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Forecasting Economic Activity with Financial Market Data in Finland: Revisiting Stylized Facts During the Financial Crisis

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ABSTRACT

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This paper examines whether readily available and easily observable financial variables have predictive content for future economic growth above and beyond past growth a small open economy in the euro area. The predictive content of term spread, short interest rates and stock returns is evaluated by forecasting out-of-sample GDP growth in Finland during the steady growth period of 2004:1–2007:4 and the financial crisis period of 2008:1–2011:2.

Our results suggest that the financial indicators are useful for forecasting purposes but that the proper choice of variables is related to general economic conditions. During steady economic growth, the preferable choice of indicating variables consists of short rates and stock returns. However, economic turbulence makes a difference in the predictive power of the financial variables: past growth and short rates have less predictive content and the term spread and stock returns play a more dominant role. This phenomenon may be exacerbated if the central bank implements a zero interest rate policy.

KEYWORDS: term spread, stock market, macroeconomy

1. INTRODUCTION

What GDP growth will occur in your country during the next quarter or the next year? Because economic growth is known to be positively serially correlated, during steady economic conditions, the persistence of growth provides a natural starting point for predicting future economic growth. However, economic turmoil poses additional challenges for forecasting. Economists would certainly like to have more predictors of economic growth than the persistence of growth. Financial market data are forward-looking aggregators of information that are easy to interpret and are observed in real time without measurement errors. Therefore, since the beginning of the 1980s, the potential for utilizing financial market information to forecast future economic activity has been explored. Certain financial variables, such as interest rates, term spreads and stock returns, are examples of readily available and precise indicators, but can they provide consistently accurate forecasts of future economic activity during both steady growth and more turbulent conditions?

Since the late 1980s, many studies have documented the usefulness of the yield curve or even the simple term spread for predicting economic activity (e.g., Harvey 1988; Laurent 1989; Estrella & Hardouvelis 1991; Stock & Watson 2003; Estrella 2005). It has become a standard procedure in the U.S. to use the term spread between the ten-year Treasury note and the three-month Treasury bill to predict recessions and future economic activity (e.g., Estrella & Mishkin 1996; Haubrich & Dombrosky 1996). The inversion of the term spread has been demonstrated to be a reliable "advance warning" of subsequent recession, but its ability to forecast exact GDP growth rates is less clear. However, many studies have found that since 1985, the term spread has been a less accurate predictor of U.S. output growth (e.g., Stock & Watson 2003; Chinn & Kucko 2010). This phenomenon may reflect either the increased stability of output growth (the Great Moderation) and other macroeconomic variables since the mid-1980s or changes in the responsiveness of monetary policy to output growth and inflation (Wheelock & Wohar 2009). If the central bank concentrates exclusively on controlling inflation, then the term spread will probably be a less accurate predictor of GDP growth. Thus, given that the European Central Bank (ECB) focuses on the control of inflation, the term spread may not necessarily merit its status as the best single predictor of economic growth in the euro area. However, despite evidence that parameter instability may weaken the performance of the term spread in predicting growth, the spread has nonetheless reached the status of the single best indicator of economic activity and a "near-perfect tool" for forecasting (e.g., Estrella 2005). Notwithstanding the predominance of term spread as the main financial indicator for predicting economic activity, Ang, Piazzesi and Wei (2006) found that the short rate had more predictive power than any term spread for forecasting GDP growth in the U.S. during 1952–2001. It has not been determined whether this result is specific to the U.S., if the FED is focusing primarily on economic growth, or whether it holds true for other countries.

