Do Professional Economists' Forecasts Reflect Okun's Law? Some Evidence for the G7 Countries

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Using survey data for the G7 countries, we report that professional economists' forecasts of changes in the unemployment rate and the growth rate of real output are consistent with Okun's law. Professional economists do not believe in potential asymmetries in Okun's law over the business cycle. They believe in the classic linear version of Okun's law.

JEL classification: C32, F37, G15

Keywords: Okun's law, Forecasting, Panel-data model

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1 Introduction

Okun's law measures the negative correlation between changes in the unemployment rate and the growth rate of real output (Okun 1962). While the exact magnitude of this negative correlation has been found to change over time and to differ across countries, the results of empirical research for the United States and many other countries support Okun's law (Knoester 1986, Kaufmann 1988, Paldam 1987, Moosa 1997, Lee 2000, Freeman 2001, Sögner/Stiassny 2002). The strong empirical support for Okun's law has led Blinder (1997) to suggest that Okun's law should be viewed as one of the cornerstones of modern practical macroeconomics.

In contrast to the earlier empirical literature, we analyze whether professional economists' *forecasts* of the growth rate of real output, when combined with their *forecasts* of changes in the unemployment rate, are consistent with Okun's law. To this end, we follow Mitchell/Pearce (2007a), who have analyzed whether economists' forecasts published in the *Wall Street Journal* (WSJ) reflect Okun's law. Using semiannual data for the United States covering the sample periods 1986 - 1988 and 1999 - 2006, Mitchell/Pearce (2007a) have reported evidence of a significant negative correlation between forecasts of changes in the rate of unemployment and forecasts of the growth rate of real output. They also have found that the expected correlation is significantly lower than the *realized* correlation implied by the data.

We go beyond the study by Mitchell/Pearce (2007a) in two important respects. First, we report empirical results for the G7 countries. Second, we tested whether professional economists' forecasts reflect asymmetries in Okun's law over the business cycle. Evidence of asymmetries has been reported by Lee (2000), Harris/Silverstone (2001), and Holmes/Silverstone (2006). We describe our data in Section 2, and our empirical model in

Section 3. We report our estimation results in Section 4, and conclude in Section 5.

2 Data Description

We used data from survey studies conducted by the Consensus Economic Inc. The Consensus Economics Forecast (CEF) survey regularly asks professional forecasters about their projection of several financial and macroeconomic variables, including the unemployment rate and the growth rate of real output. Because professional economists' forecasts of the unemployment rate are only available for the G7 countries, we carried out our empirical analyses for Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States.

The CEF data have at least two advantages as compared to other survey data. First, professional economists who participate in the CEF poll do not only take a stance on the direction of the expected change of a macroeconomic variable. Rather, they also forecast the level of a macroeconomic variable. Second, individual forecasts are published together with the name of the employer of a forecaster, implying that it is relatively easy to evaluate the accuracy of a professional economist's forecast. The accuracy of forecasts is likely to have an effect on the reputation of a forecaster. Given that the name of the employer of a forecaster is published, a forecaster should have a strong incentive to submit his or her best forecast rather than a strategic forecast. Keane/Runkle (1990) have emphasized the role of incentives for forecast accuracy. These two advantages may explain why Batchelor (2001) has found that CEF forecasts are less biased and more accurate in terms of mean absolute error and root mean square error than OECD and IMF forecasts. A comprehensive empirical analyses of the accuracy of the WSJ forecasts of interest rates and exchange rates has been carried out by Mitchell/Pearce (2007b).

Our data cover professional economists' forecasts of the growth rate of real output (GDP) and the unemployment rate. We used yearly data for the sample period from 1989 to 2007. The professional economists who participate in the survey work for institutions such as investment banks, large international corporations, economic research institutes, and at universities. The number of professional economists participating in the survey is highest for the United States (65 forecaster) and lowest for Canada (34 forecaster).

