36	0.39-0.40	0.40-0.43	0.47-0.49	0.39-0.43	0.45-0.48
	3	08Q4	37	0.47-0.47	0.47-0.47	0.47-0.48	0.49-0.49	0.48-0.52	0.51-0.54	0.46-0.51	0.49-0.53
	4	05Q4	22	0.35-0.35	0.34-0.34	0.38-0.38	0.41-0.41	0.42-0.44	0.44-0.46	0.41-0.43	0.43-0.45
	4	08Q4	37	0.48-0.48	0.46-0.46	0.49-0.50	0.50-0.51	0.50-0.51	0.50-0.51	0.49-0.51	0.49-0.52
M4m	1	05Q4	25	0.29-0.29	0.37-0.37	0.23-0.26	0.28-0.30	0.38-0.40	0.37-0.39	0.33-0.36	0.32-0.35
	1	08Q4	37	0.41-0.41	0.44-0.44	0.29-0.32	0.30-0.32	0.38-0.39	0.36-0.36	0.34-0.36	0.32-0.34
	2	05Q4	24	0.30-0.30	0.37-0.37	0.27-0.27	0.34-0.34	0.28-0.29	0.31-0.33	0.27-0.28	0.31-0.33
	2	08Q4	37	0.41-0.41	0.44-0.44	0.36-0.37	0.39-0.39	0.36-0.36	0.36-0.36	0.34-0.34	0.34-0.35
	3	05Q4	23	0.33-0.33	0.36-0.36	0.35-0.36	0.39-0.40	0.37-0.38	0.43-0.44	0.38-0.39	0.43-0.44
	3	08Q4	37	0.47-0.47	0.47-0.47	0.47-0.48	0.49-0.49	0.44-0.45	0.47-0.47	0.45-0.45	0.47-0.48
	4	05Q4	22	0.35-0.35	0.34-0.34	0.38-0.38	0.41-0.41	0.42-0.42	0.45-0.45	0.42-0.41	0.45-0.46
	4	08Q4	37	0.48-0.48	0.46-0.46	0.49-0.50	0.50-0.51	0.51-0.49	0.52-0.50	0.50-0.49	0.51-0.51

4.2) RMSFEs - Univariate Multistep Models

Reminder: Forecast = 1 (forecast of the current quarter), Forecast = 2 (forecast of the next quarter), Forecast = 3 (forecast of the next-to-next quarter).

Table 4.2.1 Univariate Models Relating to Month *m*1 (Weighted Service Balances)

Model	Forecast	End	AR		Industry		Industry+ Services	
			1st result	Last update	1st result	Last update	1st result	Last update
M111	1	05Q4	0.30-0.30	0.35-0.35	0.22-0.19	0.23-0.20	0.22-0.19	0.20-0.17
	1	08Q4	0.43-0.45	0.44-0.46	0.30-0.27	0.29-0.26	0.31-0.29	0.28-0.26
M121	2	05Q4	0.31-0.31	0.33-0.32	0.35-0.33	0.38-0.36	0.34-0.34	0.36-0.35
	2	08Q4	0.46-0.47	0.45-0.46	0.44-0.46	0.44-0.46	0.45-0.47	0.45-0.46
M131	3	05Q4	0.33-0.33	0.33-0.33	0.33-0.31	0.38-0.38	0.35-0.32	0.36-0.33
	3	08Q4	0.47-0.48	0.45-0.47	0.50-0.48	0.51-0.50	0.45-0.44	0.45-0.43
M112	1	05Q4	0.30-0.30	0.35-0.35	0.20-0.20	0.17-0.17	0.26-0.23	0.22-0.19
	1	08Q4	0.43-0.45	0.44-0.46	0.30-0.30	0.27-0.27	0.36-0.35	0.34-0.32
M122	2	05Q4	0.31-0.31	0.33-0.32	0.39-0.40	0.41-0.41	0.39-0.39	0.34-0.35
	2	08Q4	0.46-0.47	0.45-0.46	0.42-0.46	0.42-0.45	0.48-0.50	0.44-0.46
M132	3	05Q4	0.33-0.33	0.33-0.33	0.21-0.22	0.31-0.30	0.30-0.31	0.33-0.34
	3	08Q4	0.47-0.48	0.45-0.47	0.38-0.40	0.41-0.42	0.40-0.42	0.42-0.42

Last six columns: first figure = recursive estimation - second figure = rolling estimation.
Sources: INSEE, French quarterly accounts and industry and service surveys. Authors' calculations.

Table 4.2.2 Univariate Models Relating to Month *m*1 (Non-Weighted Service Balances)

Model	Forecast	End	AR		Industry		Industry+ Services	
			1st result	Last update	1st result	Last update	1st result	Last update
M1110	1	05Q4	0.30-0.30	0.35-0.35	0.22-0.19	0.23-0.20	0.23-0.22	0.21-0.20
	1	08Q4	0.43-0.45	0.44-0.46	0.30-0.27	0.29-0.26	0.29-0.28	0.27-0.25
M1210	2	05Q4	0.31-0.31	0.33-0.32	0.35-0.33	0.38-0.36	0.34-0.33	0.36-0.36
	2	08Q4	0.46-0.47	0.45-0.46	0.44-0.46	0.44-0.46	0.44-0.46	0.44-0.46
M1310	3	05Q4	0.33-0.33	0.33-0.33	0.33-0.31	0.38-0.38	0.44-0.44	0.43-0.44
	3	08Q4	0.47-0.48	0.45-0.47	0.50-0.48	0.51-0.50	0.58-0.56	0.56-0.55
M1120	1	05Q4	0.30-0.30	0.35-0.35	0.21-0.20	0.21-0.20	0.21-0.20	0.21-0.20
	1	08Q4	0.43-0.45	0.44-0.46	0.30-0.29	0.28-0.28	0.30-0.29	0.28-0.28
M1220	2	05Q4	0.31-0.31	0.33-0.32	0.39-0.40	0.42-0.42	0.35-0.39	0.36-0.36
	2	08Q4	0.46-0.47	0.45-0.46	0.42-0.45	0.43-0.45	0.41-0.48	0.40-0.46
M1320	3	05Q4	0.33-0.33	0.33-0.33	0.21-0.22	0.31-0.30	0.21-0.30	0.27-0.31
	3	08Q4	0.47-0.48	0.45-0.47	0.38-0.40	0.41-0.42	0.4-0.45	0.41-0.44

Last six columns: first figure = recursive estimation - second figure = rolling estimation.
Sources: INSEE, French quarterly accounts and industry and service surveys. Authors' calculations.

Table 4.2.3 Univariate Models Relating to Month *m*2 (Weighted Service Balances)

Model	Forecast	End	AR		Industry		Industry+ Services	
			1st result	Last update	1st result	Last update	1st result	Last update
M211	1	05Q4	0.34-0.33	0.37-0.36	0.19-0.17	0.23-0.21	0.25-0.22	0.24-0.22
	1	08Q4	0.50-0.50	0.49-0.50	0.29-0.27	0.28-0.27	0.34-0.30	0.32-0.28
M221	2	05Q4	0.31-0.31	0.27-0.26	0.34-0.33	0.37-0.35	0.24-0.24	0.30-0.30
	2	08Q4	0.35-0.36	0.31-0.32	0.39-0.39	0.39-0.38	0.43-0.42	0.44-0.43
M231	3	05Q4	0.34-0.34	0.37-0.36	0.38-0.36	0.43-0.40	0.39-0.39	0.39-0.40
	3	08Q4	0.53-0.55	0.53-0.54	0.54-0.55	0.55-0.55	0.57-0.56	0.56-0.55
M212	1	05Q4	0.34-0.33	0.37-0.36	0.24-0.21	0.26-0.25	0.27-0.24	0.27-0.26
	1	08Q4	0.50-0.50	0.49-0.50	0.29-0.28	0.29-0.27	0.35-0.32	0.34-0.32
M222	2	05Q4	0.31-0.31	0.27-0.26	0.40-0.41	0.37-0.36	0.31-0.34	0.27-0.29
	2	08Q4	0.35-0.36	0.31-0.32	0.40-0.41	0.48-0.51	0.44-0.48	0.52-0.57
M232	3	05Q4	0.34-0.34	0.37-0.36	0.36-0.36	0.42-0.41	0.35-0.36	0.39-0.40
	3	08Q4	0.53-0.55	0.53-0.54	0.46-0.50	0.48-0.50	0.46-0.48	0.47-0.49

Last six columns: first figure = recursive estimation - second figure = rolling estimation.
Sources: INSEE, French quarterly accounts and industry and service surveys. Authors' calculations.

Table 4.2.4 Univariate Models Relating to Month *m*2 (Non-Weighted Service Balances)

Model	Forecast	End	AR		Industry		Industry+ Services	
			1st result	Last update	1st result	Last update	1st result	Last update
M2110	1	05Q4	0.34-0.33	0.37-0.36	0.19-0.17	0.23-0.21	0.23-0.20	0.28-0.26
	1	08Q4	0.50-0.50	0.27-0.50	0.29-0.27	0.28-0.27	0.29-0.28	0.31-0.30
M2210	2	05Q4	0.31-0.31	0.27-0.26	0.34-0.33	0.37-0.35	0.34-0.31	0.30-0.27
	2	08Q4	0.35-0.36	0.31-0.32	0.39-0.39	0.39-0.38	0.42-0.40	0.37-0.35
M2310	3	05Q4	0.34-0.34	0.37-0.36	0.36-0.35	0.42-0.40	0.38-0.38	0.42-0.41
	3	08Q4	0.52-0.54	0.52-0.53	0.52-0.53	0.53-0.54	0.53-0.55	0.54-0.55
M2120	1	05Q4	0.34-0.33	0.37-0.36	0.25-0.23	0.26-0.24	0.22-0.21	0.18-0.17
	1	08Q4	0.50-0.50	0.27-0.50	0.28-0.26	0.28-0.27	0.28-0.28	0.25-0.25
M2220	2	05Q4	0.31-0.31	0.27-0.26	0.40-0.40	0.40-0.38	0.31-0.31	0.29-0.29
	2	08Q4	0.35-0.36	0.31-0.32	0.40-0.41	0.38-0.38	0.38-0.38	0.35-0.35
M2320	3	05Q4	0.34-0.34	0.37-0.36	0.35-0.35	0.43-0.42	0.29-0.32	0.37-0.37
	3	08Q4	0.52-0.54	0.52-0.53	0.45-0.48	0.48-0.51	0.44-0.51	0.46-0.52

Last six columns: first figure = recursive estimation - second figure = rolling estimation.
Sources: INSEE, French quarterly accounts and industry and service surveys. Authors' calculations.

Table 4.2.5 Univariate Models Relating to Month *m*3 (Weighted Service Balances)

Model	Forecast	End	AR		Industry		Industry+ Services	
			1st result	Last update	1st result	Last update	1st result	Last update
M311	1	05Q4	0.31-0.30	0.35-0.34	0.25-0.23	0.25-0.23	0.27-0.26	0.28-0.27
	1	08Q4	0.45-0.45	0.46-0.46	0.31-0.29	0.29-0.27	0.32-0.31	0.30-0.29
M321	2	05Q4	0.31-0.31	0.33-0.32	0.32-0.31	0.33-0.31	0.36-0.36	0.36-0.35
	2	08Q4	0.43-0.46	0.43-0.45	0.40-0.41	0.39-0.39	0.41-0.42	0.39-0.40
M331	3	05Q4	0.33-0.33	0.34-0.33	0.34-0.32	0.37-0.35	0.31-0.30	0.35-0.34
	3	08Q4	0.47-0.48	0.46-0.47	0.47-0.47	0.47-0.47	0.49-0.49	0.49-0.5
M312	1	05Q4	0.31-0.30	0.35-0.34	0.24-0.21	0.25-0.23	0.31-0.28	0.26-0.23
	1	08Q4	0.45-0.45	0.46-0.46	0.28-0.28	0.28-0.27	0.35-0.34	0.32-0.29
M322	2	05Q4	0.31-0.31	0.33-0.32	0.32-0.32	0.31-0.30	0.29-0.30	0.27-0.27
	2	08Q4	0.43-0.46	0.43-0.45	0.41-0.42	0.38-0.39	0.44-0.44	0.41-0.41
M332	3	05Q4	0.33-0.33	0.34-0.33	0.46-0.45	0.42-0.4	0.44-0.45	0.42-0.43
	3	08Q4	0.47-0.48	0.46-0.47	0.52-0.53	0.49-0.49	0.53-0.56	0.50-0.53

Last six columns: first figure = recursive estimation - second figure = rolling estimation.
Sources: INSEE, French quarterly accounts and industry and service surveys. Authors' calculations.

Table 4.2.6 Univariate Models Relating to Month *m*3 (Non-Weighted Service Balances)

Model	Forecast	End	AR		Industry		Industry+ Services	
			1st result	Last update	1st result	Last update	1st result	Last update
M3110	1	05Q4	0.32-0.31	0.34-0.33	0.25-0.22	0.25-0.23	0.30-0.28	0.28-0.26
	1	08Q4	0.46-0.46	0.45-0.45	0.31-0.29	0.29-0.27	0.33-0.32	0.30-0.29
M3210	2	05Q4	0.31-0.31	0.33-0.32	0.32-0.31	0.30-0.29	0.30-0.33	0.29-0.31
	2	08Q4	0.43-0.46	0.43-0.45	0.40-0.41	0.39-0.39	0.38-0.38	0.35-0.36
M3310	3	05Q4	0.32-0.32	0.33-0.33	0.33-0.32	0.38-0.36	0.36-0.35	0.38-0.36
	3	08Q4	0.46-0.48	0.45-0.47	0.46-0.47	0.47-0.48	0.47-0.47	0.47-0.46
M3120	1	05Q4	0.32-0.31	0.34-0.33	0.24-0.21	0.25-0.23	0.27-0.26	0.24-0.23
	1	08Q4	0.46-0.46	0.45-0.45	0.28-0.28	0.28-0.27	0.30-0.30	0.27-0.26
M3220	2	05Q4	0.31-0.31	0.33-0.32	0.32-0.31	0.34-0.32	0.29-0.28	0.27-0.27
	2	08Q4	0.43-0.46	0.43-0.45	0.41-0.41	0.39-0.40	0.37-0.37	0.34-0.34
M3320	3	05Q4	0.32-0.32	0.33-0.33	0.44-0.43	0.42-0.40	0.49-0.53	0.39-0.40
	3	08Q4	0.46-0.48	0.45-0.47	0.51-0.52	0.48-0.49	0.51-0.56	0.48-0.52

Last six columns: first figure = recursive estimation - second figure = rolling estimation.
Sources: INSEE, French quarterly accounts and industry and service surveys. Authors' calculations.

