Do Macroeconomic Risks Explain Returns to Size, Value and Momentum Factors?

Mikael C. Bergbrant[a] and Patrick J. Kelly[b+]

[a] *St. Johns University, New York, NY 11439*

[b] *New Economic School, Moscow, Russia 117418*

February 15, 2013

[*] We thank Jim Moore for helpful discussions as well as brown-bag seminar participants at the New Economic School. We are grateful to Lidiya Erdman for diligent research assistance.
Email addresses: bergbram@stjohns.edu, pkelly@nes.ru.

Do Macroeconomic Risks Explain Returns to Size, Value and Momentum Factors?

Mikael C. Bergbrant[a] and Patrick J. Kelly[b*]

[a] *St. Johns University, New York, NY 11439*

[b] *New Economic School, Moscow, Russia 117418*

Abstract

Market factor returns are correlated with changes in macroeconomic growth and inflation expectations. Size, value and momentum factors are often not correlated and when they are, the returns act as a hedge against macroeconomic risk, not as a proxy for it. These findings are not the result of low power test but rather from the fact that small and large stocks, and separately value and growth stocks, have economically and statistically similar sensitivity to a number of macroeconomic risk factors. Evidence suggests that the size factor may proxy for innovations in dividend yield and value factors may proxy for short rates and the term spread, suggesting that the value factor may reflect duration related risk.

February 15, 2013

* We thank Jim Moore for helpful discussions as well as brown-bag seminar participants at the New Economic School. We are grateful to Lidiya Erdman for diligent research assistance.
Email addresses: bergbram@stjohns.edu, pkelly@nes.ru.

Do Macroeconomic Risks Explain Returns to Size, Value and Momentum Factors?

Abstract

Market factor returns are correlated with changes in macroeconomic growth and inflation expectations. Size, value and momentum factors are often not correlated and when they are, the returns act as a hedge against macroeconomic risk, not as a proxy for it. These findings are not the result of low power test but rather from the fact that small and large stocks, and separately value and growth stocks, have economically and statistically similar sensitivity to a number of macroeconomic risk factors. Evidence suggests that the size factor may proxy for innovations in dividend yield and value factors may proxy for short rates and the term spread, suggesting that the value factor may reflect duration related risk.

Draft:

February 15, 2013

Preliminary and Incomplete

Hou, Karolyi and Kho (2011) and Fama and French (2012) develop international extensions of Fama and French's (1993) three-factor and Carhart's (1997) four-factor asset pricing models. These models include local, regional and global versions of the market, size (SMB), book-to-market (HML) and momentum (WML) factors and are quite successful in pricing the international cross-section of stock returns with little time-series mispricing. While local (single country), regional and global factors all contribute to pricing, most of the models' explanatory power comes from the local factors. Much as the original Fama and French three factors were largely empirically motivated, so are these international versions.

In the two decades since Fama and French put forward their model, much work has gone into attempts to understand the sources of risk for which these factors may proxy and whether these factors proxy for risk at all. The research falls in to two broad camps: those that provide evidence that the factors do not represent unhedgable sources of risk, notably Daniel and Titman (1997, 2012); and a voluminous literature that provides evidence that they do, Petkova (2006) and Vassalou, (2003) are just two of many examples. However, even these have been called into question; see for example Lewellen, Negal and Shanken (2010).

In this paper we examine whether the empirical success of the size, book-to-market and momentum factors is because they act as proxies for unhedgable sources of macroeconomic risk. In short, we find evidence that within and across 20 developed markets that market returns do respond to changes in real GDP growth and inflation expectations, but SMB, HML and WML returns do not. This is true whether we look at a value factor formed on book to market as in Fama and French (2012) or on cash flow to price as in Hou et al. (2011). Our SMB, HML and WML findings are not due to the use of low powered tests. High and low book-to-market portfolios and small and large size portfolios are sensitive to innovations in real GDP growth and inflation expectations, but the sensitivities are economically similar and statistically indistinguishable.

The prior research into the nature of risk for which these factors proxy can be broken into several, not necessarily mutually exclusive categories that which argues: size and book-to-market are characteristics of the firm which make firms more sensitive to the business cycle, such as default risk and leverage (such as Fama and French, 1998, and Ferguson and Shockley, 2003);[1] size, book to market and momentum proxy for predictive measures which forecast the distribution of returns in the spirit of the ICAPM, such as short rates, default spread, term spread and dividend yields (Petkova and Zhang, 2005, Petkova, 2006, Hahn and Lee, 2006, Kang, Kim, Lee, and Min, 2011, Bali and Engle, 2012);[2] size, book to market and momentum proxy for macroeconomic measures, GDP growth, inflation, employment, consumption (Vassalou, 2003, and Cenesizoglu, 2011). Most of this research has been conducted with U.S. data only. Liew and Vassalou (2000) is one exception. This paper provide evidence that nominal GDP growth this is relevant in several markets for local versions of HML and SMB, but not WML.

This paper contributes to the literature in at least two ways. The first contribution is that this paper is the first to examine the sources of macroeconomic risk associated with international versions of the Fama-French three factor and Carhart four factor models proposed by Hou et al. (2011) and Fama and French (2012). In doing so, we are also providing out of sample tests for the studies examining the sources of risk associated with the U.S. versions of the Fama-French and Carhart models.

Hou, et al. (2011) show that a value factor formed by sorting on cash low to price, instead of book to market as is preferred by Fama and French is still priced when using test portfolios other than the size and book-to-market portfolios typically used, where as a value factor formed on book

[1] Others which find no such effects such as Griffin and Lemon (2002) and Daniel and Titman (1997).
[2] Maio and Santa Clara (2012) provide evidence to the contrary. Predictive measures are insufficient to explain the success of the Fama and French and Carhart models.

to market is not. We compare the two different value factors, yet find that neither appears to be a proxy for macroeconomic growth or inflation risk.

Our second major contribution is to the literature examining whether momentum returns are anomalous or due to risk exposure. For the U.S., Chordia and Shivakumar (2002) and Li and Zhang (2008) find that momentum strategies are risky and their profits are associated with GDP growth risk (Griffin, Ji and Martin, 2003 provide evidence to the contrary). Our paper, extends Liu and Zhang (2008) internationally. Our preliminary evidence provides support for the notion that WML is correlated with macroeconomic risk measures, what remains to be understood is whether these correlations represent compensation for baring risk or whether they act as a hedge which could be used to reduce risk.