The survey takes place on a monthly basis. In every survey, the professional economists are asked for their forecasts of a large number of economic variables including the yearly growth rate of real output and the average unemployment rate over the year. This implies that uncertainty in forecasts should by highest in January and lowest in December. For instance, for the United States, the standard deviation of forecasts of the unemployment rate in January is more than four times higher as compared to the standard deviation of forecasts made in December. The forecasts made in January, therefore, should give a conservative answer to the question of whether professional economists' forecasts reflect Okun's law. For this reason, and in order to avoid problems due to overlapping forecast horizons, we focus on the forecasts published in January for the respective year. As a robustness check, however, we shall also report in Section 3 the results we obtained when we used the forecasts published in April.[1]

[1]The results for the other months are not reported, but are available upon request.

3 The Empirical Model

Our baseline empirical model is given by the following version of Okun's law (Moosa 1997):

$$E_{t,i}[u_{t+1}] - u_t = \alpha + \beta E_{t,i}[\Delta y_{t+1}] + \epsilon_{t,i}, \tag{1}$$

where α denotes an intercept term, β denotes a slope coefficient, $E_{t,i}$ denotes the forecast of economist i in year t, u_t denotes the unemployment rate in year t, Δy_{t+1} denotes the growth rate of real output in year $t+1$, and $\epsilon_{t,i}$ denotes a forecaster-specific stochastic disturbance term. Given the empirical support for Okun's law, one would expect $\alpha > 0$ and $\beta < 0$, where β is referred to as the Okun coefficient. A positive value for α can be expected in countries in which the unemployment rate has increased over time. Equation (1) is a widely used approximation of Okun's law. This approximation is built on the assumptions that both the natural rate of unemployment and the growth rate of real potential output are constant. Data on the current unemployment rate, u_t, are from Thompson Financial Datastream.[2]

Based on *realized* changes in the unemployment rate and *realized* growth rates of real output for various countries, the empirical estimates of the Okun coefficient reported by Paldam (1987), Moosa (1997), and Freeman (2001) vary roughly between -0.15 and -0.90.[3] If professional economists believe in Okun's law, we should observe that our estimates of the Okun coefficient that are based on *expected* changes in the unemployment

[2]The Mnemonic codes are as follows: Canada (CNOUN015Q), France (FROUN015Q), Germany (BDOUN015Q), Italy (ITOUN015Q), Japan (JPOUN015Q), United Kingdom (UKOUN015Q), United States (USOUN015Q).

[3]Okun (1962) found a value of β of about -0.30, implying that an increase in the rate of unemployment leads to a more than proportionate change in output. Okun (1962) argued that changes in unemployment are associated with changes in labor force participation and capital utilization, which lead to a more than proportional response of output.

rate and *expected* growth rates of real output are of a comparable magnitude.

We estimated Equation (1) as a fixed-effects panel-data model and tested by means of an F-test whether the null hypothesis of a common constant for all participating professional economists cannot be rejected. In case of an insignificant F-test, we used a pooled OLS estimator to estimate Equation (1). We then proceeded and tested the null hypothesis that the intercept term is constant over time. Because the null hypothesis was rejected for all countries in our sample, we estimated all regressions as a time-fixed effects model.

Finally, we tested for asymmetries in Okun's law over the business cycle. In a recent empirical study, Silvapulle et al. (2004) have analyzed Okun's law using data for the United States and have found evidence in favor of asymmetries. They have reported Okun coefficients of -0.25 and -0.61 with respect to increases and decreases in cyclical output. In order to test whether the CEF forecasts reflect asymmetries, we estimated the following model:

$$E_{t,i}[u_{t+1}] - u_t = \alpha + \beta E_{t,i}[\Delta y_{t+1}] + \gamma I(E_{t,i}[\Delta y_{t+1}])E_{t,i}[\Delta y_{t+1}] + \epsilon_{t,i}, \quad (2)$$

where the indicator function $I(.)$ assumes the value one whenever the *expected* growth rate of real output is below its sample average, and zero otherwise. In economic terms, the coefficient γ renders it possible to trace out how the correlation between the expected rate of change in the unemployment rate and the growth rate of real output differs in times of economic downturns and economic booms.