Stock prices are forward looking and thus represent another obvious financial indicator for future economic activity. Economists and investors have a well-known rule of thumb that stock market prices predict economic growth approximately half a year in advance. However, compared with the predictive content of the term spread, less empirical evidence exists regarding the predictive ability of stock prices for economic performance (e.g., Stock & Watson 2003). Chionis, Gogas & Pragidis (2010) found that augmenting the yield curve with stock index significantly improved the ability to predict GDP fluctuations in the euro area. Nyberg's (2010) results supported this conclusion with respect to predicting recessions in Germany and in the U.S. Junttila & Korhonen (2011) discovered that both stock market dividend yields and short-term interest rates were relevant information variables for forecasting future economic activity in the U.K., the Eurozone and Japan, particularly during turbulent times. By contrast, Henry, Olekans & Thong (2004) emphasized that stock returns predict economic growth when the economy is contracting but that the predictive power of stock returns in non-recession periods is less clear. These types of findings may explain Samuelson's (1966) famous notice: "The stock market has predicted nine out of the last five recessions." In any event, economic turbulence tends to strengthen the link between stock market and economic activity.

The case of Finland is interesting in many ways. The vast majority of the previous literature has examined larger, especially G7, countries, but the predictive content of financial variables is less known in smaller European countries. As a member of the Economic and Monetary Union (EMU), the Finnish economy is subject to the monetary policy of the ECB, which strongly targets inflation. It has been argued that the predictive content of the term spread for economic growth might weaken if inflation control is the main concern of the central bank. Moreover, the monetary policy of the ECB is conducted on the basis of the entire euro area; therefore, the interest rates of the euro area may be far from optimal for smaller euro countries that face asymmetric shocks. Indeed, evidence suggests that output shocks have been more country-specific in Finland than in other EU countries (e.g., Haaparanta & Peisa 1997; Kinnunen 1998), and the question of asymmetric shocks was among the main concerns when Finland considered EMU membership in the late 1990s. Thus, there are good reasons to assess the predictive content of the term spread and short interest rates in small member countries in the euro area.

After Finland emerged from an economic depression at the beginning of the 1990s, it experienced an era of continuous and sound growth until the global financial crisis plunged the Finnish economy into a deep recession at the end of 2008 (see Figure 1). A distinctive feature of this slump was its severity; during a single year, the Finnish GDP collapsed by an astonishing 10%, one of the largest collapses of economic activity among developed countries. Undoubtedly, the ups and downs of the Finnish economy pose a true challenge for forecasting economic activity.

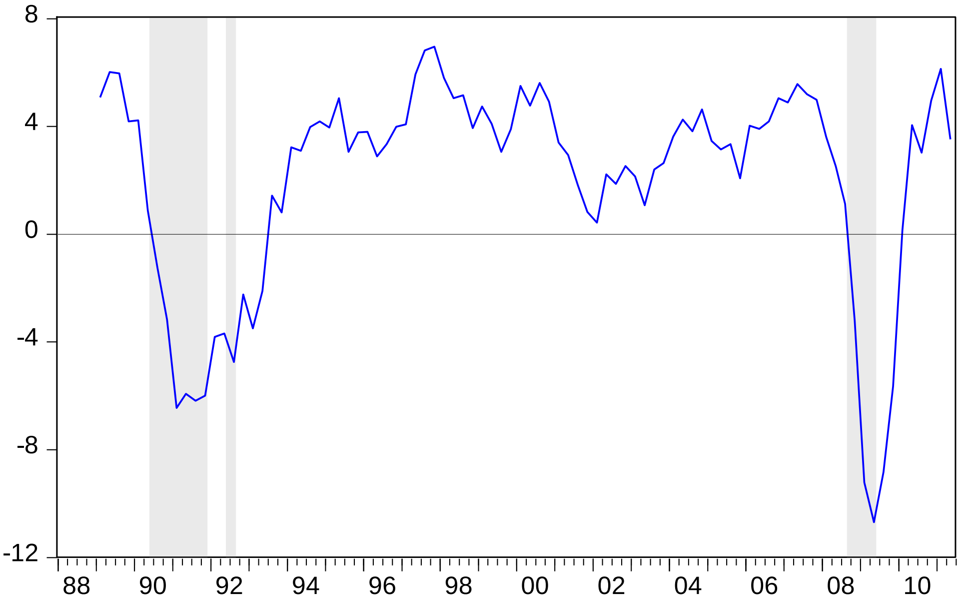

Figure 1. The annual GDP growth and recessions (shaded) in Finland from 1988:1 to 2011:2.