In detail we find that in 20 markets around the world, local market factor returns are influenced by GDP growth risk and inflation growth risk. Momentum factor returns are related to inflation, but such that WML pays off more in times when inflation is high. SML more when dividend yields are low (predicting low future returns in the market). HML based on book-to-market sorts is quite successful, but whether it is acting more a hedge against risk or a proxy for the risk is unclear. While Hou, Karolyi and Kho's (2011) cash-flow based version of the value/growth factor was more successful in their study when pricing assets in the cross-section, the findings here suggest that the success is not the result of the cash flow to price factor proxing for some macroeconomic risk.

We improve upon existing research by providing joint tests of the models across 20 markets. Relative to US-only studies, such as Aretz, Bartram and Pope (2010), which examines whether macroeconomic and predictive measures explain HML and SMB in the US, this results in more powerful tests because of the larger sample (i.e. reducing the likelihood of Type II error, not rejecting the null when the null is false). Relative to the very few other cross-country studies (see for

example, Liew and Vasalou, 2000) these joint tests recognize that country-level findings are not completely independent, since world markets are at least partially integrated. Accounting for the correlations across markets improves the size of our tests (reducing the likelihood of Type I error, rejecting the null hypothesis when the null is true). In addition, we use mean consensus economic forecasts as our measure of investor expectations. By contrast nearly all prior research into the sources of macroeconomic risk associated with HML, SMB and WML uses realizations of macroeconomic measures as proxies for expectations. By reducing noise in the measure of expectations we improve the power of our tests; and as Elton (2002) points out, if there are large surprises, or a long series of surprises in the same direction, either positive or negative, by using consensus forecasts we improve the size of our tests by reducing the likelihood of spurious correlation. Empirically, the use of direct measures of the expectations could yield dramatically different inferences from inferences drawn when using realizations to proxy for expectations. For example, Brav, Lehavy and Michaely (2005) find that high and low book-to-mark firms have no significant difference in expected returns as measured by Value-Line forecasts even though realized differences are notable.

The paper outline is as follows. Section 1 describes our data and sample. Section 2 presents evidence about the correlation between the Fama-French and Carhart factors' with macroeconomic risk. We use sorts, panel regressions and event studies for these analyses. Section 3 concludes.

1. Data

We collect market data from July, 1990 through December 2011 for 20 markets around the world. Our limiting constraint is availability of mean macroeconomic forecasts from Consensus Economics. We have data from the following markets: Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Israel, Italy, Japan, Netherlands, Norway, Portugal, South Africa, Spain, Sweden, Switzerland, UK, and the USA. Table 1 shows our market coverage in terms of firms per market and

year. On average, our sample covers in excess of 16,000 firms, with a minimum coverage of 13,217 firms and a maximum coverage of 17,817 firms. Our largest market is, as expected, the United States with an average of 4,973 firms covered, and the smallest market covered in the sample (as judged by number of firms covered) is Ireland with an average of 63 firms covered.

1.1 Macro Economic Forecasts (Independent Variables)

As explained in the introduction, we use mean consensus economic forecasts as our measure of investor expectations. The consensus forecasts are obtained from Consensus Economics and are available in a consistent format for 20 markets from October 1989 (due to the creation of portfolio returns, we start the sample in July of 1990). The company provides both the mean and standard deviation of the forecasts in most markets covered. Consensus Economics surveys professional economists every month regarding their macroeconomic forecast for the current year as well as the following year.

Surveys are typically due by the close of business on the second Monday of the month. They wait till the second Monday because macroeconomic announcements are made in the first week of the month in many markets and they want to allow their respondents to incorporate the new information in their forecasts. Since macro forecasts for the contemporaneous year often are highly correlated with the forecast for the following year, we calculate and present a compounded measure (continuously compounded) of the change in the forecasts. To calculate the change in the forecast, we subtract the previous month's forecast from the new forecast. Table 2, shows the summary statistics for our consensus economics forecasts for each market.

We focus on the macro forecasts of real GDP growth and consumer prices, but forecasts are also available for three-month interest rates, private consumption, industrial manufacturing, wages, industrial production, and the ten year interest rate. For our global model, we weight each

compounded forecast by the country's previous year-end market value. As is evidenced in Table 2, the macro economic forecasts are volatile, and there is ample dispersion both between and within markets. Focusing on GDP forecasts, the market with the highest mean forecast is Ireland with 7.21% and the market with the lowest average GDP forecast is Italy with 2.98%. Furthermore, several markets have standard deviations of the forecasts in excess of 50% of their means. For the pooled sample, the mean GDP forecast is 4.37% while the standard deviation is 2.80% (64%). Similar conclusions can be drawn regarding the other macro forecasts presented. Note that not all macro economic forecasts are available for all markets. Turning to the changes in the forecasts, and once again focusing on the GDP forecasts, it is interesting to note that while the mean change for the pooled sample is a mere -0.07%, the standard deviation of the forecast changes is 0.34%. Looking at the changes in consumer price forecasts, the mean is almost 0 (0.01%), but the standard deviation is .28%. The high volatility in the forecasts changes would allow the potential for forecast changes to explain portfolio returns.

Because the surveys are done on the second Monday of the month, they are as early as the 8th and as late as the 16th. To make sure that we know the precise timing of the returns relative to the surveys, we calculate portfolio returns (described below) from the evening of the survey date to the evening of the next survey date. In this way we can be certain that forecasts are not merely reflecting the market, but the other way around. This procedure means that some months will have a few days more than other months. As long as there is no systematic pattern these differences should cancel out in our tests.

1.2 Portfolio Returns (Dependent Variables)

Stock data is from Thomson Financial's Datastream. We restrict our analysis to common stocks that trade in the companies' home markets and in local currency. In order to eliminate non-common

equity, we follow the detailed methodology laid out in Griffin, Kelly and Nardari (2010); We eliminate securities that represent cross listings, duplicates, mutual funds, unit trusts, certificates, notes, rights, preferred stock, and other non-common equity. When a firm has multiple classes of stock, we include a class of stock if it began trading at least three months earlier than all other classes. For China, Mexico, and the Philippines, we first choose the stock that can be traded by local residents. For cases in which two or more classes of stock are first listed on Datastream within three months of each other, we choose the more actively traded stock, which is determined to be the class that has greater volume in the first calendar year of trading. If volume is missing, we choose the stock that has the greater number of trading days as proxied by non-zero returns during the trading day.