4 Estimation Results

Table 1 summarizes the results for the baseline empirical model without asymmetries. All coefficients have the expected sign and are highly significant. The Okun coefficient is negative, and its magnitude is roughly consistent with the magnitude reported by researchers who have analyzed the link between *realized* changes in the unemployment rate and *realized* growth rates of real output. Hence, our estimation results reveal that the forecasts made by professional economists for the G7 countries are consistent with Okun's law.

– Include Table 1 about here. –

It is interesting to note that the Okun coefficient we estimated for the United States is somewhat smaller than the coefficients reported in the earlier literature.[4] This result is in line with the finding of Mitchell/Pearce (2007a), who have reported that, in the case of the United States, the *expected* Okun coefficient is lower than the *realized* value.

The magnitude of the Okun coefficient varies considerably across the G7 countries. For example, we estimated the largest (smallest) Okun coefficient of about -0.34 (-0.11) for the United Kingdom (Japan). For Japan this implies that the professional economists expect a fall in the unemployment rate by 0.11 percent if they expect, at the same time, a one percent increase in real output. In his analysis of *realized* Okun's law for the sample time period 1962 - 1995, Freeman (2001) has found a value of about -0.25 for Japan, which is the lowest out of ten industrialized countries. Also, Moosa (1997) has reported that the value for Japan is the lowest one. He has analyzed the same countries and the same sample period as Freeman, but has extracted the cyclical components of output and the unemployment rate. Moosa (1997) has reported a value of -0.37 for the United Kingdom, which is close to the value -0.34 reported in Table 1.

[4] We also used real time data from the Philadelphia Federal Reserve Bank rather than revised data for the unemployment rate. The results, however, are similar to those reported in Table 1 and Table 2.

It is tempting to interpret the cross-country heterogeneity in the Okun coefficient in terms of cross-country differences in labor-market structures and institutions. According to Lee (2000), the relatively small Okun coefficient in the case of Japan can be attributed to substantial institutional rigidity in the Japanese labor market in general and to lifetime job security typical of the Japanese labor market in particular. By the same token, the substantial flexibility of the British labor market may explain the relatively large Okun coefficient of about -0.34 estimated for the United Kingdom. The British labor market is the least regulated one in the European Union (Moosa 1997). The flexibility of the labor market implies that employers can easily reduce (expand) their workforce during an economic downturn (boom). As a result, the correlation between changes in the unemployment rate and the growth rate of real output and, thus, the estimated Okun coefficient is large.

The results summarized in Table 2 suggest that this labor-market-based interpretation of the cross-country variation of the Okun coefficient should not be stretched too far. The results in Table 2 are based on forecasts made in April. Corroborating the results reported in Table 1, the Okun coefficient has the expected negative sign and is statistically significant in all countries, with Germany being an exception. As compared to the results based on the forecasts made in January, however, the relative magnitude of the coefficients has changed. The Okun coefficient estimated for the United Kingdom is now smaller in absolute terms than the Okun coefficients estimated for Canada, the United States, and France. The smallest Okun coefficient is still the one estimated for Japan. Only the coefficient estimated for Germany is smaller, but this coefficient is not significant.

– Include Table 2 about here. –

Table 3 summarizes the results for the empirical model featuring asymmetries, where the results are based on the forecasts made in January. The Okun coefficient always has the expected negative sign. The coefficient, γ, which captures potential asymmetries, is not significant. Table 4 summarizes the estimation results we obtained when we used the forecasts made in April. Again, the Okun coefficient has the expected negative sign and the coefficient that captures potential asymmetries is not significant. The coefficient γ is significant only in the case of the United States, a result which is in line with the evidence of asymmetries in Okun's law reported by Silvapulle et al. (2004). However, because the significance of the coefficient depends upon which forecasts (January versus April) we used for estimating the model, the evidence of asymmetries in the case of the United States is not particularly strong.