This paper contributes to the existing literature by explicitly addressing the predictive content of the classical term spread versus short interest rates and stock returns in the context of small open economy (SOE). Ang et al. (2006) found that compared with term spread, short interest rates were a better predictor of economic activity in the U.S. Our aim is to test whether this result is also applicable outside the U.S. Furthermore, we seek to clarify potential differences in forecasting economic activity between eras of steady growth and economic turbulence, such as the recent financial crisis. Much of the previous literature has concentrated on the predictive content of a single financial indicator (e.g., Stock & Watson 2003), but we assess the predictive content of combinations of indicators. More broadly, this paper provides further information on the predictive content of financial market indicators in smaller economies, a context that has rarely been examined in the previous literature.

The remainder of this paper is organized as follows. In section 2, we present the model setup and the data. Section 3 contains the empirical analysis of the study, and section 4 concludes the paper.

2. THE MODEL SETUP AND THE DATA

2.1. Forecasting models

In accordance with the previous literature, our financial market dataset consists of the following financial market variables: term spread (*TS*), stock returns (*R*) and short interest rates (*i*). The empirical forecasting models of the GDP growth (ΔY) in this study can be written in their most general forms as follows (see Table 1 for details):

(1) $$\Delta Y_{t,t+h} = \alpha_1 + \beta_1 \Delta Y_{t,t-h} + \beta_2 R_t + \beta_3 TS_t + u_{t+h}$$

(2) $$\Delta Y_{t,t+h} = \alpha_1 + \beta_1 \Delta Y_{t,t-h} + \beta_2 R_t + \beta_4 i_t + u_{t+h}$$

The forecasting abilities of various model specifications are assessed against the simple AR(1) benchmark, which is assumed to adequately capture the history dependence of GDP growth.

(3) $$\Delta Y_{t,t+h} = \alpha + \beta \Delta Y_{t,t-h} + u_{t+h}$$

The forecast performance is evaluated by means of the root mean squared error (RMSE) criterion.

We begin the forecasting analysis with only one forecasting variable and move gradually into richer models specifications until the most versatile model specifications (1) and (2) are reached. The term spread and the short interest rate are considered to be alternative forecasting variables and are therefore never included in the same forecasting model. We conduct the forecasting analysis both with and without AR(1) terms to assess the influence of history dependence on the predictive content of the financial market variables. This process produces a total of 11 model specifications, including the AR(1) benchmark.

2.2. Data

The data are quarterly and span the 1988:1–2011:2 time period. The annual GDP growth in Finland is presented in Figure 1, and the interest rate and stock market variables are illustrated in Figure 2. Nominal quarterly stock market returns were calculated as logarithmic changes in the Finnish general stock market index (OMX Helsinki PI). The short rate is the 3-month market rate. The term spread was constructed by calculating the difference between the 10-year government bond yields and the 3-month interest rates. The details of the data are provided in Table 1.

The time series properties of the data were explored by means of the two most efficient unit root tests, the DFGLS test by Elliot, Rothenberg and Stock (1996) and the Ng and Perron (2001) test. These test results consistently suggested that all of the variables except for short interest rates were stationary. The short rates were found to be non-stationary for the whole sample period, but during the period of Finnish membership in the EMU (1999:1–), the short rates were stationary. The non-stationary nature of the short rates for the whole sample period is likely reflective of the exceptionally high interest rates in the late 1980s and the beginning of the 1990s, which were caused by inflationary pressures and the defense of the national currency during the ERM crisis. Because the forecasting analysis takes place during the EMU-period, we estimated the forecasting models with short rates specified in levels. We also estimated the models using the first differences of the short rates, but, in general, the level-based specifications demonstrated much better performance[1].