Table 4.2.7 Univariate Models Relating to Month *m*4 (Weighted Service Balances)

Model	Forecast	End	AR		Industry		Industry+ Services	
			1st result	Last update	1st result	Last update	1st result	Last update
M411	1	05Q4	0.31-0.30	0.37-0.36	0.24-0.22	0.23-0.22	0.31-0.29	0.30-0.28
	1	08Q4	0.45-0.45	0.46-0.46	0.31-0.29	0.29-0.27	0.34-0.33	0.32-0.31
M421	2	05Q4	0.31-0.31	0.33-0.32	0.21-0.19	0.23-0.20	0.23-0.22	0.18-0.17
	2	08Q4	0.43-0.46	0.43-0.45	0.30-0.27	0.29-0.26	0.33-0.31	0.29-0.26
M431	3	05Q4	0.32-0.32	0.32-0.32	0.37-0.37	0.38-0.37	0.45-0.44	0.42-0.42
	3	08Q4	0.47-0.49	0.46-0.47	0.46-0.47	0.45-0.46	0.49-0.52	0.47-0.50
M412	1	05Q4	0.31-0.30	0.37-0.36	0.23-0.22	0.24-0.23	0.32-0.28	0.30-0.28
	1	08Q4	0.45-0.45	0.46-0.46	0.30-0.29	0.28-0.27	0.34-0.33	0.32-0.31
M422	2	05Q4	0.31-0.31	0.33-0.32	0.20-0.19	0.20-0.19	0.26-0.23	0.24-0.21
	2	08Q4	0.43-0.46	0.43-0.45	0.30-0.29	0.28-0.28	0.36-0.34	0.35-0.32
M432	3	05Q4	0.32-0.32	0.32-0.32	0.39-0.35	0.41-0.35	0.39-0.39	0.34-0.34
	3	08Q4	0.47-0.49	0.46-0.47	0.42-0.43	0.42-0.42	0.48-0.50	0.44-0.46

Last six columns: first figure = recursive estimation - second figure = rolling estimation.
Sources: INSEE, French quarterly accounts and industry and service surveys. Authors' calculations.

Table 4.2.8 Univariate Models Relating to Month *m*4 (Non-Weighted Service Balances)

Model	Forecast	End	AR		Industry		Industry+ Services	
			1st result	Last update	1st result	Last update	1st result	Last update
M4110	1	05Q4	0.31-0.30	0.37-0.36	0.24-0.22	0.23-0.22	0.26-0.24	0.23-0.22
	1	08Q4	0.45-0.45	0.46-0.46	0.31-0.29	0.29-0.27	0.31-0.29	0.28-0.26
M4210	2	05Q4	0.31-0.31	0.33-0.32	0.21-0.19	0.23-0.20	0.22-0.20	0.20-0.18
	2	08Q4	0.43-0.46	0.43-0.45	0.30-0.27	0.29-0.26	0.29-0.26	0.26-0.23
M4310	3	05Q4	0.32-0.32	0.33-0.32	0.36-0.35	0.56-0.37	0.35-0.35	0.40-0.40
	3	08Q4	0.46-0.48	0.45-0.47	0.45-0.46	0.45-0.46	0.44-0.47	0.43-0.45
M4120	1	05Q4	0.31-0.30	0.37-0.36	0.23-0.22	0.24-0.23	0.27-0.24	0.25-0.23
	1	08Q4	0.45-0.45	0.46-0.46	0.30-0.29	0.28-0.27	0.31-0.29	0.28-0.27
M4220	2	05Q4	0.31-0.31	0.33-0.32	0.20-0.20	0.20-0.19	0.20-0.20	0.20-0.19
	2	08Q4	0.43-0.46	0.43-0.45	0.30-0.29	0.28-0.28	0.30-0.29	0.28-0.28
M4320	3	05Q4	0.32-0.32	0.33-0.32	0.39-0.40	0.42-0.43	0.33-0.38	0.36-0.37
	3	08Q4	0.46-0.48	0.45-0.47	0.42-0.45	0.43-0.46	0.40-0.48	0.40-0.46

Last six columns: first figure = recursive estimation - second figure = rolling estimation.
Sources: INSEE, French quarterly accounts and industry and service surveys. Authors' calculations.

Appendix 5: Out-of-Sample Results - Tests of Predictive Accuracy
1- Tests by kind of models

5.1) VAR Models

Conventions and sources relating to all tables in Appendix 5.1:

First column: the industry and service variables *IND* and *SER* included in every model are detailed in Appendix 3.1 above.

Last ten columns: results of the three tests carried out on recursive estimations (first three results) and rolling estimations (last three results). For a set of three results, the first one refers to the test made using the Newey-West variance estimations, the second one to the test resulting from the AUTOREG procedure, the last one to the test derived from the Durbin approach. The classifications of the results are explained at the end of sub-section II.3. A negative sign preceding a result means that the corresponding test statistic is significantly negative, i.e. that the larger model performs significantly less well than the more parsimonious model. No negative sign: the test statistic is either positive, or non-significantly negative.

Dark grey tint: the predictive accuracy of the less parsimonious model outperforms that of the more parsimonious one without ambiguity.

Light grey tint: the predictive accuracy of the less parsimonious model outperforms that of the more parsimonious one with some ambiguity (P-values close to limit thresholds and/or non-unanimous results from the different tests, about half of them only leading to a clear preference for the less parsimonious model).

Sources: INSEE, French quarterly accounts and industry and service surveys. Authors' calculations.

Table 5.1.1 Restricted VAR Models Relating to <u>Month *m*1</u> (1)

Model	Horizon	End	AR1 versus VAR2				AR1 versus VAR3		VAR2 versus VAR3			
			VAR2 with an industry variable		VAR2 with a service variable				VAR2 with an industry variable		VAR2 with a service variable	
			First Result	Last Result	First Result	Last Result	First Result	Last Result	First Result	Last Result	First Result	Last Result
M1a	1	05Q4	S S S H H S	H H S H H S	S 5 A S 5 N	H H H S H H	H H S H H S	H H H H H S	U U U U U U	N N N N N N	5 5 5 2 2 2	S H S S H S
M1a	1	08Q4	2 2 S S S S	S S S S S S	S S T 2 2 T	S S 5 S S T	2 2 2 S S S	S S 2 S S 2	A A A N N N	T T T T T L	5 5 T S S S	2 2 2 S S S
M1a	2	05Q4	H S S H S S	H S 2 H S S	H T L S S S	H 5 L H 2 T	H 2 T H H 2	H 5 L H 5 L	A A A N N N	T T T T T T	S S S S S S	S S S H S S
M1a	2	08Q4	2 2 2 S 2 2	S S 5 S S T	S S L 2 2 A	S S A S S N	2 2 T S 2 T	S S T S S T	5 5 5 5 T T	2 2 2 S S 2	2 2 2 S S S	S 2 2 S S 2
M1a	3	05Q4	A A N L L L	U U U N N N	N N N U U U	U U U U U U	N N N N N N	U U U U U U	U U U U U U	U U U U U U	N N T N N N	N A 2 N A 2
M1a	3	08Q4	L L N T L N	N N N N N N	L L A N N U	N N N U U U	L A N U U U	N N N U U U	N N N U U U	U U U U U U	N N N U U U	N N N U U U
M1a	4	05Q4	N N N N N N	U U U U U U	N N N U U U	U U U U U U	N N N U U U	U U U U U U	U U U U U U	N N N U U U	U U A N N T	U U N U U A
M1a	4	08Q4	U U U N N N	U U U U U U	N N N U U U	U U U U U U	N N N U U U	U U U-T U U	N A N U U U	N A N U U U	U U N U U N	U U N U U U
M1b	1	05Q4	S S S H H S	H H S H H S	S 2 A S 5 A	S H 2 S H S	S S S S S S	H H S H S S	U U U U U U	N N N U U U	S S 2 S S 2	H H S H H H
M1b	1	08Q4	2 2 S S S S	S S S S S S	S S S S S 5	S S S S S 2	2 2 S S S S	S S S S S S	N N N U U U	N N N N N N	5 5 5 S S 2	2 2 5 S S S
M1b	2	05Q4	H S S H S S	H S 2 H S S	H H H H S S	H H H H 2 T	H H H H H H	H 5 T H 2 T	N N N N N N	L L A L L L	S S S H H S	S S S H H S
M1b	2	08Q4	2 2 2 S 2 2	S S 5 S S T	S S S S S L	H S S H S S	S 2 5 S S T	S S T S S L	L L L L L L	T T T 5 5 5	2 2 2 S S 2	2 2 5 S S 2
M1b	3	05Q4	A A N L L L	U U U N N N	N N N U U U	U U U U U U	N N N U U U	U U U U U U	N N N U U U	N N N U U U	N N T N N N	A L T N N N
M1b	3	08Q4	L L N T L N	N N N N N N	L L L N N N	N N N U U U	L A N N N U	N N N N N N	N A A U U U	N N N U U U	N N N U U U	A N N N N U
M1b	4	05Q4	N N N N N N	U U U U U U	U U U U U U	U U U U U U	N N N U U U	U U U U U U	N N N U U-T	N N U U U U	U U A U U N	U U N U U U
M1b	4	08Q4	U U U N N N	U U U U U U	U U U U U U	U U U U U U	U U U U U U	U U U-T U U	N A N U U U	A L N U U-T	U U U U U U	U U N U U U
M1c	1	05Q4	S S S H H S	H H S H H S	S 2 A S 5 N	S H H S H H	H H S H S S	H H S H H S	N N N U U U	N N N U U U	2 2 2 2 2 2	H H H S S S
M1c	1	08Q4	2 2 S S S S	S S S S S S	S S S S S 5	S S S S S 5	2 2 S S S S	S S S S S S	N N N N N N	N N N N N N	5 5 5 S S 2	2 2 5 S S S
M1c	2	05Q4	H S S H S S	H S 2 H S S	H 5 T H S S	H 5 L H 5 L	H H H H H H	H 5 L H 5 L	L L L L L L	L L L T L L	S S S H S S	H S S H H H
M1c	2	08Q4	2 2 2 S 2 2	S S 5 S S T	S S T S S L	H S S S S A	S S 5 S S T	S S T S S L	T T L T T T	T T L 5 5 5	2 2 2 S S S	2 2 2 S S S
M1c	3	05Q4	A A N L L L	U U U N N N	N N N N N N	U U U U U U	N N N N N N	U U U U U U	N N N U U U	N N N U U U	N N T U U L	A N N N N N
M1c	3	08Q4	L L N T L N	N N N N N N	T T T A A A	N N N N N N	L L N N N N	N N N N N N	A A A U U U	N N N U U U	N N L U U U	A N N U U U
M1c	4	05Q4	N N N N N N	U U U U U U	N N N U U U	U U U U U U	N N N U U U	U U U U U U	N N U U U U	N A U U U-T	U U N U U N	U U N U U U
M1c	4	08Q4	U U U N N N	U U U U U U	N N N U U U	U U U U U U	U U U U U U	U U U-T U U	A L N U U U	A L N U U-T	U U N U U U	U U N U U U

Table 5.1.1 Restricted VAR Models Relating to <u>Month *m*1</u> (2)