We calculate factor-mimicking portfolio returns for SMB and HML as in Hou, Karolyi, and Kho (2011). We rank firms on the characteristic of interest and form quintile portfolios at the end of June in each year. The value-weighted returns of those quintile portfolios are subsequently calculated from July of the year of formation (t) until June in the following year (t+1). We require at least five stocks in each of the extreme quintile portfolios in order to calculate the factor returns[3]. The formation period methodology follows closely that used by Fama and French (1992, 1993). HML is then calculated as the return on the highest of either book to market or cash flow to price quintile portfolio minus that of the lowest quintile portfolio, while SMB is calculated as the return on the lowest quintile portfolio less the return of the highest quintile portfolio. WML is calculated as in Jagadeesh and Titman (1993) six month/six month strategy, except that we use portfolio quintiles instead of deciles. In contrast to the SMB and HML, the WML portfolios are updated monthly. The returns are calculated based on a strategy of buying the winners and selling the losers from the

[33] Due to limited availability of firms with necessary data on the characteristics used to form the factor mimicking portfolios, the time series for Israel is shortened in several of the tests.

previous month[4]. Each of the portfolios formed this way are held for six months. We calculate both a country version, as well as a global version of the factor mimicking portfolios. In the global version, the ranking is employed universally across all the stocks in all the markets in our sample. The factor returns for the country and world factors are presented in Table 2.

2. Associations between factor returns and macroeconomic expectations

If SMB, HML, whether calculated by sorting on book to market or cash flow to price, and WML proxy for either predictive variables, such as the term spread, default spread or short rates, or for macroeconomic risks then the factor returns must be positively associated with increases in those risks. We are careful here to use the term "associated" and not "correlated" because, as Cochrane (2005, Chapter 9) notes, ICAPM factors are not required to explain the covariance matrix of returns. If the factors are state variables with discrete changes in state (jumps) then the correlations between returns and proposed factors may actually be quite low. We address this possibility, in part, by examining average returns to factors when macroeconomic expectations are high and low in section 2.1. We tests whether these factors are correlated with changes in the macroeconomic risk measures in section 2.2. For parsimony we focus exclusively on the Hou, et al. (2011) model, which uses only local and global versions of size, value and momentum factors, as opposed to the Fama and French (2012) version, which uses local, regional and global factors.

2.1 Portfolio average macroeconomic forecast measures and factor returns

2.1.1 Full sample averages

We begin very simply. If the size, value and momentum factors are factors associated with risk then we should see, in a long enough sample, that average returns are positive reflecting compensation

[4] In order to avoid bid-ask bounce, the winners from month t and purchased in month t+2, so one month is skipped between ranking and holding

for the risk born for holding the factor portfolio. Table 3 presents sample averages and standard deviations for each of the five factors we look at, the Market, size, momentum and value, both the Fama and French (2012) version created by sorting on book to market and the Hou et al. version created by sorting on cash flow to price.

The evidence in Table 3 is consistent with the market, value and momentum acting as factors: Each of these factor returns are on average positive over the entire sample, when we average across all 20 markets. The case for the size factor is not strong. The average size factor return is a positive 0.03 when averaging across all markets. This compared to 0.46 to 0.73 for the other factors. While theory gives us no indication what magnitude returns we should expect on factors, we do know they should be positive. For the market, value and momentum, the factor returns are positive in all but 2 markets. For size 13 of 20 markets has a negative return. If SMB is a risk factor then investors were negatively surprised on average in those 13 markets because expected returns must be positive if SMB is a risk factor.

2.1.2 Macroeconomic forecast portfolios

In Table 4 we present the average factor returns across markets to quartile portfolios formed by sorting on the two-year compound forecast for the macroeconomic measure. These sorts are done country by country, so that countries with top growth in sample do not dominate the top portfolio and countries with bottom growth do not dominate the bottom. This sort serves three purposes. First, it gives us some sense of the associations we might expect to find in regressions between the macroeconomic measures and the factor returns. Second it gives us some sense whether differences in factor returns between good and bad states are economically meaningful. Third, it allows for the possibility that states are discrete. That is, smaller changes in a forecast might not meaningfully impact factor returns, but big changes do, because a big change is indicative a different state of the economy.

In panel A we see that when we sort on next year's GDP forecast other macroeconomic forecast measures are strong when the economic forecast is strong and weaker when it is weak. Clearly (and not surprisingly) there is a common component among the macroeconomic measures. These associations are also evident in the correlation matrix in Table 6 in which we see that levels of GDP growth, private consumption and industrial production (or manufacturing) are highly correlated. Changes in the measures are less correlated, and we will be looking at those in the next section. Inflation has a high correlation with the remaining macroeconomic variables we have available to us. It is highly correlated with forecasts of wage growth, three month and ten-year treasury rates. Ultimately, we will take advantage of the high correlations by using only GDP growth and inflation in our subsequent tests. We do this solely because GDP growth and inflation are the only two forecast measures we have across all 20 markets, but the high correlations suggest that we may not be missing a lot even if we cannot use the other six forecast measures for which we have incomplete coverage.

If we sort on forecast macroeconomic measures, what we should see for factors that proxy for that risk is that expected returns are high when that measure indicates the greatest macroeconomic risk. This intuition follows from Campbell and Diebold (2005) who show that depressed expected business conditions are associated with high expected returns. In realized returns the high expected returns should translate to high average returns, given a long enough time frame. In panel B we present the average factor returns for each of the macroeconomic-measure sorted portfolios. The market portfolio returns follow the pattern described above. When a bad economy is forecast, returns are high and when a strong economy is forecast returns are low. In Figure 1 we see the market returns for the United States plotted against this year and next year's cumulative GDP forecast and cumulative inflation forecast. Implied recessions are marked in grey. What this chart reveals is that right before the market drops and GDP forecasts are revised downward. Then during

the implied recession, the market rebounds, but with high volatility, leading to the average higher returns measured. This is exactly consistent with a period of high expected return.

