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Equity Risk Premium and the Business Cycle

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Executive Summary

The magnitude of the equity risk premium is often regarded as the most important number in finance and is defined as the return on equity in excess of the risk-free rate (Dimson, Marsh, and Staunton, 2003). The basic rationale, that motivated the empirical investigations of this thesis, is laid by theoretical equilibrium models. For instance, the model of Campbell and Cochrane (1999) incorporates the feature that people are more risk averse during recessions and as a consequence demand a higher expected return to be willing to invest into equities. In a similar vein, Constantinides and Duffie (1996) propose the existence of uninsurable income shocks, that have a larger probability to occur during recessions. In sum, financial theory provides several reasonable arguments in favor of the expected future equity risk premium to exhibit countercyclical variation over the business cycle.

The empirical examination of this thesis is twofold. In a first step, the dependence between financial professionals' expectations on the magnitude of the future equity risk premium and the state of the economy is analyzed. For that purpose, the quarterly forecasts of Graham's CFO survey, that starts in the second quarter of 2000 and comprises at the minimum 141 observations per quarter, are collected. When considering the long-term premium forecasts, the quarter equally-weighted average of the periods spanned by the two recessions is found to be 4.4% as compared to 3.9% for all other quarters. Additionally, the correlation between the long-term expectations and recent past equity returns is -0.24, i.e. negative. Financial professionals therefore tend to anticipate the inherent *countercyclicality* of the equity risk premium over the long-term. A possible explanation for this observation is their thorough knowledge of financial markets and educational background.

As Amromin and Sharpe (2013) find that households have *procyclical* return expectations over the long-term horizon, the results of this thesis are in support of the closing words of Greenwood and Shleifer (2014), who state that heterogeneous agent models are a promising line of further research. In this context, households extrapolate past returns, while more sophisticated investors, such as financial professionals, take the households' behavior into account and are aware of the countercyclicality of the future premium.

This study further contributes to the literature by contrasting CFOs' long-term expectations with their short-term counterparts. In the short-term, CFOs tend to extrapolate recent past returns, as indicated by the positive correlation coefficient of 0.46. Furthermore, the average forecast during normal times reaches almost four times the magnitude of the average expectation during recessions. Hence, the reasoning above only applies to long-term expectations.

In a second step, this thesis examines forecasts based on bivariate linear regressions. The main body of the study focuses on the predictive ability of *global* variables that exhibit an unambiguous relation to the business cycle. The dependent variable is the quarterly *global* equity risk premium from the perspective of either a USD or a CHF investor. The in-sample results, which comprise the entire sample length of at least 30 years, present the R^2s and the heteroscedasticity and autocorrelation consistent t-statistics (Newey and West, 1987). For both currencies and across all lags considered, the production-based variable output gap is most significant. The statistics for output gap are comparable to those reported in Cooper and Priestley (2009) for the US. Additionally, the year-on-year quarterly GDP growth, the quarterly production growth rate, and the consumer confidence index exhibit significant estimates, which, however, are not robust to the choice of the lag.

The in-sample results are complemented by corresponding out-of-sample tests, which ensure that at each point in time all relevant information to make the forecast would have been available to an investor. All considered models are compared to the forecasts of the historical average. The predictions are evaluated using standard measures, such as the mean squared forecast error (Rapach and Zhou, 2013), the out-of-sample R^2 (Campbell and Thompson, 2008), and the p-value corresponding to the MSFE-adjusted statistic (Clark and West, 2007). Except for output gap with respect to the global USD premium, none of the models significantly improve on the historical average. Moreover, the outperformance of output gap seems to rely on specific events, such as the financial crisis. This is in line with Welch and Goyal (2008), who argue that the significance of many models disappears once appropriate out-of-sample test are conducted.

As the in-sample results are remarkably similar when comparing the USD to the CHF perspective, they support the hypothesis that there is a global business cycle that influences the future global equity risk premium irrespective of the

investor's domicile. By contrast, the extremely poor ability of all variables to forecast the CHF premium out-of-sample does not provide evidence in that regard. Clearly, there is more research needed to advance a final conclusion. Noticeably, all significant predictors have the expected coefficient sign in-sample, which confirms that the future equity risk premium on average tends to be higher in bad states of the world. Therefore, it is shown that there is a negative dependence between the business cycle and the future equity risk premium. Unfortunately, it seems to be difficult to make use of this insight from a practical point of view. The results do not provide evidence that any variable systematically outperforms the historical average, and therefore suggest that investment consultants are well-advised to adhere to the historical average approach, provided that they have no superior proprietary information.

This thesis should be viewed as an impetus for further research. The first part of the empirical examination gives some indication that financial professionals' expectations on the premium may vary countercyclically over the business cycle. Nevertheless, the reader should be cautioned against overinterpreting this evidence. As only 11 quarters coincide with recessions, any significance test would be meaningless. Therefore, more instructive examinations will only be possible once new data become available. The second part encourages both academics and practitioners to search for other business-cycle variables, that may display a more robust out-of-sample performance. In order to supply the reader with a basis that enables further engagement with the topic, a selection of influential papers are cited in the text, entailing a comprehensive reference list.