Model	Horizon	End	AR1 versus VAR2				AR1 versus VAR3		VAR2 versus VAR3			
			VAR2 with an industry variable		VAR2 with a service variable				VAR2 with an industry variable		VAR2 with a service variable	
			First Result	Last Result	First Result	Last Result	First Result	Last Result	First Result	Last Result	First Result	Last Result
M1d	1	05Q4	H H H H H H	S 5 A S H S	H H S H H S	H H H H H H	H H H H H H	H H H H H H	N N N U U U	N N N N L N	L L L T T L	T N T T N N
M1d	1	08Q4	2 2 5 S S 5	S S 2 S S S	S S 5 S S T	H H S S S 5	S S T S S T	S S 5 S S S	N N N U U U	A A A A A N	T T T 5 5 5	5 5 5 5 5 5
M1d	2	05Q4	H S 2 H S S	S H S S H S	H H S H H S	H S L H H H	H H S H 5 T	H H H H 5 L	N N N N N N	N N N A N N	T T T 5 T T	L T T T T T
M1d	2	08Q4	S S L S S L	S S T S S L	S S T S S L	H H T H H L	S S L S S A	S S L S S L	N N N N N N	N N N A N N	5 5 5 2 2 5	5 5 5 5 5 5
M1d	3	05Q4	S S S 2 2 2	5 T A T L L	N L N N N N	U U U U U U	T T T A 5 T	N N N N N N	-T-2-5-5-5-5	-2-5-5-T U U	N N N N N N	A N N N N N
M1d	3	08Q4	5 5 L 2 2 T	5 5 T 5 T T	T T T A L A	N N N N N N	5 5 T T T T	T L L L A A	U U U-T-T-T	-5-5-5-T U U	L A A N N N	L L L N N N
M1d	4	05Q4	A N N L N N	U U U U U U	U U U U U U	U U U U U U	U U U U U U	U U U U U U	U-T U U-T U	U U U U U U	U U U U U U	U U U U U U
M1d	4	08Q4	T L L N N N	N N N U U U	N N N U U U	U U U U U U	N N N U U U	U U U U U U	U U U U U U	U-T-5 U U U	N N N U U U	N N N U U U
M1e	1	05Q4	H H H H H H	S 5 A S H S	H H S H H S	H H H H H H	H H H H H H	H H H H H H	N N N U U U	N N N N N N	A N N T T T	L N N T T T
M1e	1	08Q4	2 2 5 S S 5	S S 2 S S S	S S 5 S S T	H H S S S T	S S T S S T	S S 5 S S 5	N N N U U U	N N N N A N	T T T 2 5 5	5 5 5 2 2 5
M1e	2	05Q4	H S 2 H S S	S H S S H S	H 2 T H S S	H 2 T H 2 T	H 2 T H 5 T	H H H H 5 L	N N N N N N	N N N A N N	L L L 5 5 5	L L L T T T
M1e	2	08Q4	S S L S S L	S S T S S L	S S T S S L	H H L H S L	S S L S S L	S S L S S L	N N N N N N	N N N N N N	5 T T 2 2 5	5 5 5 2 2 5
M1e	3	05Q4	S S S 2 2 2	5 T A T L L	A T L N L A	U U U U U U	T T T A T L	A T A N N N	-T-2-5-5-5-T	-2-2-5-5-T-T	N N N N N N	A N N N N N
M1e	3	08Q4	5 5 L 2 2 T	5 5 T 5 T T	T T T L T T	N N N N N N	5 5 T T T T	T T T L A A	-T U U-5-T-T	-2-2-5-5-T-T	L A A U U U	L L L N N N
M1e	4	05Q4	A N N L N N	U U U U U U	N N N U U U	U U U U U U	N N U U U U	U U U U U U	U U U U U U	U U U U U U	U U U U U U	U U U U U N
M1e	4	08Q4	T L L N N N	N N N U U U	N N U N N N	U U U U U U	N N N U U U	U U U U U U	U U U U U U	U U-T U U U	N N N U U U	N N L U U U
M1f	1	05Q4	H H H H H H	S H H H H H	S 2 T S 5 L	S H H S H H	H H H H S S	H H H H H H	N A A U U U	N N N N N N	T T T 2 2 2	T A N 2 2 5
M1f	1	08Q4	S S 2 S S 2	S S 2 S S 2	S S 5 S S T	S S 5 S S T	S S 2 S S 2	S S 5 S S 5	N N N N N N	N N N N N N	5 5 5 S S S	2 2 5 S S S
M1f	2	05Q4	H S S H 2 5	S H S S 2 N	H H S H S S	H H H H H S	H 2 T H 2 T	H T L H T L	5 S 2 5 5 5	A A N A N N	5 5 T S S S	T T T 2 2 2
M1f	2	08Q4	S S T S S T	S S S S S T	S S T S S L	S S A S S N	S S T S S T	S S L S S L	T T T 2 2 2	A A A L L A	S 2 2 S S S	2 5 5 S S S
M1f	3	05Q4	5 T L 5 2 A	L L L L L L	L L A N N N	U U U U U U	T T N N A A	N N N N N N	U U U U U U	U U U U U U	T L L T L A	T L L 5 L L
M1f	3	08Q4	2 5 T 2 2 T	T T T T L L	5 5 L T T L	A A N N N N	5 T L T L L	L L N N N N	N N N U U U	N N N U U U	T L L N N N	T L N N N N
M1f	4	05Q4	A N N T A A	N N N N N N	N N N U U U	U U U U U U	N N N U U U	U U U U U U	-N U U U U U	U U U U U U	N N N N N N	N N N N N N
M1f	4	08Q4	N N N N N N	U U U U U U	N N N U U U	U U U U U U	L N N U U U	U U U-T U U	N N N U U U	N N N U U U	L A A U U U	A A A U U N

Table 5.1.1 Restricted VAR Models Relating to <u>Month *m*1</u> (3)

Model	Horizon	End	AR1 versus VAR2				AR1 versus VAR3		VAR2 versus VAR3			
			VAR2 with an industry variable		VAR2 with a service variable				VAR2 with an industry variable		VAR2 with a service variable	
			First Result	Last Result	First Result	Last Result	First Result	Last Result	First Result	Last Result	First Result	Last Result
M1g	1	05Q4	S S S H H S	H H S H H S	S 2 N S 5 N	S H H S H S	H H S S S 2	H H H H H H	A A A N N N	L L L A A A	5 5 5 5 5 5	S S S S S S
M1g	1	08Q4	2 2 S S S S	S S S S S S	S S S S S S	H S S S S S	S 2 S S S S	S S 2 S S 2	N N N N N N	A A A L L L	T T T 2 2 T	2 2 5 S S S
M1g	2	05Q4	H S S H S S	H S 2 H S S	H 5 T H S 2	H T A H T L	H 2 T H H H	H T L H T L	T T T T L L	T T T 5 T T	S S 2 S S S	H S 2 H S S
M1g	2	08Q4	2 2 2 S 2 2	S S 5 S S T	S S S S S T	H H S S S L	S S 5 S S T	S S T S S L	L N N T L N	L L L 5 5 5	5 5 5 S 2 2	2 2 2 S S 2
M1g	3	05Q4	A A N L L L	U U U N N N	N N N N N N	U U U U U U	N N N N N N	U U U U U U	L N N N N N	L L L N N N	A N N U U N	T T T N N N
M1g	3	08Q4	L L N T L N	N N N N N N	L A A N N N	N N N N N N	L L L N N N	N N N N N N	A N N N N N	A N N N N N	L L L N N N	T L L N N N
M1g	4	05Q4	N N N N N N	U U U U U U	N N N N N N	N N N U U U	N N N U U U	U U U U U U	A T N N N N	L T N N A A	N N T U U U	U U A U U U
M1g	4	08Q4	U U U N N N	U U U U U U	N N N U U U	U U U U U U	N N N U U U	U U U U U U	A A A N N N	L T N N A A	N N A U U U	U U N U U U
M1h	1	05Q4	H H H H H H	S 5 A S H S	H H S S S S	H H S S H H	H H H H H H	H H H H H H	N N N N U N	L L A L L L	A T T 5 5 5	T T T 2 5 5
M1h	1	08Q4	2 2 5 S S 5	S S 2 S S S	S S 5 S S 5	H H S S S S	S S T S S T	S S S S S S	N N N U U U	A A A A A N	T T T S 2 2	5 5 5 S S S
M1h	2	05Q4	H S 2 H S S	S H S S H S	H S S S S S	H 5 T H 5 T	H S S H S S	H 5 T H 5 T	N A N N N N	L L L A A A	5 T T S S 2	5 T T 2 2 5
M1h	2	08Q4	S S L S S L	S S T S S L	S S T S S L	H S T S S L	S S L S S L	S S L S S L	N N N N N N	N A A N A A	2 5 5 S S 2	2 2 2 S S 2
M1h	3	05Q4	S S S 2 2 2	5 T A T L L	N L L N L A	N N N N N N	T T T A T L	L 2 5 N N N	U U U-T-T-T	-5-T-T-5-T U	N N N N N N	N N N N N N
M1h	3	08Q4	5 5 L 2 2 T	5 5 T 5 T T	T L L N A N	N N N N N N	5 5 T T T T	T T 5 L A A	U U U-T-T U	-2-5-5-T-T U	T L L L L L	L L L L L A
M1h	4	05Q4	A N N L N N	U U U U U U	N N N U U U	U U U U U U	N N N U U U	U U U U U U	U U U U U U	N N N U U U	U U U U U U	U U N U U N
M1h	4	08Q4	T L L N N N	N N N U U U	N N N N N N	U U U U U U	N N N U U U	U U U U U U	U U U U U U	U U U N N N	N N N U U U	N N T U U N
M1i	1	05Q4	H H S H H S	S S S S S S	S S S S 2 2	S H H S H H	S H H H S S	S S S H S S	A A T N N N	5 5 5 L L L	S S 2 5 2 5	S S 2 2 2 5
M1i	1	08Q4	S S S S S S	S S S S S S	S S S S 2 2	S S S S H 2	S S 2 S S S	S S S S S S	T 5 2 U A A	2 2 5 A 5 5	S S S S S 2	S S S S S S
M1i	2	05Q4	S S S H S 2	S 2 2 S 2 2	S S S S H S	H 5 5 H S S	S S 2 H 2 5	2 2 2 H 5 5	T L L N N N	L L L A N N	2 S 2 S 2 5	2 2 2 2 5 5
M1i	2	08Q4	S S S S S T	S S S S S S	S S S S S 2	S S 2 S S S	S S T S 2 2	S S S S S 2	5 T T N L A	T T T N A L	S S S S 2 5	S S S S 2 5
M1i	3	05Q4	2 2 5 2 T T	5 S 2 T 5 T	N A N N N N	N N N N U U	2 N N A A A	N A A N L A	U-T U-T-T-T	N N N-5 U U	A A A N T T	A N N N A A
M1i	3	08Q4	S S S 2 T T	2 T T 5 5 T	T L L N N N	A N N N N N	5 5 5 T T T	T L L L L L	U U U-T U U	N N N-T N N	5 5 T L T T	T T T L 5 5
M1i	4	05Q4	T L L L A A	U U U U U U	U U U U U U	U U U U U U	U U U U N N	U U U U U U	-1-5-5 U-1-1	U U U U U U	U U U U N A	-2-T-T U U U
M1i	4	08Q4	T T T N N N	N N N U U U	U U U N U U	U U U U U U	N N N U L A	U U U U N N	-5 U U U N T	U U U N N 5	N N A U A T	U U U U N N

Table 5.1.1 Restricted VAR Models Relating to Month *m*1 (4)

Model	Horizon	End	AR1 versus VAR2				AR1 versus VAR3		VAR2 versus VAR3			
			VAR2 with an industry variable		VAR2 with a service variable		First Result	Last Result	VAR2 with an industry variable		VAR2 with a service variable	
			First Result	Last Result	First Result	Last Result			First Result	Last Result	First Result	Last Result
M1j	1	05Q4	H H S H H S	H H H H H H	S 5 A S 5 N	H H H S H H	H H H H H H	H H H H H H	N N N N N N	L L L A A A	T T T 5 L L	2 2 2 S S 2
M1j	1	08Q4	H H S H H H	H H H H H H	S S T 2 2 T	S S 5 S S T	S S 2 S S 2	H H 2 H H S	T T A T T N	5 5 L T T N	L L L 5 5 5	2 2 5 S S 2
M1j	2	05Q4	H S S H H S	H S 2 H S S	H T L S S S	H 5 L H 2 T	H 2 T H H H	H 2 L H 5 L	L L L L S 2	5 5 5 T T T	2 2 2 2 2 2	2 2 2 S 2 2
M1j	2	08Q4	H S S H H S	H S S H H S	S S L 2 2 A	S S A S S N	S S 5 S S 2	H S S H S T	5 5 L 5 T L	2 2 T 5 5 T	T 5 T 5 A A	5 5 5 2 5 5
M1j	3	05Q4	2 2 5 2 2 5	T A A T L A	N N N U U U	U U U U U U	5 5 5 T T T	N N N N N N	N N T N N N	U U U U U U	2 5 5 S 2 2	2 T T 2 5 T
M1j	3	08Q4	5 T T T T T	L T T A N N	L L A N N U	N N N U U U	5 T T N A A	N N N U U U	T L 2 U U U	N N N U U U	T T T L T T	T T T L A A
M1j	4	05Q4	5 2 T 5 2 T	N N U N N N	N N N U U U	U U U U U U	5 5 T T 5 T	N U U U U U	-T-5 U-5-5-5	-T-T U-5-T-T	S 2 2 S 2 2	5 S 2 5 5 T
M1j	4	08Q4	N N N N N N	U U U U U U	N N N U U U	U U U U U U	A A N N N N	U U U U U U	N N T N N N	N N 5 N N N	L L N L T A	N N N N N N
M1k	1	05Q4	H H S H H H	H H S H H H	S 5 A S 5 N	H H H S H H	H H H H H H	H H H H H H	A A A N N N	L L A N N N	L 2 2 5 5 5	5 5 5 2 2 2
M1k	1	08Q4	H H S H H H	H H H H H H	S S T 2 2 T	S S 5 S S T	S S 2 S S 2	H H S H H S	5 T A T T N	5 5 L 5 T N	A A A T T T	5 5 T 2 5 5
M1k	2	05Q4	H S S H H S	S S 2 H S 5	H T L S S S	H 5 L H 2 T	H 5 T H 5 T	H 5 L H 5 L	5 5 5 T 5 T	5 5 5 5 5 5	2 2 5 2 2 5	5 5 5 2 5 5
M1k	2	08Q4	H S S H H S	H S S H S S	S S L 2 2 A	S S A S S N	S S T S S 5	H S S H H S	2 2 T 5 5 5	2 2 5 2 2 5	T T T T T T	T 5 T T T T
M1k	3	05Q4	5 5 5 2 2 5	T 5 T T 5 T	N N N U U U	U U U U U U	T T L A N N	U U U U U U	L A A N N N	N N N U U U	T T T 5 T T	T L T T L 5
M1k	3	08Q4	5 5 T 5 T T	T L L A N N	L L A N N U	N N N U U U	5 T T N N N	N N N U U U	2 5 T U N N	A N A U U U	T L L N N N	L A L N N N
M1k	4	05Q4	5 L L T L L	N N N N N N	N N N U U U	U U U U U U	L N N N N N	U U U U U U	-T-T-T-5-5-5	U U U U U U	5 2 2 5 S T	A L L T S 2
M1k	4	08Q4	N N N N N N	U U U U U U	N N N U U U	U U U U U U	A N N U U U	U U U U U U	N N N U U N	N A L N N N	L T A N N N	N N N U U U
M1l	1	05Q4	H H S H H S	S S S 2 2 2	H H S H H S	H H H H H H	H H H H H S	H H H S H H	T T T 2 2 A	2 2 2 2 S S	T T L U U U	T T T U U U
M1l	1	08Q4	S S 2 S S 2	S S S S S S	S S T S S L	S S T S S T	S S T S S T	H H 5 S S 5	5 5 5 2 2 L	S S S 2 2 T	L L L N N N	T T T N N U
M1l	2	05Q4	S S S S S S	2 2 5 2 2 5	H H S H S S	H S 5 H H H	H 5 T S S S	H 2 T H H H	T T T T T T	2 2 2 T S 2	T T T N N N	T L L U U U
M1l	2	08Q4	S S T 2 2 T	S S 2 2 2 T	S S L S S L	S S A S S A	S S L 2 2 T	S S L S S L	T T T 5 5 L	2 2 2 5 S S	L L L U U U	L A A U U U
M1l	3	05Q4	S S S T L L	T A T N N N	5 S T T S 2	L T L A L L	5 S S L S 2	N A L N N N	U U U N N N	U U U U U U	N N N U U U	U U U U U U
M1l	3	08Q4	2 2 T 5 T T	T T L L L L	2 2 T 5 5 5	5 T T 5 T T	2 2 5 5 2 2	T T T T T T	N N N N N N	N N N N N N	N N N-T-5 U	U U U-5-5 U
M1l	4	05Q4	T A A N N N	U U U U U U	N N N N N N	U U U U U U	U U U U U U	U U U-T-T U	U U U U U U	U U U-T U U	U U U-1-1-1	U U U-1-1-2
M1l	4	08Q4	5 T T U U U	N N N-T-T-T	N N N N N N	U U U U U U	U U U U U U	U U U-5-T-T	U U U U U U	-T U U U U U	U U U-2-2-5	U U U-1-2-2