Given the high correlation across the macroeconomic measures, the fact that we see similar patterns when using any of the macroeconomic measures is not surprising. However, in unreported results, these differences are significant only for sorts on GDP growth and inflation. In general, when the measure forecasts worsening economic condition average returns are higher. The same cannot be said for other factor returns. All have exactly the opposite pattern, forecasts of bad economic conditions is associated with lower expect/average returns, which does not bode well for these "factors" acting as proxies for macroeconomic growth risk. In unreported results, these differences are significant when sorting on GDP growth for the size and momentum factors and the value factor calculated on cash-flow, but not the value factor calculated using book to market. Except momentum, the other factors show little difference when sorting on other forecast measures.

It is possible that our quartile sorts are not fine enough to show what is going on during weak economic times verses strong economic time, because recessions are not 25% of the time in our sample. In the US, recessions are only 13.9% of the time. As robustness, in Table 5 we sort socks into two portfolios, the top 6/7ths of forecast GDP and the bottom $1/7^{th}$. We call months in the bottom $1/7^{th}$ (chosen to correspond roughly to 13.9%) implied recessions. The results are a bit more pronounced using these finer sorts.

Inflation yields opposite inferences: low inflation expectations are associated with high market returns and high inflation expectations are associated with low future returns. Among the size, value and momentum portfolios we see the opposite, low inflation expectations are associated with low returns and high inflation expectations with high returns, although in unreported results, none of these differences are statistically significant. Together these findings suggest that the market is more strongly associated in the correct direction with GDP growth measures and size, value and

momentum factors with inflation. In the next section we turn to examining impact of innovations in macroeconomic measures on factor returns, in a panel regression setting which controls for common movements across markets.

2.2 Panel regressions using local factors

Next we turn to regressions to examine whether changes in macroeconomic expectations impact factor returns. We choose panel regressions over simple country-by-country regressions because panel regressions allow us to control common comovement across countries, while at the same time allowing us to exploit cross-country differences to improve the power of our tests.

In our specifications we run pooled OLS regressions with cluster by time and by country. Consensus Economics forecasts are always for a full calendar year. For example, in January of 2009 Consensus Economics asks its survey participants to forecast real GDP growth for calendar year 2009 and calendar year 2010. Each month they ask for the same forecasts, so in December of 2009, Consensus Economics will still be asking what the forecast for 2009 and 2010 are. To control for possible seasonalities induced by this survey method we include dummy variables for each month but January. In Tables 7, 8, 9 and 10 we suppress these dummies and the constant term to conserve space.[5]

2.2.1 Ex-ante forecasts

In Table 7 we regress market returns, the two value factor returns, size and momentum returns on changes in the monthly revisions to the annual GDP forecasts and the predictive variables dividend yield, term spread and short rates. These revisions are made on the day before we start to calculate

[5] As robustness, we used several methods to adjust for the fact that the forecast period was shorter. For instance, we scaled forecast changes by (a) the standard deviation of the forecast given and (b) by the average standard deviation for all forecasts made in a month respectively. In additional tests, we interacted the forecast changes by the month to allow macro forecast changes to have a different impact on portfolio returns in different months. All these methods yielded qualitatively similar results, so we decided to stay with the most straight forward method to control for the seasonality so as to minimize concern that our adjustment techniques were spuriously driving our findings.

returns. For example if the survey was closed on February 8th, we start calculating returns from the close of the market on February 8th. We include an implied recession dummy, calculated as described in section 2.1.2 above. This implied recession dummy is interacted with the macroeconomic forecast measure to allow for a different impact of changes during recessions and during expansions. This is expected to be particularly important for inflation, where high inflation might be viewed negatively during expansions, but positively during revisions (Bestelmeyer, Breunsbach, and Dieter, 2011, show that macroeconomic news has different impact at different points in the business cycle, as does McQueen and Roley (1993) and Boyd, Hu and Jagannathan, 2005). We ran specifications with and without the term spread, dividend yield and short rates, but the results were nearly the same, so we only report those with dividend yield, term spread and short rates.

In the panel setting we again find that average returns for the market in Panel A is positive and significant during recessions, but either not significant or negative and significant for the cash-flow-to-price value factor, the size factor and momentum in the second column of Panels B through E. What is notable about these findings is that almost all of the portfolios that make up the factors have positive return during implied recessions, just like the market as a whole does, the negative averages come from the fact that the big portfolio or the growth portfolio or the loser portfolio has a higher positive return during recessions than its small, value or winner companion. We get mixed results from the Fama-French HML factor. Forecast improvements lead to negative factor returns during expansions and positive changes during recessions. This evidence is consistent with Petkova and Zhang's (2005) evidence that value stocks have high betas during recessions and low betas during expansions. As such it is a risk related to GDP growth, but the risk is not GDP growth itself.

The cash-flow-to-price value factor appears to act as a hedge against short interest rate risk rather than a factor representing that risk: Its returns increase right when interest rates are forecast to rise and money becomes more costly to borrow. Normally, high dividend yields predict high

returns. For the size factor, and especially for the small portfolio we see that high dividend yield predict low returns, and low dividend yields predict high returns. Like the cash-flow-to-price factor, this suggests that the size factor is a hedge for what ever risks might be associated with dividend yield, not a proxy for that risk.

In Table 8 we examine the impact of changes in inflation expectations on the factors and the portfolios that make up the factors controlling for term spread, dividend yield and short rates. There is good economic motivation for including both growth forecasts and term spread, dividend yield and short rates, Campbell and Diebold (2005, 2009) show that term spread, dividend yield, short rates and default spread provide information about long horizons in addition to short horizon information, where as growth forecasts predominantly contain information medium and short horizon information. The market is very sensitive to increases in inflation in the direction we would expect. Inflation increases during expansions and returns drop. The positive coefficient on the interaction between inflation and the recession indicator is nearly identical to the coefficient on inflation during expansions, suggesting that inflation has no real impact on returns during recessions. This makes since, because as noted earlier, inflation during recessions is not unambiguously negative. The value and momentum factors are positively and significantly associated with increases in inflation, suggesting that these factor portfolios act to hedge inflation, not as a proxy for its risk. The same is true for the size factor in sign, but its coefficient is statistically insignificant. Once again, the sub-portfolios are sensitive to inflation risk consistent with a factor-mimicking portfolio, but the factor portfolio returns are not.