– Include Tables 3 and 4 about here. –

5 Conclusion

Our results suggest that, for the G7 countries, professional economists' forecasts reflect Okun's law. We found a significant negative relationship between the *expected* change in unemployment rate and the *expected* growth rate of real output. While the magnitude of the Okun coefficient shows some variation over the year, the estimated coefficients are significant and largely comparable in size to those found in studies based on realized data. Professional economists, however, do not believe in potential asymmetries of Okun's law over the business cycle. This result may reflect that, while empirical evidence in support of the classic linear version of Okun's law is robust, empirical evidence of asymmetries in Okun's law over the business cycle is less clear-cut and often involves difficult econometric issues concerning the appropriate specification and testing of an empirical model (see, for example, Lee 2000).

Taken together, our results suggest that, in the G7 countries, professional economists believe in and, thus, adopt the classic linear version of Okun's law to forecast macroeconomic developments.

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Table 1: Estimation Results for the Baseline Model (January forecasts)

Country	Canada	France	Germany	Italy	Japan	UK	US
Method	Fixed Effects	Fixed Effects	Fixed Effects	Pooled OLS	Fixed Effects	Pooled OLS	Fixed Effects
α	.5429***	1.532***	.6541***	3.6651***	.9172***	.0776	.8245***
	(4.98)	(10.05)	(16.48)	(14.16)	(9.08)	(1.06)	(9.50)
β	-.2953***	-.2831***	-.1848***	-.2784***	-.1109***	-.3413***	-.2395***
	(-7.83)	(-6.39)	(-3.64)	(-3.83)	(-6.05)	(-12.68)	(-9.14)
Observations (No. of groups)	278 (34)	324 (38)	406 (44)	248 (37)	331 (42)	513 (64)	472 (65)
Test statistics Fixed effects (F-value)	2.27***	2.41***	1.32*	1.31	1.92***	1.22	1.30*
Test statistics Time effects (F-value)	13.26***	47.93***	23.28***	112.65***	12.85***	157.35***	36.18***
Goodness-of-fit	within = 0.6094 between = 0.1365 overall = 0.5482	within = 0.7524 between = 0.6257 overall = 0.7177	within = 0.7086 between = 0.5317 overall = 0.6912	R^2 = 0.9351	within = 0.6408 between = 0.4345 overall = 0.6034	R^2 = 0.9067	within = 0.6586 between = 0.7225 overall = 0.6539

Note: We give t-statistics in parentheses. *** (**, *) = significant at the 1 (5, 10) percent level.

Table 2: Estimation Results for the Baseline Model (April forecasts)

Country	Canada	France	Germany	Italy	Japan	UK	USA
Method	Fixed Effects	Fixed Effects	Pooled OLS	Pooled OLS	Fixed Effects	Pooled OLS	Fixed Effects
α	1.1395***	.9806***	1.5526***	3.5899***	.6194***	-.5135***	.6264***
	(16.96)	(7.89)	(5.44)	(16.19)	(7.08)	(-10.09)	(12.61)
β	-.2589***	-.2024***	-.0527	-.1663**	-.0788***	-.1958**	-.2030***
	(-7.39)	(-5.61)	(-.70)	(-2.43)	(-4.33)	(-7.51)	(-9.65)
Observations (No. of groups)	283 (34)	315 (37)	444 (46)	245 (36)	329 (42)	510 (64)	465 (62)
Test statistic: Fixed effects (F-value)	1.56**	2.29***	1.18	1.10	2.11***	1.26	1.89***
Test statistic: Time effects (F-value)	25.78***	49.10***	118.81***	115.99***	17.64***	316.91***	41.63***
Goodness of Fit	within = .7784 between = .6622 overall = .7498	within = .8106 between = .5611 overall = .7731	R^2 = .8206	R^2= .9221	within = .5519 between = .3198 overall = .4993	R^2 = .9238	within = .6839 between = .6554 overall = .6518

Note: We give t-statistics in parentheses. *** (**, *) = significant at the 1 (5, 10) percent level.