Table 5.1.2 Restricted VAR Models Relating to Month *m*2 (1)

Model	Horizon	End	AR1 versus VAR2				AR1 versus VAR3		VAR2 versus VAR3			
			VAR2 with an industry variable		VAR2 with a service variable		First Result	Last Result	VAR2 with an industry variable		VAR2 with a service variable	
			First Result	Last Result	First Result	Last Result			First Result	Last Result	First Result	Last Result
M2a	1	05Q4	S S S S S S	S S S S S S	2 2 2 2 5 5	S S 2 2 2 5	S S 5 S S 2	S S S S S 2	U U U U U U	U U U U U U	N N N T T L	T T T 5 5 5
M2a	1	08Q4	2 2 L 2 2 L	S S L S 2 L	5 5 A 5 T N	2 2 A 5 5 N	2 2 L 2 2 N	2 2 L S 2 L	U U N U U U	U U U U U U	L L T T T T	5 5 5 5 5 5
M2a	2	05Q4	H H S S 2 2	T S 2 L A N	5 T T 5 T L	T H 2 T H S	H H S S H S	T L A T L A	L L L L L L	T T T T T T	A A A A A A	N N N N N N
M2a	2	08Q4	H H H H H H	2 T 5 2 T 5	S 2 S S 2 2	S 2 5 S 2 2	H H H H H H	S 5 2 S 2 2	T T T T T T	2 2 2 5 2 T	T T T 5 T T	L A A L L L
M2a	3	05Q4	U U U U U U	-5-T U-5-T U	U U U U U U	U U U U U U	U U U U U U	-T U U-T U U	L L L N N N	A L A N N N	N N N U U U	N N N U U U
M2a	3	08Q4	U U U-5 U-T	U U U-5-T U	N N N U U U	N N N U U U	N N N U U U	U U U U U U	5 5 5 N N N	T T T N N N	N N N U U U	U U U U U U
M2a	4	05Q4	U U U U U U	U U U U-T-5	N N N N N N	N N N N N N	U U U U U U	U U U U U U	T T N L L U	L T U A L U	-T U U U U A	U U U U U U
M2a	4	08Q4	U U U-T U U	U-T-5 U-T U	A A A U U U	A A A U U U	N N N U U U	N N N U U U	5 2 L L T N	T 5 A L L U	-T U U U U U	U U U U U U
M2b	1	05Q4	S S S S S S	H H S H H S	S S 2 2 2 5	S S 2 2 2 5	S S S S S 2	H S S S S S	U U U N N N	U U U U U U	N N N 5 5 T	T A N S 5 U
M2b	1	08Q4	2 2 A 2 5 N	S S A S 2 N	5 5 L 5 5 N	2 2 L 5 5 A	2 2 T 5 5 N	S S L 2 2 N	U U U L L A	U U U N N N	A N N 2 2 2	5 L A S 5 T
M2b	2	05Q4	N N A L N L	U U U U U U	H S S H S 2	5 H S 5 H S	H S S S S 5	T A L T S S	2 2 5 2 2 5	5 5 L 5 5 L	-1-2 U-5-5 U	-T-T T-5-5-5
M2b	2	08Q4	T T T L T T	U U U U U U	H H H H H S	S H H S 2 2	H H H H S S	S S S S S S	S S S S S 2	2 2 2 2 2 2	-T-5-T U U U	-T-T N-5-5-5
M2b	3	05Q4	N N N N N N	U U U U U U	U U U U U U	U U U U U U	U U U U U U	U U U U U U	U U U-5-T-T	N N N-5-5-T	5 T L 5 T T	N N N N N N
M2b	3	08Q4	N N N N N U	U U U U U U	N N N N N N	U U U U U U	N N N N N N	U U U U U U	U U U N N N	A N N N N A	N N N A N N	U U U U U U
M2b	4	05Q4	U U U U U U	U U U U U U	U U U U U U	N N N U U U	U U U N N U	N N N N N N	U U U N N N	N N N N N N	U U U T L L	N N N N N N
M2b	4	08Q4	U U U U U U	U U U U U U	U U U U U U	U U U N N N	U U U N N U	N N U N N U	N N N L L N	N N N L L N	U U U L A A	U U U N N N
M2c	1	05Q4	S S S S S S	H H H H H H	S 2 2 2 2 5	S S S S 2 2	S S S S S 2	H S S S S S	U-5-T U-T U	U U U U U U	N N N A A A	2 2 5 S 5 N
M2c	1	08Q4	2 5 T 5 5 U	S S A 2 2 N	5 5 A 5 T N	2 2 A 5 5 N	5 5 L 5 5 N	2 2 A 2 2 N	U U U U U U	U U N U U N	A A A T T T	2 2 2 S 5 A
M2c	2	05Q4	A A A 5 L T	U U U U U U	2 5 T 2 5 T	5 H S 5 H S	2 5 T 2 5 T	L S 2 T S S	N N N N N N	A T L T L L	-1-2-5 U U U	-1-1-1-5-5-5
M2c	2	08Q4	T T T L T T	N U U U U U	H H S S H S	S H S S H S	H H S S H S	S S S S H H	L A A T L L	T T T 2 5 5	-1-2-2-T-T-T	-1-1-1-1-2-2
M2c	3	05Q4	L A N L N N	U U U U U U	U U U U U U	U U U U U U	U U U U U U	U U U U U U	-2-5-5-5-5-T	-T U U U U U	T L L T T T	U U U N N N
M2c	3	08Q4	T L A A N N	N N N U U U	N N N U U U	U U U U U U	N N N U U U	U U U U U U	U U U-T-T-T	U U U U U U	L L A 5 T T	N N N N N N
M2c	4	05Q4	N N U N N U	A A A A A A	U U U U U U	U U U U U U	U U U U U U	N N N U U U	U U U U U U	U U U U U U	-T U U U U N	U U U U U U
M2c	4	08Q4	U U U U U U	N N U N N U	U U U U U U	N N N U U U	U U U U U U	N N N U U U	N N N U U U	N N N U U U	-T-T-T U U U	U U-T U U U

Table 5.1.2 Restricted VAR Models Relating to Month *m*2 (2)

Model	Horizon	End	AR1 versus VAR2				AR1 versus VAR3		VAR2 versus VAR3			
			VAR2 with an industry variable		VAR2 with a service variable		First Result	Last Result	VAR2 with an industry variable		VAR2 with a service variable	
			First Result	Last Result	First Result	Last Result			First Result	Last Result	First Result	Last Result
M2d	1	05Q4	5 5 2 2 2 2	S S S S S 2	S S 2 2 2 2	S S S S S 2	S S 2 2 2 2	S S S S S S	N N N N N N	L L N N N N	N N N N N N	T T L T T T
M2d	1	08Q4	5 5 T 5 5 N	S S A 2 2 N	5 5 A 5 5 N	2 2 A 5 5 N	5 5 L 5 5 N	2 2 A 2 2 N	L L N L L N	T T N T T A	N N N L L T	T T T 2 2 2
M2d	2	05Q4	T L L 5 2 2	U U U U U U	5 T T 5 T L	T H S T H S	2 T T 2 S 2	A L A L N N	A L U A L U	T 5 N 5 5 N	N N N N N N	N N N U U U
M2d	2	08Q4	T T L 5 S 2	N N N N N N	S H S S 2 2	S 2 2 S 2 2	S H S S S S	2 2 2 5 S S	T T T L T N	5 2 2 2 2 2	N N N U U U	U U U U U U
M2d	3	05Q4	L A A L A A	U U U U U U	U U U U U U	U U U U U U	N U U U U U	U U U U U U	U U-T U U-T	N N U U U U	2 5 5 S 2 2	T T L 2 T 5
M2d	3	08Q4	L A A A A A	N N N U U U	N N N U U U	U U U U U U	N N N U U U	N N N U U U	N A N U U U	T T N U U U	N A A T T T	N N N A A A
M2d	4	05Q4	N N U N N U	N N U N N U	N N N N N N	N N N N N N	N N U N N U	N N U N N N	5 5 5 L T N	S S 2 T 2 2	N N N N N N	L L N L L N
M2d	4	08Q4	U U U N N U	N N U N N-T	A A A U U U	L A A U U U	N N U U U U	N N U U U U	2 2 T T S T	S S A 2 H S	U U U U U U	U U U U U U
M2e	1	05Q4	S S S S S S	S S S S S S	S S 2 2 2 2	S S S S S 2	S S S S S S	S S S S S S	N N N N N U	N T L N N N	L L T N T T	A A L A A L
M2e	1	08Q4	S S T 2 2 L	S S T S S L	5 5 A 5 5 N	2 2 L 5 5 N	2 2 L 2 2 A	2 2 L 2 2 L	L L A L L A	T T A T T L	A A A N N N	N N A N N N
M2e	2	05Q4	U U U N N N	-2-5-5-2-1-2	2 5 5 5 T T	L L L L S S	2 5 5 S 2 5	N N N L T L	S 2 2 H H S	5 T 5 2 5 2	N N N L L L	U U U N N 5
M2e	2	08Q4	U U U U U U	-T U U-5-T U	H H S S 2 2	S S S 2 5 5	H S S S S S	2 5 5 2 5 5	S S 2 S 2 2	S 2 2 2 2 2	N N N T N T	U U U N N N
M2e	3	05Q4	N N N N N N	U U U U U U	U U U U U U	U U U U U U	U U U U U U	U-T-T U U U	U U U U U U	U U U U U U	T N L 5 N L	N N N N N N
M2e	3	08Q4	N N N N N N	U U U U U U	N N N U U U	U U U U U U	N N N U U-T	U U U U U U	N N N U U U	A A N U U U	2 A T N N N	A N N U U U
M2e	4	05Q4	N N N N N N	N N N N L A	U U U U U U	N N N U U U	U U U U U U	N N N N N N	U U U U U U	U U U U U U	A N N 5 T T	N N N L A A
M2e	4	08Q4	U U U U U U	U U U U U U	U U U U U U	N N N U U U	U N U U U U	N N N N U U	N N N N N N	N N N N N N	L A A 5 T T	N L L L L A
M2f	1	05Q4	S S S S S S	S S S S S S	S S S S S 2	S S S S 2 2	H S S S S S	H S S S S S	N N N N N N	A A A N N N	N N N A A A	T T L 5 5 T
M2f	1	08Q4	S S T 2 2 L	S S T S S L	2 2 T 2 2 L	2 2 T 2 2 T	2 2 T 2 2 L	S S T 2 2 L	A A N L L N	T L A A A N	L L L T T T	5 5 T 2 2 2
M2f	2	05Q4	U U U N N N	-2-5-T-2-T-5	H S 5 S 2 T	T H S T L L	H S 2 H S 5	T H S 5 H T	S S S S S 5	5 5 T 2 5 T	L L L 5 5 2	N N 5 L L L
M2f	2	08Q4	U U U U U U	-T U U-5-T U	H H H H H S	2 H H 2 H S	H H H H S S	S H H 2 H 5	S S S S S S	2 5 5 2 2 5	T T T T T T	L L L L L L
M2f	3	05Q4	N N N N N N	U U U U U U	U U U U U U	U U U U U U	U U U U U U	U U U U U U	U U U U U U	N N N U U U	T L L T L L	U U U N N N
M2f	3	08Q4	N N N N N N	U U U-T-T U	N N U U U U	U U U U U U	N N U U U U	U U U U U U	U U U U U U	N N N N N N	T N N 5 A T	N N N N N N
M2f	4	05Q4	N N N N N N	N N N A T L	N N N U U U	A N N N N U	N N N N N N	L A N N N U	N N N N N N	N N N N N N	U U U N A N	U U U N N A
M2f	4	08Q4	U U U U U U	U U N U U U	U U U U U U	U U U U U U	U U U U U U	N N N N N N	N N N N N N	N N U N N N	U U U 5 5 5	U U U T T T

Table 5.1.3 Restricted VAR Models Relating to Month *m*3 (1)