In table 9 we run regressions with both GDP and inflation forecasts and dividend yield, term spread and short rates. Results are qualitatively similar to those already described for panel regressions with inflation and real GDP growth separately.

2.2.2 Contemporaneous forecasts

Finally, in Table 10 we run a similar panel regression as in table 9, except that we use forecasts that come after returns have been observed. There are at least two ways to view such a regression. The first is that it suggests how economists update their forecasts in response to stock market movements. The second interpretation is that both the market and the forecasters are updating their expectations at the same time so that the forecasts measured after the returns gives a better estimate of how changes in the assessment of the economy impacts stock prices and factor returns. Unfortunately, we cannot disentangle the two possibilities.

The results are qualitatively similar to those using the ex-ante forecast measures, except that they are statistically much stronger. Ultimately the story is the same: The market and the portfolios that make up the factors reflect macroeconomic risks, but the factors themselves do not.

2.3 Global factor sensitivity to macroeconomic forecasts and other predictive variables

In this section we examine whether changes in global forecasts affect global factor returns. Consensus Economics does not provide global forecasts, so instead we create a global forecast by using the market capitalization weighted forecast averaged over all 20 markets. The results are similar, but not exactly the same as previous evidence regarding the local factors.

As we see in Table 11, world inflation growth has a positive impact on returns during recessions, but otherwise no impact. The big difference here from the local results, is that there is no association between global GDP growth and world market returns (really the value-weight average of the 20 markets in our study). In contrast to earlier tests, here the Fama-French HML factors appears to reflect some inflation related risk. HML returns increase in response to inflation during recessions. The Hou, Karolyi and Kho cash-flow-to-price version of the value factors is providing very mixed evidence. With respect to inflation, the negative coefficient on inflation during recessions

suggests that the correlation is going the opposite direction of what would be expected from a risk factor. So to for the negative coefficient on GDP growth during expansions. This value factor is looking more like a hedge against risk rather than a proxy for it.

Finally, Table 11 shows that there is no relation between the global size factor real economic growth and inflation risks. Momentum factor returns have a negative loading on dividend yield (typically the association is positive), suggesting that the global momentum factor is acting as a hedge against whatever risk dividend yield explains.

3. Conclusion and Future Work

In this paper we examine whether the empirical success of the size, value and momentum factors is because they act as proxies for unhedgable sources of macroeconomic risk. This is the first paper to test for the macroeconomic risks that may be associated with international versions of the three-factor and four-factor models developed by Hou, Karolyi and Kho (2011) and Fama and French (2012). In short, we find evidence that within and across 20 developed markets that market returns do respond to changes in real GDP growth and inflation expectations, but SMB, HML and WML returns do not. This is true whether we look at a value factor formed on book to market as in Fama and French (2012) or on cash flow to price as in Hou et al. (2011). Our SMB, HML and WML findings are not due to the use of low powered tests. High and low book-to-market portfolios and small and large size portfolios are sensitive to innovations in real GDP growth and inflation expectations, but the sensitivities are economically similar and statistically indistinguishable.

To further increase the power of our tests, future work will use macroeconomic news announcements to examine the response of factor returns to scheduled macroeconomic announcement days and macroeconomic surprises. We will also examine whether macroeconomic expectations shock consistently lead to changes in market volatility following Flannery and

Protopapadakis (2002). We will investigate the cross-country momentum findings in greater deapth to extend Lie and Zhang's (2008) finding that momentum profits are associated with the business cycle in the US. Finally, we will examine whether these macroeconomic factors could plausibly price the cross-section of stock.

REFERENCES

Aretz, Kevin, Sohnke Bartram and Peter F. Pope, 2010, Macroeconomic risks and characteristic-based factor models, Journal of Banking and Finance 34, 1383–1399.

Bali, Turan G. and Robert F. Engle, 2012, The Conditional CAPM Explains the Value Premium, NYU Working Paper.

Brav, Alon, Reuven Lehavy, and Roni Michaely, 2005, Using Expectations to Test Asset Pricing Models, Financial Management, 5-37.

Bestelmeyer, Georg, Miriam Breunsbach, and Dieter Hess, 2011, Expected Risk Premium Dynamics across the Business Cycle and the Stock Market's Response to Macroeconomic News, University of Cologne working paper.

Campbell, Sean D. and Francis X. Diebold, 2005, Stock Returns and Expected Business Conditions: Half a Century of Direct Evidence, National Bureau of Economic Research working paper 11736.

Campbell, Sean D. and Francis X. Diebold, 2009, Stock Returns and Expected Business Conditions: Half a Century of Direct Evidence, *Journal of Business and Economic Statistics* 27, 266-278.

Carhart, Mark M., 1997, On Persistance in Mutual Fund Performance. *Journal of Finance* 52, 57-82.

Cenesizoglu, Tolga, 2011, Size, book-to-market ratio and macroeconomic news, *Journal of Empirical Finance* 18, 248-270.

Chordia, Tarun and Lakshmanan Shivakumar, 2002, Momentum, Business Cycle, and Time-varying Expected Returns, *Journal of Finance* 57, 985–1019.

Daniel, Kent and Sheridan Titman, 1997, Evidence on the Characteristics of Cross Sectional Variation in Stock Returns. *Journal of Finance* 52, 1-33.

Daniel, Kent and Sheridan Titman, 2012, Testing Factor-Model Explanations of Market Anomalies. *Critical Finance Review* 1, 103-139.

Elton, Edwin J., 1999, Expected Return, Realized Return, and Asset Pricing Tests, *Journal of Finance* 54, 1199-1220.

Fama, Eugene F., and Kenneth R. French, 1992, The Cross-Section of Expected Stock Returns, *Journal of Finance* 47, 427–465.

Fama, Eugene F., and Kenneth R. French, 1993, Common Risk Factors in the Returns on Stock and Bonds. *Journal of Financial Economics*, 1993, 33(1), pp. 3-56.

Fama, Eugene F., and Kenneth R. French, 1998, Value versus Growth: The International Evidence, *Journal of Finance 53, 1975–1999* .

Fama, Eugene F., and Kenneth R. French, 2012, Size, Value, and Momentum in International Stock Returns, *Journal of Financial Economics*, 2012, 105(3), pp. 457-72.

Ferguson, Michael F. and Richard L. Shockley, 2003, Equilibrium "Anomalies", *Journal of Finance* 58, 2549-2580.