[1] The unit root tests and the results using the first differences of the short rates are available upon request.

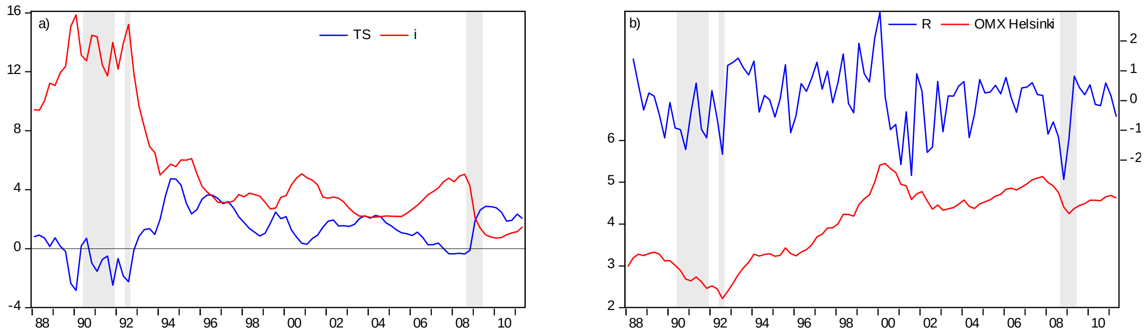

Figure 2. The financial variable values and recessions (shaded) for Finland.

Table 1. The data.

$\Delta Y_{t,t+h} = \ln(Y_{t+h}/Y_t)\times 100,\ h=1,2,4$ $\Delta Y_{t,t-h} = \ln(Y_t/Y_{t-h})\times 100,\ h=1,2,4$	Y = the Finnish gross domestic product index (volume, market prices). Source: OECD Economic Outlook database.
$R_t = \ln(P_t/P_{t-1})\times 100$	P = the Finnish general stock market index (OMX Helsinki PI). Source: OECD Main Economic Indicators database.
$TS_t = i10_t - i3_t$	$i10$ = the Finnish 10-year government bond yield. $i3$ = the Finnish 3-month interest rate (1988:1–1998:4 Helibor 3, 1999:1–2011:2 Euribor 3). Source: OECD Main Economic Indicators database.

During the sample period, the Finnish economy has experienced two major recessions, which are indicated by the shaded areas in Figure 2. It is noteworthy that the negative term spread (an inverted yield curve) provided an early warning of both impeding recessions.

Table 2 presents the descriptive statistics from the entire sample period (1988:1–2011:2) and from the forecasting periods of the study (2004:1–2007:4 and 2008:1–2011:4). The former forecasting period is intended to represent a period of normal and steady economic growth, whereas the latter represents a time of economic turbulence, which was caused by the recent global financial crisis and its aftermath. The figures show that the relatively strong growth in GDP collapsed due to the financial crisis. One interesting observation is that despite the fact that the sample period includes the exceptionally deep economic depression in Finland at the beginning of the 1990s, the greatest annual drop in the Finnish GDP (-10.73%) occurred as a result of the recent financial crisis. Moreover, the volatility of economic activity increased substantially as a result of the financial crisis.

Large swings in performance are typical of the Finnish stock markets (see Figure 2). Stock prices collapsed by 60–70% on three separate occasions (1989–1991, 2000–2002 and 2008) during the sample period. However, stock market upswings (1993–1994, 1996–1999 and2003–2007) were also exceptionally vigorous by international standards. Despite strong volatility, the compound annual stock return during the sample period was a relatively normal rate of 6.3%.

Table 2. Descriptive statistics for the data.