Model	Horizon	End	AR1 versus VAR2				AR1 versus VAR3		VAR2 versus VAR3			
			VAR2 with an industry variable		VAR2 with a service variable		First Result	Last Result	VAR2 with an industry variable		VAR2 with a service variable	
			First Result	Last Result	First Result	Last Result			First Result	Last Result	First Result	Last Result
M3a	1	05Q4	H H H H H S	H H H H S 2	2 2 2 2 2 5	S S S S S S	H S S H H S	H H S H H H	-T-T-T-2-2-5	N N N U U N	2 T 2 2 2 5	S S S 2 2 S
M3a	1	08Q4	2 2 5 2 2 2	S S 5 S S 2	2 2 T 5 5 T	S S 2 S S 5	2 2 5 2 2 5	S S 5 S S 5	U U U U U U	N N N N N N	2 2 2 2 2 2	S S 2 S S S
M3a	2	05Q4	T T T T T T	N N N N N N	A A A N N N	U U U U U U	N N N N N N	U U U U U U	U U U U U U	U U U U U U	U U U N N N	U U U U-T-T
M3a	2	08Q4	A A A N N N	N N N U U U	N N N U U U	U U U U U U	N N N N N N	U U U U U U	U U U N N N	U U U N N N	U U U L L L	U U N A A A
M3a	3	05Q4	T T L T 5 T	N U U N N N	N N N N N N	N N N U U U	N N N N N N	U U U U U U	U U U-T-T-T	U U U U U U	N N N U U U	U U U U U U
M3a	3	08Q4	L A A A N N	N U U U U U	N N N N N N	N N N U U U	N N N N N N	U U U N U U	-T-T-T U U U	-T U U U U U	U U U N N N	U U U U U T
M3a	4	05Q4	N N N L A A	U U U U U U	A N N N N U	N N N N N N	N N N N N U	N N N U U U	U U-T-T U U	N N N U U U	U U U U U A	U U N U U N
M3a	4	08Q4	U U U U U U	U U U U U U	U U U U U U	U U U U U U	U U U U U U	U U U U U U	-T-T-T U U U	U U U U U U	-T-5 U U U A	-5-2 U U U N
M3b	1	05Q4	H H S H H S	H H S H H H	S S S S S S	S S S S S S	H H H H H H	H H S H H H	N N N U U U	N N A N N N	N N N N N N	T T T T T T
M3b	1	08Q4	5 5 N 5 5 L	2 2 T 2 2 5	2 2 L 5 5 N	S S T 2 2 A	2 2 L 5 5 N	S S T 2 2 T	N N N N N N	N A T L L L	L L A T T T	5 5 T 2 2 5
M3b	2	05Q4	S S S S S S	S S S 2 5 5	N A A N N N	U U U U U U	2 2 5 T L A	T L T A T T	U U U U U U	U U U U U U	2 L N 2 T N	5 A N 2 L T
M3b	2	08Q4	S 2 2 2 2 2	2 2 2 2 2 5	N N N N N N	U U U U U U	5 T T T T T	T L L T T T	U U U U U U	U U U U U U	T T T T T L	5 T T 5 5 5
M3b	3	05Q4	T L L T L L	N N N N N N	U U U U U U	U U U U U U	N N N N N N	U U U U U U	U U U U U U	U U U U U U	T T T 5 5 T	N N N N N N
M3b	3	08Q4	5 T T 5 T T	A N N N N N	N N N U U U	U U U U U U	T L L L A A	N N N N N N	U U U U U U	U U U U U U	T T T 5 5 5	N N N L L A
M3b	4	05Q4	T A A T A A	A N N A N U	U U U-T-T U	U U U U U U	N N N U U U	U U U U U U	N N N U U U	U U N U U U	A N N L L U	N N U N N U
M3b	4	08Q4	A N N A N N	N N N N N U	U U U U U U	U U U U U U	U U U U U U	U U U U U U	U U U U U U	U U U U U U	N N U A N N	U U U N N U
M3c	1	05Q4	H S S S 2 S	H H S S S S	2 2 2 5 5 T	S S S S S S	S S S S 2 2	H H S H S S	N N N N N N	2 2 2 T T A	T T L L L A	5 T T T T T
M3c	1	08Q4	5 5 T 5 5 5	5 5 5 2 2 2	2 2 T 5 5 T	S S 2 S S 5	5 5 T 5 5 5	2 2 5 2 2 2	L L L N N N	S S S 2 T T	T T 5 N N N	5 5 S T T T
M3c	2	05Q4	H 5 T H S S	H H H H H S	L L N N N N	N N N N N N	H S S S S S	S 2 2 S 2 S	U U U U U U	U U U U N N	2 5 5 S 5 2	5 L A 2 5 5
M3c	2	08Q4	S 2 2 2 2 5	S 2 5 2 2 5	N N N N N N	U U U U U U	S S 2 2 2 5	S S 2 S 2 2	-T U U N N N	-T-T-T N N N	2 2 5 2 2 2	2 2 2 2 2 2
M3c	3	05Q4	A N N N N N	N N N U U U	N N N N N N	N N N N N N	L T L L L A	L T L T 5 T	N N N N N N	N N N T L L	N N N A A A	N N N N N N
M3c	3	08Q4	T T T N N N	L L L U U U	A N N N N N	N N N N N N	5 2 5 2 5 5	5 2 2 S S S	N N N T T T	N N N 2 2 2	T L L 5 T T	L A A T T T
M3c	4	05Q4	A N N L N N	U U U U U U	N N N N N N	N N N N N N	N N N N N N	U U U U U U	U U U U U U	N N T N N N	U U U N N N	U U U U U-5
M3c	4	08Q4	L N N A N N	N N N U U U	U U U U U U	U U U U U U	U N U L L L	U U U N N N	U U U N N N	U U N N N N	N N N T T T	N N N A N N

Table 5.1.3 Restricted VAR Models Relating to <u>Month *m*3</u> (2)

Model	Horizon	End	AR1 versus VAR2				AR1 versus VAR3		VAR2 versus VAR3			
			VAR2 with an industry variable		VAR2 with a service variable				VAR2 with an industry variable		VAR2 with a service variable	
			First Result	Last Result	First Result	Last Result	First Result	Last Result	First Result	Last Result	First Result	Last Result
M3d	1	05Q4	2H22HS	SHS2HS	SSSSSS	SSSSSS	HHSHSS	HHSHHH	LLLAAA	TTTTTT	UUUNNN	NN5NNN
M3d	1	08Q4	55A22L	22T22T	22L55N	SST22A	22A55N	SST22L	TTTTTT	5LL222	NNNANL	TTTTTT
M3d	2	05Q4	55TTTT	LAAANN	NAANNN	UUUUUU	TTTA5A	ANNNNU	NNNUUU	NNNUUU	LTLL5T	AAAANN
M3d	2	08Q4	AANANN	NNNNNN	NNNNNN	UUUUUU	NNNNNN	NNNNNN	NNNNUU	NNNNNU	NNNNNN	NNNNNN
M3d	3	05Q4	LLLAAA	NNNUUU	UUUUUU	UUUUUU	NNNUUU	UUUUUU	NNNUUU	NNNNNN	TTLTLL	NNNNNN
M3d	3	08Q4	TTTTTT	NNNNNN	NNNUUU	UUUUUU	TLLNNN	NNNNNN	NNNUUU	NNNNNN	5TT5TT	LANLLA
M3d	4	05Q4	LAALAA	NNNNNU	UUU-T-TU	UUUUUU	NNNUUU	UUUUUU	NNNUUU	NANUUU	NNNNNN	NNNUUU
M3d	4	08Q4	NNNNNN	UUUNNN	UUUUUU	UUUUUU	UUUUUU	UUUUUU	NNNUUU	AAANNN	NNNNNN	UUUUUU
M3e	1	05Q4	225555	222222	SSSSSS	SS2S22	SSSSS2	SSSSS2	TNNTTT	2L5SSS	ANNAAA	AAAAAA
M3e	1	08Q4	55N55N	55L22T	22N55N	22T22T	55N55N	22L22T	5TL555	S5SSSS	555222	555225
M3e	2	05Q4	TS5TTT	LAAANN	SSSSSS	HSSSSS	SSSSS2	HSSSSS	55TT5T	2S2222	NNNNNN	NNNUUU
M3e	2	08Q4	LLLLLL	ANNANN	SSSSSS	HHTHHT	SSTSS5	SSTSS5	222SS2	SSTSS5	AAANNN	AAAUUU
M3e	3	05Q4	LLLAAA	NNNNNN	ANNNNN	NNNNNN	ANNNNN	NNNUUU	NNNNNN	NNNNNN	UUUNUU	UUUUUU
M3e	3	08Q4	TTTTTT	AAAANN	TTTNNN	ANNNNN	TTTAAA	AAANNN	LTTUUU	LAAUUU	AAALLL	NAAAAA
M3e	4	05Q4	TNNTNN	NNNNNU	NNNNNN	UUUUUU	NNNNNN	UUUUUU	NNNUUU	NNNUUU	-2-T-T-1-1-2	-TUU-2-5-5
M3e	4	08Q4	NNNNNN	UUUUUU	LNNNNN	NNNUUU	LNNNNN	NNNUUU	AANUUU	NANUUU	UUU-1-1-1	UUU-2-2-2
M3f	1	05Q4	HSSS2S	HHSSSS	SSSSSS	S222HS	SSSSSS	SSSSHH	-T-TUUUU	UUUUUU	NNNAAA	NNNTTT
M3f	1	08Q4	55T555	555222	22N55N	22T22T	55A55T	22T552	UUUUUU	UUUUUU	NNNNNN	LLLLLL
M3f	2	05Q4	H5THSS	HHHHHS	SSSSS2	SSSSSS	SSSSSS	S22225	NNNNNN	NNNUUU	NNNLAA	NNNUUU
M3f	2	08Q4	S22225	S25225	SSSSSS	HHTSST	SST225	SST225	NNNNNN	NNNUUU	LAALAT	AAANNN
M3f	3	05Q4	ANNNNN	NNNUUU	NNNNNN	NNNUUU	ANNNNN	NNUNNN	UUUNNN	UUUNNN	UUUNNN	UUUNNN
M3f	3	08Q4	TTTNNN	LLLUUU	TTTNNN	NNNNNN	TTTNNN	LAANNN	NNNNNN	NNNNNN	NNNNNN	NNNNNN
M3f	4	05Q4	ANNLNN	UUUUUU	NNNNNN	UUUUUU	NNNNNN	UUUUUU	UUUUUU	UNNNNN	UUUUUU	UUUUUU
M3f	4	08Q4	LNNANN	NNNUUU	LNNNNN	UUUUUU	LNNNNN	NNNUUU	NNNUUU	NNNUUU	UUUUUU	NNNUUN

Table 5.1.4 Restricted VAR Models Relating to <u>Month *m*4</u> (1)

Model	Horizon	End	AR1 versus VAR2				AR1 versus VAR3		VAR2 versus VAR3			
			VAR2 with an industry variable		VAR2 with a service variable				VAR2 with an industry variable		VAR2 with a service variable	
			First Result	Last Result	First Result	Last Result	First Result	Last Result	First Result	Last Result	First Result	Last Result
M4a	1	05Q4	H H H H H H	H H S H H S	S S 2 S S S	S S S S S S	H H S H H S	S S S S S S	5 5 T A N N	2 2 2 T T T	T T L T T T	5 T A 5 T N
M4a	1	08Q4	S S N S S N	S S T S S 5	2 2 A 2 2 N	S S L S S N	S S N S S L	S S T S S S	5 5 5 N N N	2 2 2 N N N	5 5 5 T 2 2	S S 2 2 5 L
M4a	2	05Q4	T S 2 5 2 5	5 T T 5 5 T	2 2 2 2 2 2	5 L L S S 2	5 S S 5 5 5	5 5 T 5 5 5	N N N U U N	A T L L S 2	U U U N N N	N N N N N N
M4a	2	08Q4	2 S S 2 S S	2 2 2 S 2 2	S S S S S S	S S 2 H S S	2 S S 2 S S	S 2 2 S 2 2	N N N A L L	N A N T 2 2	N N N N N N	A A A A A N
M4a	3	05Q4	L L L T T L	N N N N N N	5 5 T T N N	T L L T T T	2 5 5 2 5 5	T T T T L L	S 2 5 5 T A	S 2 2 S 5 5	U U U U U U	U U U U U U
M4a	3	08Q4	5 T T L A A	L A N N N N	S S 2 2 L A	2 2 5 2 5 5	S 2 2 S S S	2 5 5 2 2 2	S S S S S S	H S S S S S	N N N N N N	N N N U U U
M4a	4	05Q4	A N N A N N	N N N N N N	N N N U U U	U U U U U U	U U U U U U	U U U U U U	N N N N N N	N N N N N N	-5-T-T U U U	-T-T-T U U U
M4a	4	08Q4	N N N N N N	U U U U U U	N N N U U U	U U U U U U	U U U U U U	U U U U U U	L T N L T L	L T L N N N	-T-T-T U U U	-5-5-5 U U U
M4b	1	05Q4	H H S H H S	S 2 L H H S	S S S S S S	S S S S S S	H S S H H S	H H S H H S	L L L U U U	5 5 5 T L L	S 2 5 S S S	S S S S S 2
M4b	1	08Q4	2 2 N S S T	S S T S S 5	S S L S S T	S S 5 S S 5	S S L S S T	S S T S S T	L L L N N U	5 5 5 T T T	5 5 5 S S 2	S 2 2 S S S
M4b	2	05Q4	H S 2 H S S	S H S S H S	2 S 2 T 5 A	S 2 2 2 S 2	H S S H S S	S S 2 S H S	2 2 2 L L L	T T T A L L	S 2 5 S 5 N	2 T N 2 T N
M4b	2	08Q4	S S L S S L	S S T S S T	S S S 2 S T	S S S S S S	S S T 2 2 T	S S T S S T	N N N 5 5 5	N N N L 5 5	2 2 5 2 2 5	2 2 2 2 2 2
M4b	3	05Q4	S S L S S L	5 S S 5 T U	2 5 5 T T L	5 5 T T L L	S S S 5 5 5	S S 2 S T T	2 S 5 N N N	S 5 5 N N N	5 T T T L L	T T T L A A
M4b	3	08Q4	5 5 A 2 2 L	5 5 L 2 5 T	S S 2 2 2 5	S 2 2 S 2 5	2 2 T 2 2 T	2 2 T S 2 2	2 S 2 N N N	2 5 5 A N N	5 5 L T L L	5 5 5 L L L
M4b	4	05Q4	T L L T L A	N N N N N N	N N U U U U	U U U U U U	T A N N N N	N N N U U U	U U U U U U	N U U U U U	L L A A S 2	N T T N N N
M4b	4	08Q4	5 T T L A A	A N N U N N	U U U N N N	U U U U U U	5 T L A N N	N A L U U U	U U U U U U	U U U U U U	5 5 5 L S 2	T T T N A L
M4c	1	05Q4	H H S H H H	H H S H H S	S S S S S S	S S S S S S	H H S H H H	H H H H H S	A A N U U-T	5 5 5 L L L	S 5 T S 2 2	S 5 T S S 2
M4c	1	08Q4	5 5 L 5 5 L	2 2 T 2 2 5	S S L S S T	S S 5 S S 5	2 2 L 2 2 N	S S T S S L	A T T N N N	5 T T T T T	5 5 2 5 5 S	5 5 2 5 5 S
M4c	2	05Q4	H S S H H H	H S A H S T	5 5 5 L L N	2 2 5 5 2 5	H H S H H S	H S N H S T	S S S N N N	5 2 L U U U	S 2 5 H S S	S 2 2 H S 2
M4c	2	08Q4	2 2 T 2 2 T	S 2 T 2 2 T	2 5 5 T T T	2 2 2 2 2 2	2 2 2 2 5 2	2 2 T 2 2 5	N U U U U U	N U U U U U	5 5 2 2 2 2	2 2 5 5 5 2
M4c	3	05Q4	T T T T S 5	L A A A N N	5 5 5 L L L	5 5 T T L L	2 5 5 L L L	H S 2 T 2 5	S 2 S N N N	S S 5 T L L	L L L A A A	T T T A A A
M4c	3	08Q4	T T A 5 5 A	T L L T T L	2 5 5 T L L	2 5 5 T T T	2 5 T 5 5 T	2 5 2 5 5 5	2 5 2 T L L	2 2 2 5 5 5	L L L T T N	T T L T T N
M4c	4	05Q4	T L L L A A	U U U U U U	N N U U U U	U U U U U U	L N N N N N	N N N U U U	N N U U U U	N N U N N U	N N N N N N	N N N U U N
M4c	4	08Q4	N N N N N N	U U U U U U	U U U U U U	U U U U U U	N N N N N N	U U U U U U	N N N U U U	N N U N N U	T T T 5 5 5	L L L A A A