Flannery, Mark J. and Aris Protopapadakis, 2002, Macroeconomic Factors Do Influence Aggregate Stock Returns, *Review of Financial Studies,* 751-782.

Gilbert, Thomas, 2011, Information aggregation around macroeconomic announcements: Revisions matter, *Journal of Financial Economics* 101, 114–131.

Griffin, John M., Susan Ji and Spencer Martin, 2003, Momentum Investing and Business Cycle Risk: Evidence from Pole to Pole, *Journal of Finance* 58, 2515-2547.

Griffin, John M., Patrick J. Kelly, and Federico Nardari, 2010, Do Market Efficiency Measures Yield Correct Inferences? A Comparison of Developed and Emerging Markets, *Review of Financial Studies*, 23, 3225-3277

Griffin, John M., and Michael Lemmon, 2002, Book-to-market equity, distress risk, and stock returns, *Journal of Finance*, 57, 2317–2336.

Hahn, Jaehoon and Hangyong Lee, 2006, Yield Spreads as Alternative Risk Factors for Size and Book-to-Market, *Journal of Financial and Quantitative Analysis* 41, 245-269.

Hou, Kewei, G. Andrew Karolyi, and Bong-Chan Kho, 2011, What Factors Drive Global Stock Returns, *Review of Financial Studies* 24, 2527-2574.

Jegadeesh, Narasimhan, and Sheridan Titman, 1993, Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency*, Journal of Finance* 48, 65-91.

Kang, Jangkoo, Tong Suk Kim, Changjun Lee and Byoung-Kyu Min, 2011, Macroeconomic risk and the cross-section of stock returns, *Journal of Banking & Finance* 35, 3158–3173.

Lewellen, Jonathan, Stefan Nagel and Jay Shanken. A Skeptical Appraisal of Asset-Pricing Tests. *Journal of Financial Economics* 96, 175–194.

Liew, Jimmy and Maria Vassalou, 2000, Can book-to-market, size and momentum be risk factors that predict economic growth? , *Journal of Financial Economics* 57, 221-245.

Liu, Laura Xiaolei and Lu Zhang, 2008, Momentum Profits, Factor Pricing, and Macroeconomic Risk, *Review of Financial Studies* 21, 2417-2448.

Maio, Paulo and Pedro Santa-Clara, 2012, Multifactor models and their consistency with the ICAPM, *Journal of Financial Economics* 106, *586–613*.

McQueen, G., and V. V. Roley, 1993, Stock prices, news, and business conditions, *Review of Financial Studies* 6, 683-707.

Petkova, Ralitsa, 2006, Do the Fama–French factors proxy for innovations in predictive variables? Journal of Finance 61, 581-612.

Petkova, Ralitsa and Lou Zhang, 2005, Is Value Riskier than Growth?, Journal of Financial Economics 78, 187–202.

Savor, Pavel and Mungo Wilson, 2011, How much do investors care about macroeconomic risk? Evidence from scheduled economic announcements, *Journal of Financial and Quantitative Analysis* forthcoming.

Savor, Pavel and Mungo Wilson, 2011, Stock market beta and average returns on macroeconomic announcement days, *University of Pennsylvania, Wharton School of Business Working Paper*.

Vassalou, Maria, 2003, News related to future GDP growth as a risk factor in equity returns. Journal of Financial Economics 68, 47-73.

Table 1 – Sample Coverage

This table shows the coverage of our sample by market. The sample covers 20 markets over the period from July 1990 to December 2011. This table shows the average number of firms per market during the same period, as well as the minimum and maximum number of firms per market.

	Number of Firms per Market		
Market	Mean	Min	Max
Belgium	171	142	197
Canada	1790	1156	2246
Denmark	210	165	251
Finland	118	60	149
France	886	724	1006
Germany	739	422	1113
Greece	239	102	323
Ireland	63	41	85
Israel	490	164	603
Italy	283	245	325
Japan	2928	1976	3523
Netherlands	166	104	216
Norway	181	119	242
Portugal	96	46	154
South Africa	408	275	561
Spain	157	123	183
Sweden	352	205	484
Switzerland	247	231	270
UK	1707	1227	2023
USA	4973	4066	5833
Global	16203	13217	17817

Table 2 – Macro Economic Forecasts

This table shows the average macroeconomic real growth forecast as well as the average growth forecast change for each market in our sample. The forecasts are obtained monthly from Consensus Economics. We focus on the growth forecasts for GDP, Consumer Prices, Three-Month Interest Rates, Private Consumption, Industrial Manufacturing, Wages, Industrial Production, and the 10 Year Bond Rate. The sample extends from July 1990 to December 2011 and covers 20 markets.

	GDP				Consumer Prices			
	Forecast		Change		Forecast		Change	
	Mean	Std	Mean	Std	Mean	Std	Mean	Std
Belgium	3.76%	1.86%	-0.07%	0.28%	4.19%	1.23%	0.00%	0.22%
Canada	5.09%	1.79%	-0.06%	0.28%	4.44%	1.93%	-0.02%	0.20%
Denmark	3.77%	1.75%	-0.05%	0.23%	4.51%	1.09%	-0.03%	0.17%
Finland	4.59%	2.90%	-0.08%	0.42%	4.64%	2.41%	-0.05%	0.23%
France	3.86%	1.81%	-0.07%	0.26%	3.71%	1.31%	-0.01%	0.16%
Germany	3.37%	2.26%	-0.06%	0.32%	3.98%	1.64%	0.00%	0.15%
Greece	4.22%	4.02%	-0.11%	0.43%	8.32%	5.48%	0.01%	0.32%
Ireland	7.21%	5.10%	-0.04%	0.54%	5.18%	2.26%	-0.02%	0.33%
Israel	6.60%	2.58%	-0.09%	0.54%	7.98%	5.55%	-0.04%	0.52%
Italy	2.98%	2.12%	-0.11%	0.24%	5.78%	2.87%	0.02%	0.22%
Japan	3.07%	2.88%	-0.07%	0.43%	0.90%	2.03%	-0.02%	0.19%
Netherlands	3.89%	2.25%	-0.07%	0.31%	4.38%	1.27%	0.01%	0.18%
Norway	4.84%	1.72%	0.01%	0.29%	4.84%	1.67%	-0.04%	0.21%
Portugal	3.68%	2.97%	-0.11%	0.31%	7.49%	5.49%	0.01%	0.33%
South Africa	6.49%	1.90%	-0.10%	0.42%	12.58%	3.65%	-0.01%	0.54%
Spain	4.62%	2.77%	-0.07%	0.25%	6.43%	2.69%	0.02%	0.24%
Sweden	4.06%	2.49%	-0.05%	0.32%	5.03%	3.65%	-0.04%	0.31%
Switzerland	3.20%	1.40%	-0.06%	0.26%	3.22%	2.25%	-0.03%	0.22%
UK	3.82%	2.09%	-0.06%	0.24%	6.11%	2.44%	0.01%	0.30%
USA	5.05%	1.93%	-0.03%	0.34%	5.31%	1.65%	0.00%	0.23%
Global	4.52%	1.68%	-0.05%	0.25%	4.49%	1.43%	0.00%	0.19%
All	4.37%	2.80%	-0.07%	0.34%	5.34%	3.65%	-0.01%	0.28%