		$\Delta Y_{t,t+1}$	$\Delta Y_{t,t+2}$	$\Delta Y_{t,t+4}$	***i*3**	***TS***	***R***
Mean	1988:1 - 2011:2	0.50	1.01	2.03	5.26	1.23	1.53
	2004:1 - 2007:4	1.04	2.06	4.10	2.91	0.97	5.05
	2008:1 - 2011:4	-0.19	-0.31	-0.64	2.09	1.55	-3.63
Std.Dev.	1988:1 - 2011:2	1.28	2.22	3.91	4.08	1.55	13.65
	2004:1 - 2007:4	0.50	0.59	0.91	0.94	0.79	7.08
	2008:1 - 2011:4	2.13	3.71	5.78	1.72	1.29	13.08
Max	1988:1 - 2011:2	2.67	3.94	6.92	15.81	4.67	41.73
	2004:1 - 2007:4	1.89	3.08	5.53	4.72	2.19	11.94
	2008:1 - 2011:4	2.67	3.07	6.10	4.98	2.80	12.57
Min	1988:1 - 2011:2	-5.63	-9.05	-10.73	0.66	-2.89	-34.76
	2004:1 - 2007:4	-0.07	0.72	2.04	2.06	-0.41	-15.56
	2008:1 - 2011:4	-5.03	-9.05	-10.73	0.66	-0.42	-34.76

3. EMPIRICAL ANALYSIS

The forecasting analysis is conducted for two different time periods: the steady growth period form 2004:1 to 2007:4 and the financial crisis period from 2008:1 to 2011:2 (Figure 3). By separating the forecast periods in this way, it is possible to scrutinize the predictive content of financial market variables during different economic conditions. We estimate one-, two-, and four-quarter forecast models.

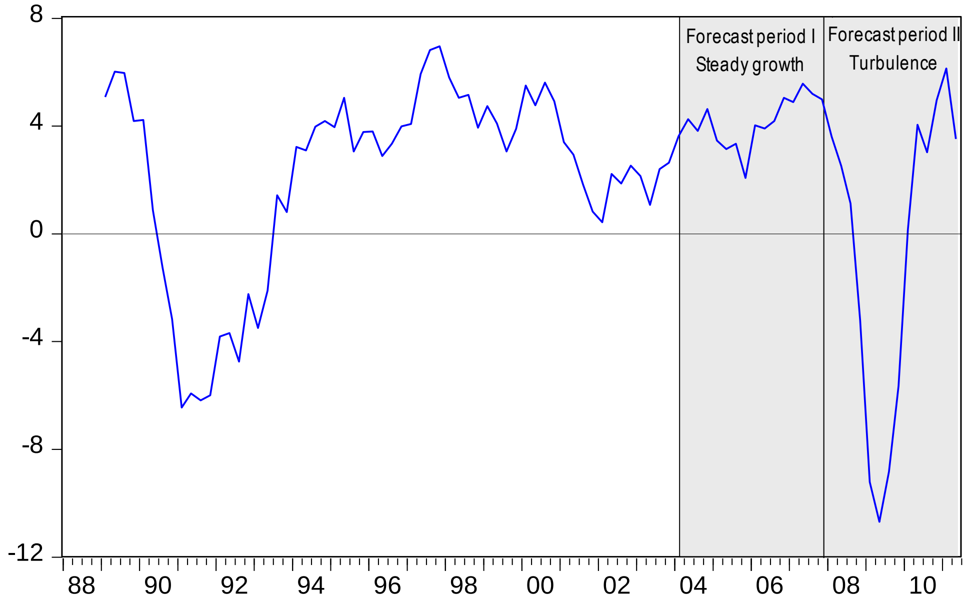

Figure 3. The annual GDP growth in Finland and the forecast periods.

To ensure that the forecasting procedure is as realistic and practical as possible, the forecasting analysis is conducted recursively. That is, for the first forecasting period (2004:1–2007:4), we first conduct regressions through 2003:4 and then use these estimates to compute forecasts for 2004:1, 2004:2 and 2004:4. The models are subsequently re-estimated through 2004:1, and the new forecasts for 2004:2, 2004:3 and 2005:1 are computed. This process is continued throughout the forecasting period. Thus, we consider only true out-of-sample forecasts. The recursive forecasting scheme has the intuitive advantage that all of the available information is utilized for the calculation of each forecast.