Table 5.1.4 Restricted VAR Models Relating to <u>Month *m*4</u> (2)

Model	Horizon	End	AR1 versus VAR2				AR1 versus VAR3		VAR2 versus VAR3			
			VAR2 with an industry variable		VAR2 with a service variable				VAR2 with an industry variable		VAR2 with a service variable	
			First Result	Last Result	First Result	Last Result	First Result	Last Result	First Result	Last Result	First Result	Last Result
M4d	1	05Q4	H H S H H S	S 2 L H H S	S S 2 S S S	S S S S S S	H H S H H S	H H S H H S	S S S 5 T T	S S 2 S S T	S S S H S S	S H S S H S
M4d	1	08Q4	2 2 N S S T	S S T S S 5	2 2 A 2 2 N	S S L S S N	2 2 L 2 2 5	S S T S S T	S S S 5 5 5	S 2 2 S S S	2 2 2 S S S	S S S S S S
M4d	2	05Q4	H S 2 H S S	S H S S H S	2 2 2 2 2 2	5 L L S S 2	H S 2 H S S	S S 2 S 2 5	U U U N L T	U U U N N N	2 5 5 S S 2	5 5 5 2 5 5
M4d	2	08Q4	S S L S S L	S S T S S T	S S S S S S	S S 2 H S S	S S T S S T	S S S S S 5	U U U N N N	-5 U U N N N	5 5 T 2 2 2	2 2 5 2 2 5
M4d	3	05Q4	S S L S S L	5 S S 5 T U	5 5 T T N N	T L L T T T	S S S S S S	5 5 5 2 5 5	T 5 T 2 H S	L A A 5 S S	5 T T 2 2 2	L 2 5 T S 2
M4d	3	08Q4	5 5 A 2 2 L	5 5 L 2 5 T	S S 2 2 L A	2 2 5 2 5 5	2 2 A S S T	2 2 T S S S	5 T T S S S	L A A S S S	T T A 2 2 L	T T A 5 5 L
M4d	4	05Q4	T L L T L A	N N N N N N	N N N U U U	U U U U U U	T A A T A A	U N N U U N	U U U-T U N	U U U-2-T N	L A A T T T	N N N N N N
M4d	4	08Q4	5 T T L A A	A N N U N N	N N N U U U	U U U U U U	2 T T 5 L L	N A T N N N	U U U N N N	U U U U U U	5 5 T 5 5 T	T T T L A A
M4e	1	05Q4	H H H H H H	H H S H H S	H H S H H S	H H S H H S	H H H H H H	H H H H H H	L A A N N N	L L L T 2 5	S S 2 2 2 2	S S S S S T
M4e	1	08Q4	S S N S S N	S S L S S N	S S L 2 2 T	S S 5 S S 5	S S A S S L	S S 5 H H S	T T T N N N	T T T N L T	S S S 2 T L	H H H S S S
M4e	2	05Q4	5 5 5 2 2 5	2 S 2 2 S S	H H S H S S	H S T H H H	H 2 A H 5 N	H 5 N H 5 N	2 H S 5 S S	2 H S 2 H S	N L A N N N	T 5 5 T A T
M4e	2	08Q4	S S 2 2 2 2	S H S S S S	S S T S S L	S S T S S L	S S L S S T	S S T S S T	2 2 T 2 5 T	S 2 T 2 2 T	T 5 5 N N N	2 S 2 L T T
M4e	3	05Q4	A A A T L L	A T N A L A	A T L N T L	U U U U U U	A A N N N N	N N U N N U	U U U-5-5 U	-5-5-5-5-2-T	U U U U U U	U U U U U U
M4e	3	08Q4	5 T T 5 T T	T T L L T L	T T L A T L	A N N N N N	T T A T T T	L L A N N N	N N N U U U	U U N U U U	N N N N N N	N N N N N N
M4e	4	05Q4	A N N L A N	A N N T N N	U U U U U U	U U U U U U	N N N N N N	U U U U U U	N N N U U U	U U U U U U	U U U U U U	U-T-T U U U
M4e	4	08Q4	A N N N N N	N N N N N N	N N N N N N	U U U U U U	L N N N N N	U U U U U U	A A A N N N	N N N U U U	N N N U U U	U U U U U U
M4f	1	05Q4	H H H H H H	H H H H H H	S S 2 S S S	S S S S S S	H H H H H H	H H S H H S	L A A N N N	T T T N N N	S 2 2 2 2 5	S H H S H S
M4f	1	08Q4	S S N S S N	S S T S S 5	2 2 A 2 2 N	S S L S S N	S S A S S 5	S S T S S 5	L L L N N N	T L L A A A	S S S S H S	S S S H H S
M4f	2	05Q4	H S 2 H S S	S H S H H S	2 2 2 2 2 2	5 L L S S 2	S S S S S S	S S 2 S S S	N N U N N U	U U U N N N	5 T T 2 5 5	5 5 5 2 5 5
M4f	2	08Q4	H S S H H S	H H H H H H	S S S S S S	S S 2 H S S	H S S S S S	S S S S S S	U U U U U U	U U U U U U	2 2 5 5 2 T	2 2 2 2 5 5
M4f	3	05Q4	T T T T T T	T T T T T L	5 5 T T N N	T L L T T T	S H T 2 S T	S S S S S 2	S 2 2 S T T	A A A L L A	N N N N N U	N N N N N U
M4f	3	08Q4	5 5 L 2 5 5	5 T L 5 5 T	S S 2 2 L A	2 2 5 2 5 5	S 2 2 S 2 2	2 5 5 S 2 2	2 2 2 S S S	A A A 2 2 5	A A N L L N	N N N L L N
M4f	4	05Q4	2 T T 5 T T	5 L A T A A	N N N U U U	U U U U U U	L N N N N N	N N N U U U	U U U U U U	U-T U U U U	N N N N N N	N N N N N N
M4f	4	08Q4	5 T T L A A	L N N N N N	N N N U U U	U U U U U U	L A A L A A	U U U N N N	U U U N N N	U U U U U U	N N U L A N	N N U N N N

Table 5.1.4 Restricted VAR Models Relating to Month *m*4 (3)

Model	Horizon	End	AR1 versus VAR2				AR1 versus VAR3		VAR2 versus VAR3			
			VAR2 with an industry variable		VAR2 with a service variable				VAR2 with an industry variable		VAR2 with a service variable	
			First Result	Last Result	First Result	Last Result	First Result	Last Result	First Result	Last Result	First Result	Last Result
M4g	1	05Q4	H H H H H H	H H H H H S	2 S S 2 2 2	S H S S H S	H H H S S S	H H S H H H	N N A N N N	L L L N N N	S S S 2 2 5	S S S 5 5 5
M4g	1	08Q4	S S S S S S	S S S S S S	2 2 A 5 5 N	S S T S S N	2 2 5 2 2 2	S S 2 S S S	L L L N N N	5 5 T A A A	2 2 S 2 S 2	S S S 2 2 2
M4g	2	05Q4	H S S H H S	S 2 2 S S 5	5 L N 5 L N	L S N T S A	S 2 2 S 5 A	S H T S H H	N N N U U U	N N N N N N	S S 2 2 5 5	2 T T 2 5 T
M4g	2	08Q4	H H S H H S	S S S S S S	2 5 5 S 2 2	5 S L S S 2	S S S S S 2	S 5 T S S S	N N N A A N	N N N A A A	S 2 2 5 5 5	S 2 2 2 5 5
M4g	3	05Q4	L L L 5 T T	N N N N N N	L L L N N N	N N N N N N	L L L A L A	N N N N N N	T 5 T A A A	5 T T T L L	N N N N N N	N N N N N N
M4g	3	08Q4	L L L T T T	N N N N N N	2 5 5 5 T T	A A A A N N	2 5 5 2 5 5	L A A L L L	2 S T 5 5 L	2 2 2 5 5 5	N N N A L A	N N N N N N
M4g	4	05Q4	5 T T 2 5 T	N N N N N N	N N N U U U	U U U U U U	N N N U U U	U U U U U U	N N U U U U	N N N U U U	N N N U U U	N N N-T-5-5
M4g	4	08Q4	L L L L L L	N N N N N N	U U U U U U	U U U U U U	N N N N N N	U U U U U U	N N N U U U	N N N U U U	L L L N N N	T L L U U U
M4h	1	05Q4	H H H H H H	H H H H H H	S S S S S S	S S S S S S	H S T H H H	H H S H H H	N N N N N N	S H H 5 5 5	S S S S S S	H H H H H H
M4h	1	08Q4	S S N 2 2 N	S S L S S A	S S L S S T	S S 5 S S 5	S S A S S N	S S T S S T	N N N N N N	S S 2 2 2 5	S S S S S 5	H H S H H S
M4h	2	05Q4	S S S S S S	S H S S H S	2 2 2 T 5 A	2 2 2 2 2 2	S S S S S S	S S 2 S S S	L A A N N N	N N N N N N	5 T T 5 5 T	5 5 5 2 5 5
M4h	2	08Q4	S S S S S S	H H H H H H	2 2 2 5 5 5	S S 2 S S 2	S S S S S S	S S S H S S	U U U U U U	U U U U U U	S 2 2 2 2 2	S S 2 S S 2
M4h	3	05Q4	T T T T T T	T T T L L L	2 5 5 T T T	5 5 5 5 T T	S 2 2 5 T T	H H S S H S	S 2 5 5 T T	5 T T T T L	N N N N N N	A L N N A A
M4h	3	08Q4	5 T A 5 5 T	T T L T T T	S 2 2 T T T	S 2 2 5 T T	S 5 5 5 T T	S 5 5 2 5 T	N N N N N N	N N N N N N	N N N N N N	N N N N N N
M4h	4	05Q4	2 T T 5 T T	5 L L T A A	N N U U U U	U U U U U U	L N N N N N	N N N N N N	-T U U U U U	U-T-T U-T-T	N N-T N N N	L A A N N N
M4h	4	08Q4	2 T T L A A	L A A N N N	U U U U U U	U U U U U U	N N N N N N	U U U U U U	-5-5-5-T U U	-T-5-5-T-T-T	N N U U U U	N U-5 U U U
M4i	1	05Q4	H H S H H H	H H S H H S	S S 2 S S S	S S S S S S	H H S H H H	H H S H H S	5 S S T S 2	2 5 5 5 5 5	2 2 2 S S S	S S 2 2 S 2
M4i	1	08Q4	5 5 L 5 5 L	2 2 T 2 2 5	2 2 A 2 2 N	S S L S S N	2 2 T 5 5 L	S S T 2 2 L	5 5 5 T S 2	5 T A 2 5 5	5 5 2 S S S	5 5 2 2 2 2
M4i	2	05Q4	H S S H H H	H S A H S T	5 5 5 T T T	T A L 5 H S	H S S H H S	H 2 N H S L	L L L N N N	N N L N N N	S 2 5 H S S	S 2 5 S S 2
M4i	2	08Q4	2 2 T 2 2 T	S 2 T 2 2 T	S 2 2 S S 2	2 2 2 S S S	2 2 2 2 2 S	2 2 5 2 2 5	U U U U U U	U U U-T U U	5 T 5 5 5 S	5 5 T 5 5 2
M4i	3	05Q4	T T T T S 5	L A A A N N	T T T L 5 T	L A A L A A	5 T T T T T	5 T L T L L	2 T 5 T T A	2 S 2 5 T A	N N N T T T	N N N A T T
M4i	3	08Q4	T T A 5 5 A	T L L T T L	S 2 2 5 T T	5 5 5 T T T	5 5 L 2 2 L	T T T 5 5 T	S S S S 2 2	2 H H S 2 2	A A N T T N	A A N T T N
M4i	4	05Q4	T L L L A A	U U U U U U	N N N U U U	U U U U U U	N N N U U U	U U U U U U	U U U U U U	N N N U U U	U U N U U U	U-2-5-T U N
M4i	4	08Q4	N N N N N N	U U U U U U	N N N U U U	U U U U U U	A N N N N N	U U U U U U	N N N U U U	N N N U U U	N N N A N N	U U U U U A

Table 5.1.4 Restricted VAR Models Relating to <u>Month *m*4</u> (4)