Table 2 (*continued*)

	Three-Month Interest				Private Consumption			
	Forecast		Change		Forecast		Change	
	Mean	Std	Mean	Std	Mean	Std	Mean	Std
Belgium	11.95%	4.51%	-0.08%	0.54%				
Canada	8.72%	4.79%	-0.08%	0.50%				
Denmark	13.32%	4.93%	-0.10%	0.75%				
Finland								
France	8.33%	4.81%	-0.05%	0.40%	5.33%	0.11%	0.10%	0.10%
Germany	8.00%	4.26%	-0.05%	0.36%	2.52%	1.90%	-0.07%	0.27%
Greece								
Ireland	14.39%	4.59%	-0.11%	0.91%				
Israel								
Italy	10.62%	7.11%	-0.06%	0.55%	2.70%	1.46%	-0.05%	0.22%
Japan	2.97%	4.11%	-0.04%	0.26%	3.06%	2.28%	-0.05%	0.35%
Netherlands	7.95%	4.23%	-0.04%	0.38%	2.64%	2.42%	-0.10%	0.39%
Norway	8.79%	3.33%	-0.02%	0.50%	5.65%	1.66%	0.01%	0.41%
Portugal								
South Africa								
Spain	10.47%	7.16%	-0.08%	0.51%	5.35%	0.86%	-0.02%	0.21%
Sweden	10.16%	6.17%	-0.06%	0.69%	2.74%	1.84%	0.05%	0.31%
Switzerland	5.64%	4.62%	-0.06%	0.43%	2.93%	0.85%	0.00%	0.20%
UK	11.07%	5.61%	-0.08%	0.49%				
USA	7.40%	3.99%	-0.07%	0.37%				
Global	7.07%	3.73%	-0.07%	0.28%	3.18%	1.81%	-0.06%	0.25%
All	8.79%	5.76%	-0.06%	0.50%	3.26%	2.18%	-0.04%	0.32%

Table 2 (*continued*)

	Industrial Manufacturing				Wage			
	Forecast		Change		Forecast		Change	
	Mean	Std	Mean	Std	Mean	Std	Mean	Std
Belgium	3.68%	3.60%	-0.13%	0.66%				
Canada					5.81%	0.82%	0.00%	0.33%
Denmark	3.62%	3.77%	-0.14%	0.97%				
Finland	5.72%	6.28%	-0.25%	1.11%				
France					5.75%	1.37%	-0.01%	0.17%
Germany					5.19%	1.63%	-0.02%	0.15%
Greece	2.69%	5.31%	-0.32%	1.06%				
Ireland	9.83%	6.71%	-0.12%	1.40%				
Israel	7.25%	2.98%	-0.14%	0.99%				
Italy					5.45%	1.40%	-0.01%	0.19%
Japan					1.52%	2.58%	-0.09%	0.40%
Netherlands					4.80%	1.52%	0.00%	0.16%
Norway					8.73%	1.20%	0.01%	0.21%
Portugal	2.22%	4.52%	-0.22%	1.19%				
South Africa	8.08%	4.22%	-0.17%	1.34%				
Spain					6.03%	1.74%	0.00%	0.29%
Sweden					7.33%	1.56%	-0.02%	0.19%
Switzerland								
UK					8.93%	3.03%	-0.06%	0.19%
USA								
Global	5.74%	3.86%	-0.18%	0.66%	5.54%	2.91%	-0.06%	0.29%
All	5.37%	5.49%	-0.19%	1.11%	5.90%	2.81%	-0.02%	0.24%

Table 2 (*continued*)

	Industrial Production				Ten Year Interest Rates			
	Forecast		Change		Forecast		Change	
	Mean	Std	Mean	Std	Mean	Std	Mean	Std
Belgium								
Canada	4.24%	4.07%	-0.18%	0.67%	11.50%	3.76%	-0.06%	0.38%
Denmark								
Finland								
France	3.72%	3.95%	-0.16%	0.56%	10.69%	3.48%	-0.04%	0.33%
Germany	4.19%	5.02%	-0.12%	0.69%	10.30%	3.17%	-0.05%	0.31%
Greece								
Ireland								
Israel								
Italy	2.83%	4.71%	-0.23%	0.67%	13.34%	6.30%	-0.04%	0.48%
Japan	3.19%	7.48%	-0.25%	1.42%	5.31%	3.37%	-0.04%	0.34%
Netherlands					9.18%	2.05%	-0.06%	0.32%
Norway					9.65%	1.82%	-0.05%	0.36%
Portugal								
South Africa								
Spain	3.80%	6.85%	-0.23%	0.86%	10.42%	3.56%	-0.07%	0.37%
Sweden	5.68%	7.17%	-0.22%	0.97%	9.97%	3.45%	-0.10%	0.36%
Switzerland	5.61%	4.27%	-0.13%	0.93%	5.58%	1.29%	-0.05%	0.25%
UK					11.82%	4.11%	-0.06%	0.34%
USA	5.14%	3.90%	-0.11%	0.57%	10.79%	2.76%	-0.06%	0.36%
Global	4.59%	4.19%	-0.16%	0.59%	9.74%	2.69%	-0.05%	0.31%
All	4.10%	5.37%	-0.18%	0.84%	10.05%	4.24%	-0.06%	0.36%

Table 3 – Portfolio Returns

This table shows the average portfolio return for each market in our sample. The data is obtained from Thompson Reuters Datastream. We calculate market returns as well as factor mimicking returns for SMB, HML, WML, and CFP. The sample extends from July 1990 to December 2011 and covers 20 markets. All represents a simple average of all firms across all markets.