3.1. In-sample analysis

The initial parameter estimates are based on the sample of 1988:1–2003:4 for the first forecasting period and the sample of 1988:1–2007:4 for the second forecasting period. Because the estimation results were quite similar for both estimation periods, we present only the results for the first estimation period (Table 3). The estimation method is OLS with heteroscedasticity- and autocorrelation-robust Newey–West standard errors.

The in-sample estimation results indicate that in the models, the term spread and the aggregate stock returns are positively correlated and the short interest rates are negatively correlated with economic activity. This result is well in accordance with theoretical expectations. It is also noteworthy that all of the parameter estimates of the financial market indicator variables are consistently significant at the 10% level or better.

With respect to the in-sample explanatory power of the various model specifications, the following notable results were observed. First, the model specifications with history dependence yielded higher explanatory power (adjusted R^2) than the model specifications without history dependence. This phenomenon occurs consistently irrespective of the forecast window. Second, the highest explanatory power was obtained by the model specification with stock returns, the short interest rate and the history dependence as the explanatory variables. Third, the model specification that included stock returns as the only predictor had the lowest explanatory power. Clearly, one should avoid utilizing stock returns as the sole predictor for output growth, the short rate being a much better choice. Fourth, past growth alone is capable of explaining approximately 20% to 50% of the observed economic activity, and the parameter estimates (0.47–0.73) suggest that economic activity displays a remarkable degree of history dependence.

Table 3. In-sample regression results (1988:1–2003:4).

$dy_{t,t+1}$											
Const.	0.29	0.29	**0.48**	0.11	0.15	**1.17**	**1.54**	0.13	0.16	**1.14**	**1.39**
$\Delta y_{t,t-1}$	**0.47**	**0.39**		0.26		0.17		0.21		0.18	
TS_t				**0.25**	**0.34**			**0.24**	**0.30**		
R_t		**0.02**	**0.03**					**0.01**	**0.02**	**0.01**	**0.02**
i_t						**-0.11**	**-0.14**			**-0.11**	**-0.13**
$\overline{R^2}$	0.21	0.24	0.11	0.31	0.27	0.33	0.29	0.32	0.30	0.34	0.33
$\Delta y_{t,t+2}$											
Const.	0.28	0.28	**0.95**	0.03	0.26	**1.79**	**3.20**	0.07	0.27	**1.67**	**2.88**
$\Delta y_{t,t-2}$	**0.73**	**0.66**		**0.52**		**0.48**		**0.49**	**0.63**	**0.45**	
TS_t				**0.40**	**0.72**			**0.35**	**0.03**		
R_t		**0.03**	**0.06**					**0.02**		**0.02**	**0.03**
i_t						**-0.18**	**-0.30**			**-0.17**	**-0.27**
$\overline{R^2}$	0.53	0.57	0.18	0.61	0.42	0.63	0.45	0.64	0.48	0.66	0.52
$\Delta y_{t,t+4}$											
Const.	0.71	0.69	**1.77**	-0.05	0.47	**6.05**	**6.55**	0.02	0.44	**5.52**	**5.87**
$\Delta y_{t,t-4}$	**0.55**	**0.48**		**0.22**		0.09		**0.21**		0.09	
TS_t				**1.24**	**1.43**			**1.09**	**1.26**		
R_t		**0.09**	**0.11**					**0.66**	**0.07**	**0.05**	**0.07**
i_t						**-0.63**	**-0.62**			**-0.57**	**-0.56**
$\overline{R^2}$	0.31	0.44	0.22	0.59	0.49	0.67	0.54	0.64	0.57	0.71	0.62

Note: The bold figures denote statistical significance at the 0.10 level or better.