Model	Horizon	End	AR1 versus VAR2				AR1 versus VAR3		VAR2 versus VAR3			
			VAR2 with an industry variable		VAR2 with a service variable		First Result	Last Result	VAR2 with an industry variable		VAR2 with a service variable	
			First Result	Last Result	First Result	Last Result			First Result	Last Result	First Result	Last Result
M4j	1	05Q4	H H H H H H	H H H H H H	S S S S S S	S S S S S S	H S T H H H	H H S H H S	N N N N N N	2 2 2 2 2 5	2 2 2 S S 2	H H H H H H
M4j	1	08Q4	S 2 N 2 2 N	S S L S S L	S S L S S T	S S 5 S S 5	S S A S S A	S S T S S T	A A N A N N	S S S 2 2 2	S S S S S S	S S S S S S
M4j	2	05Q4	H S S H H S	S H S H H H	2 2 2 T 5 A	2 2 2 2 2 2	H S S S S S	H S S H S S	N N U N N N	U U U U U U	2 5 5 S 2 2	2 2 5 S S 2
M4j	2	08Q4	S S S S S S	H S S H S S	2 2 2 5 5 5	S S 2 S S 2	S S S S S S	H S S H S S	U U U U U U	U U U U U U	S H S 2 2 5	S S S S S 2
M4j	3	05Q4	2 5 5 5 5 T	2 5 T T T T	2 5 5 T T T	5 5 5 5 T T	S 2 2 5 5 5	H H S S H S	2 5 2 5 L T	T T T T T L	L L L T L L	T T T 5 T T
M4j	3	08Q4	5 5 L 2 5 5	5 5 L 5 5 T	S 2 2 T T T	S 2 2 5 T T	S 2 5 2 5 5	S 2 5 S S S	N N N N N N	N N N N N N	N N N N N N	A N N A N N
M4j	4	05Q4	2 T T 5 T T	T A A L N N	N N U U U U	U U U U U U	L N N N N N	N N N N N N	-T U U U U U	U U U U U U	N N N N N N	L N N N N N
M4j	4	08Q4	2 T T T L L	A N N N N N	U U U U U U	U U U U U U	N N N N N N	U U U U U U	-T-T-T-T U U	U-T-T-T-T-T	U U U U U U	U U U U U U
M4k	1	05Q4	H H H H H H	H H H H H S	S S 2 2 2 2	S S S S S S	H H H H H S	H H H H H H	U U U U U U	5 5 5 A A A	S S S 2 2 2	H H H S S 2
M4k	1	08Q4	S S S S S S	S S S S S S	S 2 L 2 2 A	S S 5 S S 5	S S 2 2 2 2	S S 2 S S 2	N N N N N N	2 2 2 T T T	S S S S S S	S S S S S 2
M4k	2	05Q4	H S S H H S	S 2 2 S S 5	5 5 5 T T T	5 T T 5 S A	H S S 2 T 5	S S 5 2 H L	U U U U U U	N N N U U U	2 S 2 T L T	S H S 5 2 5
M4k	2	08Q4	H H S H H S	S S S S S S	5 T T T T T	5 T T 5 S L	2 2 5 S 2 2	S 2 2 S H 5	U U U U U U	U U U U U U	L A A 5 5 5	5 T T 2 2 2
M4k	3	05Q4	L L L 5 T T	N N N N N N	L L L A N N	N N N N N N	T T T A A A	A L N N N N	T T T N N N	T T T N N N	N N N U U U	N N N U U U
M4k	3	08Q4	L L L T T T	N N N N N N	5 T T L A A	A A A N N N	A A A L L L	N N N N N N	U U U N N N	N N N N N N	U U U U U U	U U U U U U
M4k	4	05Q4	5 T T 2 5 T	N N N N N N	N N N U U U	U U U U U U	A N N N N N	N N N U U U	N N U U U U	N N N U U U	N N N U U U	N U N-5 U U
M4k	4	08Q4	L L L L L L	N N N N N N	U U U U U U	U U U U U U	U U U N N N	U U U U U U	U U U U U U	U U-T U U U	U U U N N N	U U U U U U

Table 5.1.4 Restricted VAR Models Relating to Month *m*4 (5)

Model	Horizon	End	AR1 versus VAR2				AR1 versus VAR3		VAR2 versus VAR3			
			VAR2 with an industry variable		VAR2 with a service variable		First Result	Last Result	VAR2 with an industry variable		VAR2 with a service variable	
			First Result	Last Result	First Result	Last Result			First Result	Last Result	First Result	Last Result
M4I	1	05Q4	H H S H H H	H S T H H H	S S S S S S	H H S H S S	H H H H H H	H H H H H H	U U U U-2-5	T T L N H S	S S 5 5 5 L	H H S 2 2 L
M4I	1	08Q4	S S 2 S S 5	S S 2 S S S	2 2 N 5 5 N	S S T S 2 L	2 2 T 2 2 5	S S 5 S S 2	N N N N N N	5 5 5 T T T	S S S 2 5 5	S S S 2 2 2
M4I	2	05Q4	H S S H S S	S S 5 S S S	H 5 T H S S	H 2 T H S T	H 5 T H S S	H 2 T H S T	S S 2 2 2 T	S S S 2 S 2	5 5 T T T T	2 2 5 T 2 5
M4I	2	08Q4	H H H H S S	H S S H S S	S S A 2 2 A	S S A S S N	S S A S S L	S S A S S A	2 2 T 2 2 L	S S 5 S S T	S S S 2 2 2	S S S S 2 2
M4I	3	05Q4	L A A A N N	N N N N U U	A T L N L N	U U U U U U	N L A N N N	U U U U U U	N N N U U U	U U U U U U	5 5 5 N N N	S T 2 L L L
M4I	3	08Q4	T T T T 5 T	N N N N N N	T T L N A N	N N N U U U	5 5 L N A N	A N N U U U	T T L N U U	A N N U U U	S S S A T T	S H S 5 H S
M4I	4	05Q4	5 L A T A A	N N N U U U	N N N N N N	U U U U U U	N N N N N N	U U U U U U	N N N U U U	N N N U U U	T T T A A A	N A A N N N
M4I	4	08Q4	T L L N N N	N N N U U U	L A A N N N	N N N N N N	5 T T N N N	N N N U U U	A A A N N N	A A A N N N	5 2 2 N N N	L A A N N U
M4m	1	05Q4	H H S H H H	H S T H H H	S S 2 2 2 2	S S S S S S	H H S S S S	H H H H H S	-T-2 U U-2-5	N N N N N N	S S S 2 2 2	S S S S 2 2
M4m	1	08Q4	S S 2 S S 5	S S 2 S S S	2 2 N 2 2 N	S S L S S L	2 2 T 2 2 T	S S 2 S S 2	U U U U U U	A A A A T T	S 5 T S T T	S H S S S S
M4m	2	05Q4	H S S H S S	S S 5 S S S	H S S S S S	H H H H H S	H H S S S S	H H H H H S	T 5 T T 5 L	T 5 L T T T	T L T 5 5 5	T L T 2 5 5
M4m	2	08Q4	H H H H S S	H S S H S S	2 S L 2 2 L	S S L S S L	S S L S S L	S S L S S L	5 5 L 5 5 L	5 2 T 5 2 T	S 2 5 S S S	S S S S 2 5
M4m	3	05Q4	L A A A N N	N N N N U U	5 T T T T T	L T N N N N	5 T T T L L	L L N N N U	T L L N 2 2	N A A N N N	N U U U U U	N N N U U U
M4m	3	08Q4	T T T T 5 T	N N N N N N	5 5 L 5 5 T	T T L T T L	2 5 T 2 2 5	T T T T T T	T T L T T L	T T L L T A	U U U U U U	U U U U U U
M4m	4	05Q4	5 L A T A A	N N N U U U	N N N N N N	U U U U U U	L N N N N N	U U U U U U	N N N N N N	U U U U U U	L L L N N N	N N N U U U
M4m	4	08Q4	T L L N N N	N N N U U U	L A A T L L	N N N N N N	5 T T 5 T T	N N N N N N	A N N L L L	N N N N A N	A T 5 N N N	N A T U U U

5.2) Univariate Multistep Models

Conventions and sources relating to all tables in Appendix 5.2:

First column: the industry and service variables included in every model are detailed in Appendix 3.2 above.

Last six columns: results of the 3 tests carried out on recursive estimations (first 3 results) and rolling estimations (last 3 results). For a set of 3 results, the first one refers to the test made using the Newey-West variance estimations, the second one to the test resulting from the AUTOREG procedure, the last one to the test derived from the Durbin approach. The classifications of the results are explained at the end of sub-section II.3. A negative sign preceding a result means that the corresponding test statistic is significantly negative, i.e. that the larger model performs significantly less well than the more parsimonious model. No negative sign: the test statistic is either positive, or non-significantly negative. Grey tints: same as in appendix 5.1 above.

Sources: French quarterly accounts and industry and service surveys. Authors' calculations.

Table 5.2.1 Univariate Models Relating to Month *m*1 (Weighted Service Balances)

Model	Forecast	End	AR 1 vs. Industry		AR 1 vs. Industry + Services		Industry vs. Industry + Services	
			1st result	Last update	1st result	Last update	1st result	Last update
M111	1	05Q4	5 5 5 S S 2	S S 2 H S S	5 T T S 2 5	S S 5 H S S	T H S T S L	2 2 5 2 2 2
	1	08Q4	T T 2 T T A	5 5 5 5 5 N	T T 5 T T A	5 5 T 5 5 A	N N N U U U	T T T L L L
M121	2	05Q4	U U U U U U	U-T-T U-5-T	U U U U U U	U U U U U U	N N N U U U	N N N N N N
	2	08Q4	N N N N N N	N N U U U U	N N U N N U	U U U U U U	U U U U U U	U U U U U U
M131	3	05Q4	U U U N N N	U U U U U U	U U U N N N	U U U N N N	U U U U U U	N N N A A A
	3	08Q4	U U U U U U	-5-T-T U U U	N N N A A N	N N U A A N	N N N A A A	L L L T T T
M112	1	05Q4	S 2 T S S 5	S T A S T A	L L L 5 T 5	2 5 5 S 2 5	S 2 2 H S S	S 2 2 S 2 2
	1	08Q4	T T 5 T T L	T 5 L T 5 A	N N A A A 5	A A A L L T	N N N N N N	N N N N N N
M122	2	05Q4	U-T U-T-T-T	U-1-1-T-1-1	U U U U-5 U	U U U U-T-T	N N L N N N	A L L A 2 T
	2	08Q4	N N N N N N	N N N N N N	U U N U U N	N N U N N N	U U U U U U	U U N U U U
M132	3	05Q4	S 2 2 S 2 2	N N N A N N	N N N N N N	U N U U U U	-1-5-5-1-2-5	U U U U U U
	3	08Q4	2 2 5 5 2 5	L L N L T L	L L 5 L L L	N N U N N N	U U U U U U	U U U U U U

Table 5.2.2 Univariate Models Relating to Month *m*1 (Non-Weighted Service Balances)

Model	Forecast	End	AR 1 vs. Industry		AR 1 vs. Industry + Services		Industry vs. Industry + Services	
			1st result	Last update	1st result	Last update	1st result	Last update
M1110	1	05Q4	5 5 5 S S 2	S S 2 H S S	T L T T T T	S 2 2 S S 5	A A A N S S	5 5 5 5 S S
	1	08Q4	T T 2 T T 5	5 5 5 5 5 L	T T 5 T T T	5 5 T 5 5 L	T T T A 5 5	2 2 2 S 2 L
M1210	2	05Q4	U U U U U U	U-5-T U-5-T	U U U U U U	U-T-T U-5-T	T T L L L A	5 L N 5 L N
	2	08Q4	N N N N N N	N N U U U U	N N U N N U	N N U N N U	L N N A N N	T A N T A N
M1310	3	05Q4	U U U N N N	U U U U U U	U-T-T U-T-T	U U U U U U	U U U U U U	N N N N N N
	3	08Q4	U U U U U U	-5-T-T U U U	-5-2-2-5-2-2	-5-2-2-T-5-5	U U U U U U	N N N N N N
M1120	1	05Q4	2 5 5 S 2 5	S S 2 S S 2				
	1	08Q4	T T 5 T T T	5 5 T 5 5 L				
M1220	2	05Q4	-T-T U-T-T-T	-T-1-1-5-1-1	U U U-T U U	U U U U U U	T T L N N N	2 5 2 T T L
	2	08Q4	N N N N N N	N N N N N N	N N N U N U	N N N N N U	N N N U N N	A A A U N N
M1320	3	05Q4	S 2 2 S 2 2	N N N A N N	2 5 5 N N N	T L N N N N	2 L L U U U	H H S 5 T A
	3	08Q4	2 2 5 5 2 5	L L N L T A	5 5 5 A A A	T L L N A A	N N U U U U	T T T N N N

Table 5.2.3 Univariate Models Relating to Month *m*2 (Weighted Service Balances)

Model	Forecast	End	AR 1 vs. Industry		AR 1 vs. Industry + Services		Industry vs. Industry + Services	
			1st result	Last update	1st result	Last update	1st result	Last update
M211	1	05Q4	S H S H S 2	L 2 2 A 2 2	2 5 T S 5 T	A 5 5 A 2 5	T T T T T T	L L L L L L
	1	08Q4	L 5 N L 5 T	L 5 N A 5 A	L T 2 A T 5	L 5 N A 5 L	U U U A A A	N N N L L A
M221	2	05Q4	U U U U U U	-5-5 U-5-5-T	A A N A A N	U U A U U N	5 5 T T T T	5 5 T L T 5
	2	08Q4	U U U U U U	-2-2-5-2-2-2	U U U U U U	-T-T-T-T-T-T	U U U U U U	U U U U U U
M231	3	05Q4	U U U U U U	U-T- U U U	U U- U U U	U U U U U U	U U- U U U	N N- N N U
	3	08Q4	U U U N N N	U U U U U U	U U U U U U	U U U U U U	U U U U U U	U U U N N U
M212	1	05Q4	5 5 5 S 2 T	N T U N T T	L T T S H T	N L L N T T	S S 5 2 2 5	2 2 5 5 H S
	1	08Q4	A T N A 5 N	A T A A T N	A T S A T 2	A L A A T L	N N N N N N	N N U N N N
M222	2	05Q4	-T-T-T-T-T-T	U U U U U U	N N N U U U	N N N U U U	T L L L L A	5 T T T T T
	2	08Q4	N U U N U U	N U U N U U	U U U U U U	U U U U U U	N N N N N N	L T L N A A
M232	3	05Q4	U U U U U	U U U U U U	U U U U U	U U U U U U	5 S 5 5 T T	S 2 5 L A T
	3	08Q4	N A A N A N	N N L N N N	A A A A A A	N N A N N N	N N N 2 2 5	L L L T T T

