International Stock Return Predictability: On the Role of the United States in Bad and Good Times[1]

Boriss Siliverstovs[2]

KOF Swiss Economic Institute, ETH Zurich

November 10, 2015

Abstract

In this paper we document the asymmetric role that the U.S. stock market plays in the international predictability of excess stock returns during recession and expansion periods. Most of the positive evidence accrues during the periods of recessions in the United States. During the expansions there is only a limited evidence supporting the importance of lagged U.S. returns in predictability of stock returns in 10 industrialised countries.

Keywords: Excess stock return, U.S. recessions and expansions, asymmetric response

JEL code: C22, G12, G14

[1]Useful comments from participants at the KOF Brown Bag Seminar are gratefully acknowledged. We also are grateful to Dave Rapach for providing the data and code on his website allowing us to replicate the results of Rapach et al. (2013). Computations were produced using the R language (`http://cran.r-project.org/)`. The usual disclaimer applies.

[2]`e-mail: siliverstovs@kof.ethz.ch`

”Disclosure Statement”

I have nothing to disclose.

1 Introduction

In the recent contribution to already a vast literature investigating predictability of excess stock market return (e.g. see Fama and Schwert, 1977; Ang and Bekaert, 2007; Campbell and Thompson, 2008; Rapach et al., 2010; Zhu, 2013), Rapach et al. (2013) argue that lagged U.S. return demonstrate a superior out-of-sample predictive ability of excess returns in stock markets of 10 industrialised countries relative to a popular benchmark represented by the historical average. Though compliant with the most of relevant literature emphasising that the excess stock returns are predictable, this finding contrasts those reported in Welch and Goyal (2008). Welch and Goyal (2008) conducts a comprehensive exercise testing most popular variables that were proposed earlier in the literature to be good predictors of the excess stock returns. In particular, Welch and Goyal (2008, p. 1504) summarise their findings stating that "... most models seem unstable or even spurious".

In this paper, we scrutinise the results of Rapach et al. (2013) in order to verify whether the documented superior forecasting performance of lagged U.S. return is indeed stable during recession and expansion phases of the business cycle in the U.S.A. Though Rapach et al. (2013, p. 1656) acknowledge that "... there is a tendency for the gains to be concentrated in NBER-dated U.S. business cycle recessions...", no formal statistical investigation of this observation was so far conducted, providing a main motivation for our paper. Our main finding is that most of the evidence on the predictive ability of lagged U.S. return of national stock returns accrues during recessions. There is a very limited evidence of this kind during expansions.

The rest of the paper is structured as follows. A description of the data is provided in Section 2. Econometric methodology is reviewed in Section 3. The final section concludes.

2 Data

In order to exclude variations in the results due to the use of different sample periods or countries, we downloaded the data used in Rapach et al. (2013) from the website of Dave Rapach.[1] The data comprise the excess stock returns observed during the period 1980M2—2010M12 in the following 11 industrialised countries: Australia, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom and the United States. For brevity, in the remainder of the paper we will refer to the excess stock market return simply as "return".

3 Econometric methodology

In a basic specification, Rapach et al. (2013) investigate the predictive ability of lagged U.S. returns using the following regression model

$$r_{i,t+1} = \beta_{0,i} + \beta_{USA,i} * r_{USA,t} + \varepsilon_{i,t+1}, \tag{1}$$

where $r_{i,t}$ is the monthly return in country i and, respectively, $r_{USA,t}$ is the return in the United States. The forecasts from Equation (1) are compared with those produced by a restricted model with $\beta_{USA,i} = 0$, i.e.

$$r_{i,t+1} = \beta_{0,i} + \varepsilon_{i,t+1}, \tag{2}$$

which is essentially a constant return model. In this model, a historical mean of past returns is the forecast for the next-period return.

Equations (1) and (2) are estimated by OLS in a recursive manner using an expanding window. Initially, a model is estimated using the sample 1980M2—1984M12 and a forecast $\widehat{r}_{i,t+1}$ is produced for 1985M1. Then

[1] http://sites.slu.edu/rapachde/home/research.

the estimation window is increased by one month (1980M2—1985M1) and a forecast is made for the next month again. This procedure continues until the last forecast is made for 2010M12. As a result of this simulated out-of-sample forecasting exercise, a sequence of one-step ahead forecasts is obtained for every country i for 1985M1—2010M12.

Rapach et al. (2013) evaluate predictive ability of $r_{USA,t}$ in terms of out-of-sample measure of fit R^2_{OS} suggested in Campbell and Thompson (2008) which measures the proportional reduction in mean squared forecast error of the benchmark model relative to the more sophisticated model. Positive values of R^2_{OS} indicate that the average forecasting performance of the benchmark model is worse than that of the competing model. Naturally, negative values indicate the opposite. Since the model in Equation (2) is nested in the model in Equation (1), the test of Clark and West (2007) is used for statistical inference on the difference in the predictive ability of the competing models.

4 Empirical results

The empirical results are summarised in Table 1. We report the values of R^2_{OS} for the whole forecast evaluation sample (1985M1—2010M12) for the sake of comparison with the results reported in Rapach et al. (2013, Table VII, columns (2) and (5)) as well as sub-periods defined by the recessionary and expansionary phases of the U.S. business cycle according to the chronology of the National Bureau of Economic Research (NBER). During the period in question there are three recession periods identified with the business cycle peaks in 1990M7, 2001M3 and 2007M12 and the corresponding troughs in 1991M3, 2001M11 and 2009M6.