3.2. Out-of-sample forecasting results

The forecasting results are presented in Table 4. The forecast accuracy is measured in terms of the root mean squared forecast errors (RMSE). The forecasting era was divided into two roughly equal time periods to examine the influence of the recent financial crisis on forecasting performance. The first forecasting period (2004:1–2007:4) represents a steady growth period, whereas the second forecasting period (2008:1–2011:2) incorporates exceptional economic turbulence.

Certain general outcomes are evident from the forecasting results. As expected, the forecast errors increase consistently with the forecast horizon. The performance of the forecasts collapsed during the financial crisis, and the forecast errors were more than three times larger during the financial crisis than during the steady growth period. During normal economic conditions, the differences in RMSEs between the best and the worst model specifications are limited at short forecast horizons, but they become more significant as the forecast window is extended to longer horizons. Thus, the selection of a proper model specification is far from inconsequential. The results also strongly suggest that during steady growth, past growth is unambiguously useful for forecasting purposes; however, during economic turbulence, the predictive power of the lagged GDP growth effectively vanishes for longer forecast horizons.

What if one wishes to select a single financial market indicator for predicting GDP growth? Our results demonstrate that the short interest rate would be a better choice than the more traditional term spread or stock returns. It is also interesting to note that although stock returns or term spread perform rather poorly as single predictors of GDP growth, the combination of these variables proves to be useful for forecasting purposes.

Although the GDP growth appears to incorporate a degree of history dependence that is useful for forecasting purposes under normal economic circumstances, the usefulness of previous economic growth decreases considerably during economic turbulence. During the financial crisis era (2008:1–2011:2), the simple AR(1) model specification is capable of yielding better out-of-sample forecasts in 4/10 cases, 1/10 cases and 0/10 cases at the forecast horizons of one quarter, two quarters and four quarters, respectively.

Short interest rates were found to be the single most important financial market indicator for predicting economic activity during periods of steady growth, this result does not hold true during more turbulent times. According to our results, stock returns and the term spread are the appropriate choices among financial market indicators for forecasting future growth during unsettled economic conditions.

Table 4. Out-of sample forecast errors of GDP growth.

	RMSE 2004:1–2007:4	RMSE 2004:1–2007:4 No history dep.	RMSE 2008:1–2011:2	RMSE 2008:1–2011:2 No history dep.
Forecasted variable	$\Delta y_{t,t+1}$	$\Delta y_{t,t+1}$	$\Delta y_{t,t+1}$	$\Delta y_{t,t+1}$
Forecasting variables				
$\Delta y_{t,t-1}$	0.648		1.923	
$\Delta y_{t,t-1}, R_t$	0.662	0.682	1.751	1.850
$\Delta y_{t,t-1}, TS_t$	0.679	0.736	1.847	2.043
$\Delta y_{t,t-1}, i_t$	0.560	**0.533**	2.057	2.290
$\Delta y_{t,t-1}, R_t, TS_t$	0.682	0.723	**1.730**	1.834
$\Delta y_{t,t-1}, R_t, i_t$	0.572	0.556	1.907	2.021
Mean RMSE	0.634	0.646	1.869	2.021
	$\Delta yt_{t,t+2}$	$\Delta yt_{t,t+2}$	$\Delta yt_{t,t+2}$	$\Delta yt_{t,t+2}$
$\Delta y_{t,t-2}$	0.695		4.053	
$\Delta y_{t,t-2}, R_t$	0.757	1.097	3.669	3.279
$\Delta y_{t,t-2}, TS_t$	0.812	1.204	3.454	3.412
$\Delta y_{t,t-2}, i_t$	**0.640**	0.743	3.911	4.042
$\Delta y_{t,t-2}, R_t, TS_t$	0.823	1.168	3.243	**3.078**
$\Delta y_{t,t-2}, R_t, i_t$	0.681	0.781	3.593	4.542
Mean RMSE	0.735	0.999	3.654	3.671
	$\Delta y_{t,t+4}$	$\Delta y_{t,t+4}$	$\Delta y_{t,t+4}$	$\Delta y_{t,t+4}$
$\Delta y_{t,t-4}$	1.757		7.012	
$\Delta y_{t,t-4}, R_t$	1.853	2.145	6.012	5.189
$\Delta y_{t,t-4}, TS_t$	2.056	2.112	4.988	4.999
$\Delta y_{t,t-4}, i_t$	1.228	1.310	6.500	6.681
$\Delta y_{t,t-4}, R_t, TS_t$	2.013	2.095	4.512	**3.557**
$\Delta y_{t,t-4}, R_t, i_t$	**1.117**	1.217	5.765	5.782
Mean RMSE	1.671	1.776	5.798	5.242