Table 5.2.4 Univariate Models Relating to Month *m*2 (Non-Weighted Service Balances)

Model	Forecast	End	AR 1 vs. Industry		AR 1 vs. Industry + Services		Industry vs. Industry + Services	
			1st result	Last update	1st result	Last update	1st result	Last update
M2110	1	05Q4	S H S H S 5	L 2 2 A 2 2	2 2 T S 2 T	N L L N L L	L A A L S S	N N N N S N
	1	08Q4	L 5 N L 5 U	L 5 N A 5 N	L 5 T A 5 A	A T A A T N	5 5 T T 5 N	N N N N 5 N
M2210	2	05Q4	U U U U U U	-5-5 U-5-5 U	U U N U U N	U U N U U U	U U U N N N	T T T 5 5 T
	2	08Q4	U U U U U U	-2-2-5-2-2-2	U U U U U U	-5-T-T U U U	U U U U U U	N N N A A A
M2310	3	05Q4	U U U U U U	U U U U U U	U U U U U U	U U U U U U	U U-T-5-T-T	N N N U U U
	3	08Q4	N N N N N N	U U U U U U	U U U U U U	U U U U U U	-T-T-T-5-T-5	U U U U U U
M2120	1	05Q4	L L L T T T	N 5 T N 5 5	L T T T T T	L S 2 L S S	N A A N N N	T 5 5 L 5 5
	1	08Q4	A T N A T A	A 5 L A 5 L	A T L A T L	L 5 L L 5 L	N N N U U U	N L A N N N
M2220	2	05Q4	-T-T-T-5-5-T	-T-T-T-T-T-T	U U U U U U	U U N U U U	L L L 5 T T	T 5 5 5 5 T
	2	08Q4	U U U U U U	U U U U U U	U U U U U U	U U U U U U	N N N N N N	N N N N N N
M2320	3	05Q4	U U U U U U	U U U U U U	A A A N N N	U U U U U U	S S S S S 2	H S S H S S
	3	08Q4	A A N N A N	N N N N N N	L T T N N N	N A N N N N	L T N N N U	5 5 N N N U

Sources: INSEE, French quarterly accounts and industry and service surveys. Authors' calculations.

Table 5.2.5 Univariate Models Relating to Month *m*3 (Weighted Service Balances)

Model	Forecast	End	AR 1 vs. Industry		AR 1 vs. Industry + Services		Industry vs. Industry + Services	
			1st result	Last update	1st result	Last update	1st result	Last update
M3111	1	05Q4	T T L 5 5 5	T 2 5 T 2 2	A A N A A A	A T T A T T	U U U U-T-T	-5-5-5-1-2-2
	1	08Q4	L T 2 L T 5	T 5 5 T 5 5	L T 5 L T T	L 5 T L 5 T	U U U U U U	U U U U U U
M321	2	05Q4	U U U N U U	U N N N N N	U U U U U U	U U U U U U	-T-T U-T-T-T	U U U-T-T-T
	2	08Q4	N N N A A A	N N N A A A	N N N N N N	N N N N N N	U U U U U U	U U U U U U
M331	3	05Q4	U U U N N N	U U U U U U	N N N N N N	U U U U U U	N N N N N N	N A N N N N
	3	08Q4	N N N N N N	U U U U U U	U U U U U U	-T-2-1 U U U	U U U U U U	U U U U U U
M312	1	05Q4	S S S H S S	T 5 T T S L	N N L A N N	T T T L T T	-T-T U-T U U	U U U U U U
	1	08Q4	L 5 N L 5 N	L 5 T L 5 A	A L T A T T	T T 2 L T 2	-5-5-5-1-5-T	U-T-T U U U
M322	2	05Q4	N U U N U U	N N U N N N	N N N N N N	L N N L N U	N N N N N N	T T T L L L
	2	08Q4	N N U A A N	A A A L L N	N N N N N N	N N N N N N	U U U U U U	U U U U U U
M332	3	05Q4	-T-T-T-T-T-T	U U U U U U	-5-5-T-T-T-T	U-T-T-T-T-T	T T T 5 T T	A L A A L L
	3	08Q4	U U U U U U	U U U U U U	-T-T-T-5-5-T	U U U-T-T-T	L L L L L L	N A A N N N

Table 5.2.6 Univariate Models Relating to Month *m*3 (Non-Weighted Service Balances)

Model	Forecast	End	AR 1 vs. Industry		AR 1 vs. Industry + Services		Industry vs. Industry + Services	
			1st result	Last update	1st result	Last update	1st result	Last update
M3110	1	05Q4	2 T T S 2 5	T 5 T T 2 5	N N N N N N	N A A A L L	-T-T-T-2 U U	U U U U 2 2
	1	08Q4	L T 2 L 5 2	T 5 5 L 5 T	A T T A T T	L T T L T T	U U U U N N	N N N U S S
M3210	2	05Q4	U U U N U U	N N N N N N	N N N U U U	N N N U U U	N N U U U U	N N N U U U
	2	08Q4	N N N A A N	N N N A A N	A A A A A N	T L L L L N	L T T A A N	T 5 T A L L
M3310	3	05Q4	U U U N N N	-T U U U U U	U U U U U U	-T-T U U U U	U U U U U U	N N N U U U
	3	08Q4	N N N N N N	U U U U U U	U U U N N N	U U U N N N	U U U N N N	N N N N N N
M3120	1	05Q4	S S S H S S	T 5 T T S L	T 5 T L 5 T	T 5 5 L 5 5	U U U U U U	N N N N N N
	1	08Q4	L 5 N L 5 N	L 5 T L 5 L	L T L A T L	T 5 T L 5 T	U U U U U U	N N N N N N
M3220	2	05Q4	U U U N U U	U N N N N N	N N N N N N	L 2 2 L 5 5	A T L A A A	T T T L 5 5
	2	08Q4	N N U A N N	N N N A N N	A A N L L A	L L L T T A	A L N L N N	T T L T A A
M3320	3	05Q4	U-T-T U U U	U U U U U U	-T-T-T-5-5-5	U U U U U U	L T N U U U	2 2 5 L L L
	3	08Q4	U U U U U U	U U U U U U	U U U-2-2-2	U U U-T-T-T	N N N U U U	N A N U U U

Sources: INSEE, French quarterly accounts and industry and service surveys. Authors' calculations.

Table 5.2.7 Univariate Models Relating to Month *m*4 (Weighted Service Balances)

Model	Forecast	End	AR 1 vs. Industry		AR 1 vs. Industry + Services		Industry vs. Industry + Services	
			1st result	Last update	1st result	Last update	1st result	Last update
M411	1	05Q4	2 5 T S 2 5	T 2 2 T S 2	N N N N N N	A L L L T T	-1-1-1-1-1-1	U U-T-5-T-T
	1	08Q4	L 5 L L T N	T 5 T T 5 L	N L N N L N	L T L L T L	-T-T-T-1-5 U	U U U-5-T-T
M421	2	05Q4	2 5 5 S S 2	S H S S H S	T T T 5 T 5	S A L S L T	T L N A N N	S 2 A S S 2
	2	08Q4	T T 2 5 5 A	T T 5 5 5 N	L L T T T A	T T L T T A	U U U U U U	T A N L L L
M431	3	05Q4	U-5-T U-5-T	U-2-2 U-2-2	-5-5-5-5-5-5	-T-1-2-2-1-2	-T-5-5-T-5-T	-T U U-5 U U
	3	08Q4	N N N N N N	N N N N N N	U U L U U U	U U U U U U	U U U-T-T-T	U U N-T-T U
M412	1	05Q4	T A A T A L	T 2 5 T 2 2	U U U N N N	N A A L T L	-1-1-1-1-1-1	-5-5-T-5-1-2
	1	08Q4	L 5 A L T N	T 5 T T 5 L	N L N A T N	L T L L T A	-2-5-5-1-1-1	U U U-2-1-1
M422	2	05Q4	S 2 T S S 2	S H 2 S H 5	L L A 5 T S	T S S 2 H S	S 2 2 H S S	S 5 T 2 5 5
	2	08Q4	T T 5 T T L	T T L T T A	N N L L L T	N N N L L T	N N N N N N	N N N N N N
M432	3	05Q4	U U U U U U	U U U U U U	U U U U U U	U U N U U U	N N A U U N	A 5 2 N N N
	3	08Q4	N N N N N N	N N N N N N	U U N U U N	N N N N N U	U-T-T-2-2-2	U U U U U U

Table 5.2.8 Univariate Models Relating to Month *m*4 (Non-Weighted Service Balances)

Model	Forecast	End	AR 1 vs. Industry		AR 1 vs. Industry + Services		Industry vs. Industry + Services	
			1st result	Last update	1st result	Last update	1st result	Last update
M4110	1	05Q4	2 5 T S 2 5	T 2 2 T S 2	T L L 2 T T	5 S 2 5 S 2	U U U N N N	T T T T N N
	1	08Q4	L 5 L L T A	T 5 T T 5 L	L T L L T N	T 5 T T 5 T	N N N L T T	5 S S 2 N N
M4210	2	05Q4	2 5 5 S S 2	S H S S H S	5 T T 2 5 5	S S S S H S	N N N N N N	5 5 5 5 5 5
	2	08Q4	T T 2 5 5 5	T T 5 5 5 L	T T 2 T T L	5 5 T 5 5 A	T T T T T T	S S 2 S S S
M4310	3	05Q4	U-T-T U U U	U-5-T U-T-T	U U U U U U	U U U U U U	N N N N N N	S 2 5 5 L L
	3	08Q4	N N N N N N	N N N N N N	N N U N N U	N N N N N N	N N N U U U	T L L N N N
M4120	1	05Q4	T A A T A L	T 2 5 T 2 2	A N L 5 2 5	T 2 5 T 2 2	N N N A L L	2 2 5 2 S S
	1	08Q4	L 5 A L T N	T 5 T T 5 L	L T A L T A	T 5 T T 5 L	N N N 5 5 5	S S S S S S
M4220	2	05Q4	S 2 5 S 2 5	S H S S H S				
	2	08Q4	T T 5 T 5 5	T T T T 2 L				
M4320	3	05Q4	U U U-T-T-T	-T-1-1-T-1-1	U U U U U U	U U-2 U U U	S S S H 2 2	H S S H H S
	3	08Q4	N N N N N N	N N N N N N	N N N U U U	N N N N N U	5 2 5 A A A	S S S 5 5 5

Sources: INSEE, French quarterly accounts and industry and service surveys. Authors' calculations.

Appendix 6: Out-of-Sample Results - Tests of Predictive Accuracy
2- Univariate Models versus VAR Models

Forecast = 1 (forecast of the current quarter, corresponding to the one or two quarter-horizon for the VARs, depending on the months).

Forecast = 2 (forecast of the next quarter, corresponding to the two or three quarter-horizon for the VARs, depending on the months).

Table 6.1 Univariate VAR Models versus Multistep Models

Month	VAR model	Multistep model	Forecast	Horizon	GDP benchmark	Pvalue	Sign	Result
*m*1	M1a	M1110	1	2	1st result	0.474	-	N
*m*1	M1a	M1110	1	2	Last update	0.471	+	N
*m*2	M2a	M2120	1	1	1st result	0.305	+	N
*m*2	M2a	M2120	1	1	Last update	0.256	+	N
*m*2	M2a	M2220	2	2	1st result	0.079	-	T
*m*2	M2a	M2220	2	2	Last update	0.280	-	N
*m*2	M2a	M222	2	2	1st result	0.120	-	L
*m*2	M2a	M222	2	2	Last update	0.164	-	A
*m*3	M3e	M312*	1	1	1st result	0.111	+	L
*m*3	M3e	M312*	1	1	Last update	0.292	+	N
*m*3	M3e	M3210	2	2	1st result	0.121	-	L
*m*3	M3e	M3210	2	2	Last update	0.419	+	N
*m*4	M4i	M4110	1	1	1st result	0.227	-	N
*m*4	M4i	M4110	1	1	Last update	0.456	-	N
*m*4	M4i	M411	1	1	1st result	0.044	-	5
*m*4	M4i	M411	1	1	Last update	0.208	-	N
*m*4	M4i	M4120	1	1	1st result	0.272	-	N
*m*4	M4i	M4120	1	1	Last update	0.441	-	N
*m*4	M4l	M4110	1	1	1st result	0.485	-	N
*m*4	M4l	M4110	1	1	Last update	0.465	+	N
*m*4	M4l	M411	1	1	1st result	0.020	-	2
*m*4	M4l	M411	1	1	Last update	0.090	-	T
*m*4	M4l	M4120	1	1	1st result	0.432	-	N
*m*4	M4l	M4120	1	1	Last update	0.493	+	N
*m*4	M4i	M4210	2	2	1st result	0.199	+	A
*m*4	M4i	M4210	2	2	Last update	0.008	+	S
*m*4	M4l	M4210	2	2	1st result	0.432	-	N
*m*4	M4l	M4210	2	2	Last update	0.380	+	N

Notes: Dark grey tint: better model without ambiguity, light grey tint: possible better model, among the two models tested using an unilateral Harvey et al. (1997) test into account. Tests performed on the forecast errors resulting from recursive estimations using the Newey-West estimation of the variance of the test stat.
All best VARs are models with three variables (*g*, *IND*, *SER*). The best multistep models also include variables from the two surveys except *: model without service variables.
Month *m*1: at the three-quarter horizon (forecast of the next quarter), neither the VARs nor the multistep models outperform the AR models. Therefore, the best VARs and multistep models were compared for the forecasting of the current quarter only.
Month *m*3:
Month *m*4: M4i (resp. M4l) outperforms the other VARs at the one-quarter (resp. two-quarter) horizon. The three multistep models tested perform quite equivalently on the whole.

Sources: INSEE, French quarterly accounts and industry and service surveys. Authors' calculations.

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