On the basis of Table 1 several observations can be made. First, we were able to exactly reproduce the findings of Rapach et al. (2013). Judging at the 10% significance level, in 9 out of 10 countries the predictive model in Equation (1) yields a statistically significant reduction in MSFE relative to the historical average model, according to the test of Clark and West (2007). Only for the United Kingdom the null hypothesis of equal predictive ability cannot be rejected. The estimated country-specific R^2_{OS} is between -0.685 for Australia and 3.805 for the Netherlands. As mentioned in Rapach et al. (2013, p. 1656), six of the R^2_{OS} values is above 1% and thus can be interpreted as "economically sizeable".

Second, the comparison of the R^2_{OS} values reported for recessions and expansions reveals a stricking difference both in terms of their magnitude and range. For recessions, the R^2_{OS} takes values in the range between 4.275 for Japan and 13.152 for the Netherlands and for expansions the range is between -3.058 for Australia and 0.698 for Sweden. The Clark and West (2007) test statistic is significant at the 5.1% level in 9 out of 10 countries for recessions. On the contrary, we can reject the null hypothesis of equal forecast accuracy only for Sweden and Switzerland at the 10% level during expansions.

5 Conclusion

In this paper, we verified the robustness of the results of Rapach et al. (2013) regarding whether national excess stock market returns in 10 industrialised countries can be predicted more accurately using lagged U.S. return than a simple benchmark model of constant returns. In doing so, we compared the predictive performance of the competing models over the contractionary and expansionary phases of the U.S. business cycle. We document a strong asymmetry in the predictive ability of the lagged U.S. returns during recessions and expansions with the most evidence supporting predictability of international stock markets found during recessions.

We conclude that the evidence reported in Rapach et al. (2013) is fragile with respect to the forecast evaluation period. Our results are more in line with the earlier retults of Welch and Goyal (2008).

References

Ang, A. and G. Bekaert (2007). Stock return predictability: Is it there? *Review of Financial Studies 20*(3), 651–707.

Campbell, J. Y. and S. B. Thompson (2008). Predicting excess stock returns out of sample: Can anything beat the historical average? *Review of Financial Studies 21*(4), 1509–1531.

Clark, T. E. and K. D. West (2007). Approximately normal tests for equal predictive accuracy in nested models. *Journal of Econometrics 138*(1), 291–311.

Fama, E. F. and G. W. Schwert (1977). Asset returns and inflation. *Journal of Financial Economics 5*(2), 115–146.

Rapach, D. E., J. K. Strauss, and G. Zhou (2010). Out-of-sample equity premium prediction: Combination forecasts and links to the real economy. *Review of Financial Studies 23*(2), 821–862.

Rapach, D. E., J. K. Strauss, and G. Zhou (2013). International stock return predictability: What is the role of the United States? *The Journal of Finance 68*(4), 1633–1662.

Welch, I. and A. Goyal (2008). A Comprehensive Look at The Empirical Performance of Equity Premium Prediction. *Review of Financial Studies 21*(4), 1455–1508.

Zhu, X. (2013). Perpetual learning and stock return predictability. *Economics Letters 121*(1), 19 – 22.

Table 1: Assessing predictive ability of lagged U.S. returns

	Whole sample[a]			Recessions			Expansions		
	R^2_{OS} [b]	Clark and West (2007) (t-stat)	(p-value)	R^2_{OS}	Clark and West (2007) (t-stat)	(p-value)	R^2_{OS}	Clark and West (2007) (t-stat)	(p-value)
AUS	-0.685	1.489	**0.068**	11.005	1.887	**0.030**	-3.058	0.559	0.288
CAN	1.304	2.357	**0.009**	12.866	2.534	**0.006**	-1.719	1.019	0.154
FRA	1.520	1.902	**0.029**	6.242	1.794	**0.036**	0.254	0.978	0.164
DEU	1.572	1.778	**0.038**	6.836	1.636	**0.051**	-0.053	0.920	0.179
ITA	0.918	1.540	**0.062**	6.708	2.383	**0.009**	-0.463	0.108	0.457
JPN	0.821	1.332	**0.091**	4.275	1.221	0.111	-0.455	0.605	0.273
NLD	3.805	2.617	**0.004**	13.152	2.692	**0.004**	0.578	1.227	0.110
SWE	2.900	2.249	**0.012**	10.231	1.770	**0.038**	0.698	1.493	**0.068**
CHE	2.639	2.453	**0.007**	11.891	2.510	**0.006**	0.458	1.309	**0.095**
GBR	0.286	0.973	0.165	5.652	1.828	**0.034**	-1.013	-0.248	0.598

[a] The forecast evaluation sample is 1985M1-2010M12. The reported results exactly replicate those in Rapach et al. (2013, Table VII, columns (2) and (5)). The whole sample is split into the periods defined as a recession by NBER and the expansion periods.

[b] R^2_{OS} is the out-of-sample R^2 statistic (Campbell and Thompson, 2008) which measures proportional reduction in MSFE of the benchmark model (Equation (2)) relative to the model augmented with lagged U.S. stock returns (Equation (1)). The test of Clark and West (2007) is used for testing the null hypothesis of equal forecast accuracy between nested models.