Note: A constant term is included in all of the forecasting models.

3.3. The analysis of the forecasting results

The previous literature suggests that financial market variables are useful for predicting economic activity but that the predictive content is not robust with respect to different countries and time periods (Stock & Watson 2003). Among different financial market variables, term spread has gained the status of the best single financial market indicator for future economic activity (e.g., Estrella 2005, Wheelock & Wohar 2009). The results by Kuosmanen and Vataja (2011) supported this conclusion in the Finnish context.

However, as emphasized by Stock & Watson (2003), the history dependence of economic activity has not been accounted for in many previous studies. Recent literature has suggested that the predictive content of the term spread has decreased since the mid-1980s; this decrease may be due to either the increased stability of economic activity (Wheelock & Wohar 2009) or fundamental changes in the relationship between the term spread and economic activity across countries. These changes may have arisen as a result of a variety of factors, such as the birth of the European monetary union, the “great moderation”, the global savings glut and the zero lower bound on nominal interest rates (Chinn & Kucko 2010).

Although the term spread and stock returns represent the traditional financial market variables that are used to predict future economic activity, the results from the U.S. context by Ang et al. (2006) suggest that short interest rates have greater predictive power than the term spread for forecasting GDP growth. From this perspective, our results from Finland are novel and lend support to the usefulness of short rates in predicting future economic activity during steady growth periods. The importance of the short rate appears even more remarkable from the perspective of the euro area given that the monetary policy of the ECB targets the entire euro area and that Finland is only a tiny fraction of this region. Furthermore, even though the ECB concentrates exclusively on controlling inflation, short rates are found to play a crucial role in indicating future economic activity in Finland.

According to our results, the proper choice of indicator variables changes notably during exceptional growth periods. The forecasting ability of the short rate decreases during economic turbulence. Moreover, in unsettled conditions, the predictive content of past growth vanishes for longer forecast horizons. Instead, the traditional term spread and stock returns are found to be more appropriate indicator variables for future economic activity during turbulent times.

4. CONCLUSIONS

The purpose of this study was to reinvestigate and clarify the predictive content of readily available and easily observable financial market variables for forecasting future GDP growth during both normal and exceptional economic circumstances. Our results address Finland, the small open economy in the euro area that was heavily influenced by the financial crisis.

Our results confirmed the usefulness of financial market information for forecasting future economic activity. The proper selection of financial market indicator variables was found to be related to the general health of the economy. During steady growth periods, short interest rates play a more prominent role in forecasting economic activity. By contrast, during economic turbulence, the importance of the traditional term spread and stock returns notably increases. Our results also emphasize that stock returns as a sole financial predictor of GDP growth performs rather poorly. However, by combining stock returns with other financial indicators improve the forecasting performance.

We also witnessed a dramatic increase in forecast errors during exceptional economic circumstances. This result indicates the severe difficulties that exceptional times pose for forecasting. Clearly, one should be very cautious in forecasting economic activity during periods of economic turbulence.

The results of this study suggest that the predictive power of the short rate and the term spread are related to the central bank’s ability to conduct conventional monetary policy. If the central bank is out of conventional monetary policy tools (at the bounds that are imposed by a zero interest rate policy), then the predictive content of the term spread and stock markets begin to play a more dominant role in forecasting economic activity. However, if the central bank is able to conduct conventional monetary policy, then the short rate is the preferable growth indicator.

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