Table 3: Estimation Results for the Model Featuring Asymmetries (January forecasts)

Country	Canada	France	Germany	Italy	Japan	UK	US
Method	Fixed Effects	Fixed Effects	Fixed Effects	Pooled OLS	Fixed Effects	Pooled OLS	Fixed Effects
α	.5657***	1.5175***	1.0274***	3.6148***	.9171***	.0796	.8295***
	(4.94)	(9.66)	(16.39)	(13.13)	(9.05)	(1.08)	(9.45)
β	-.2991***	-.2789***	-.1853***	-.2637***	-.1109***	-.3411***	-.2411***
	(-7.83)	(-6.60)	(-3.64)	(-3.39)	(-6.02)	(-12.66)	(-9.09)
γ	-.0154	.0077	.0041	.0220	-.0001	-.0161	-.0044
	(-0.66)	(0.41)	(0.12)	(0.54)	(-0.01)	(-0.66)	(-0.40)
Observations (No. of groups)	278 (34)	324 (38)	406 (44)	248 (37)	331 (42)	513 (64)	472 (65)
Test statistic: Fixed effects (F-value)	2.27***	2.40***	1.30*	1.31	1.90***	1.21	1.29*
Test statistic: Time effects (F-value)	13.10***	45.08***	21.62***	107.62***	12.71***	145.90***	36.09***
	within = 0.6102	within = 0.7526	within = 0.7086		within = 0.6408		within = 0.6587
Goodness-of-fit	between = 0.1424	between = 0.6252	between = 0.5299	$R^2 = 0.9352$	between = 0.4344	$R^2 = 0.9067$	between = 0.7235
	overall = 0.5482	overall = 0.7179	overall = 0.6910		overall = 0.6034		overall = 0.6541

Note: We give t-statistics in parentheses. *** (**, *) = significant at the 1 (5, 10) percent level.

Table 4: Estimation Results for the Model Featuring Asymmetries (April forecasts)

Country	Canada	France	Germany	Italy	Japan	UK	USA
Method	Fixed Effects	Fixed Effects	Pooled OLS	Pooled OLS	Fixed Effects	Pooled OLS	Fixed Effects
α	1.1250***	.9872***	1.5550***	3.6080***	.6284***	-.5082***	.5621***
	(14.26)	(7.80)	(5.43)	(15.57)	(6.81)	(-9.43)	(10.58)
β	-.2554***	-.2044***	-.0533	-.1721**	-.0808***	-.1952***	-.2044***
	(-7.00)	(-5.55)	(-.70)	(-2.39)	(-4.16)	(-7.47)	(-9.83)
γ	.0064	-.0044	.0084	-.0124	.0069	-.0063	.0357**
	(.35)	(.28)	(.15)	(-.27)	(.31)	(-.30)	(3.16)
Observations (No. of groups)	283 (34)	315 (37)	444 (46)	245 (36)	329 (42)	510 (64)	465 (62)
Test statistic: Fixed effects (F-value)	1.55**	2.28***	1.18	1.09	2.10***	1.26	1.90***
Test statistic: Time effects (F-value)	25.44***	48.62***	116.24***	113.48***	16.96***	305.65***	41.97***
Goodness of Fit	within = .7785 between = .6637 overall = .7498	within = .8106 between = .5620 overall = .7732	R^2 = .8202	R^2 = .9218	within = .5521 between = .3216 overall = .4995	R^2 = .9237	within = .6919 between = .6608 overall = .6600

Note: We give t-statistics in parentheses. *** (**, *) = significant at the 1 (5, 10) percent level.