	Mkt Ret		SMB		HML		WML		CFP	
	Mean	Std	Mean	Std	Mean	Std	Mean	Std	Mean	Std
Belgium	0.53%	6.19%	-0.44%	6.18%	0.83%	7.00%	1.17%	4.76%	-0.19%	6.47%
Canada	-0.46%	7.91%	3.47%	7.41%	1.19%	11.89%	-1.07%	6.81%	1.74%	10.82%
Denmark	0.82%	5.27%	-0.43%	4.79%	-0.04%	5.42%	1.32%	3.74%	0.82%	6.99%
Finland	0.93%	9.18%	-0.23%	8.48%	0.17%	11.31%	0.76%	5.18%	0.88%	10.67%
France	0.58%	5.22%	-0.19%	6.29%	0.48%	5.91%	0.70%	4.13%	0.06%	5.57%
Germany	0.63%	5.54%	-0.46%	5.50%	0.63%	5.55%	0.86%	4.46%	0.78%	7.19%
Greece	0.91%	11.35%	1.19%	12.93%	0.74%	11.30%	0.97%	7.86%	0.69%	10.47%
Ireland	0.64%	7.28%	-0.02%	9.50%	-0.16%	13.08%	0.61%	6.67%	-0.30%	14.54%
Israel	0.79%	5.32%	0.24%	6.83%	0.02%	6.37%	0.46%	5.52%	1.05%	5.21%
Italy	0.44%	6.68%	-0.49%	4.87%	0.39%	6.90%	0.93%	3.86%	0.88%	7.24%
Japan	-0.13%	6.65%	0.02%	4.84%	0.75%	3.84%	-0.25%	4.21%	0.55%	4.29%
Netherlands	0.80%	5.53%	-0.56%	5.08%	0.23%	6.88%	1.28%	4.64%	0.53%	6.69%
Norway	0.96%	6.75%	-0.27%	6.02%	0.42%	6.72%	0.98%	5.13%	0.65%	7.64%
Portugal	0.55%	7.47%	0.10%	11.81%	0.24%	10.81%	0.50%	6.48%	2.38%	11.29%
South Africa	1.39%	5.75%	0.39%	6.71%	1.49%	9.02%	0.88%	5.24%	0.48%	5.99%
Spain	0.44%	5.83%	-0.06%	5.18%	0.17%	7.74%	0.48%	4.68%	1.65%	9.22%
Sweden	1.05%	7.07%	-1.69%	8.10%	0.59%	7.66%	0.95%	5.25%	0.77%	8.76%
Switzerland	0.77%	5.34%	-0.15%	4.51%	0.70%	4.36%	0.95%	4.25%	0.17%	5.63%
UK	0.79%	4.65%	-0.62%	5.36%	0.20%	5.28%	1.15%	3.66%	0.39%	5.35%
USA	0.88%	5.16%	0.84%	4.55%	0.25%	4.27%	0.12%	4.51%	0.46%	5.21%
Global	0.60%	4.99%	0.23%	4.95%	0.20%	3.95%	0.42%	3.93%	0.71%	4.76%
All	0.67%	6.69%	0.03%	7.19%	0.46%	7.94%	0.73%	5.14%	0.69%	8.16%

Table 4 - Mean Forecasts and Portfolio Returns by Macro Announcement Quartiles

We sort all country/month observations into quartile based on their forecasted real growth in macro variables, one at a time. We then compute the average forecasts (Panel A), as well as portfolio returns (Panel B) for each of the quartiles. In Panel B, we also report the p-value which corresponds to a test of differences in mean returns between the country/time observations in the highest and lowest quartiles.

PANEL A:

		GDP	Δ GDP	Private Consumption	Δ Private Consumption	Industrial Manufacturing	Δ Industrial Manufacturing	Consumer Prices	Δ Consumer Prices	Wage	Δ Wage	Industrial Production	Δ Industrial Production	Three-Month Interest	Δ Three-Month Interest	Ten Year Interest Rates	Δ Ten Year Interest Rates
GDP	Low	0.89%	-0.23%	1.46%	-0.11%	-0.81%	-0.53%	4.40%	-0.04%	4.54%	-0.07%	-0.87%	-0.46%	7.09%	-0.18%	8.54%	-0.07%
	High	7.43%	0.04%	6.61%	0.04%	9.37%	-0.05%	6.66%	0.02%	6.96%	0.03%	7.83%	0.07%	10.34%	0.07%	11.35%	-0.02%
Private Consumption	Low	1.33%	-0.11%	0.49%	-0.11%			2.65%	-0.04%	3.41%	-0.08%	-0.57%	-0.36%	5.12%	-0.09%	7.74%	-0.07%
	High	5.62%	-0.01%	6.03%	0.01%			4.34%	-0.01%	7.52%	0.01%	6.92%	-0.08%	9.49%	-0.01%	11.11%	-0.06%
Industrial Manufacturing	Low	0.42%	-0.29%			-1.28%	-0.64%	4.11%	0.01%								
	High	8.22%	0.02%			11.21%	0.09%	6.43%	0.03%								
Consumer Prices	Low	2.84%	-0.06%	2.68%	-0.02%	1.81%	-0.29%	2.06%	-0.06%	4.07%	-0.04%	2.95%	-0.18%	4.15%	-0.04%	7.21%	-0.04%
	High	4.94%	-0.12%	3.03%	-0.14%	8.08%	-0.19%	10.05%	0.01%	8.94%	-0.03%	3.94%	-0.24%	16.38%	-0.10%	16.13%	-0.08%
Wage	Low	2.18%	-0.05%	1.70%	-0.05%			2.00%	0.00%	2.54%	-0.07%	2.55%	-0.17%	3.17%	-0.02%	6.68%	-0.02%
	High	4.50%	-0.06%	4.66%	-0.02%			5.61%	-0.02%	9.23%	-0.01%	5.36%	-0.29%	12.40%	-0.07%	12.92%	-0.08%
Industrial Production	Low	1.11%	-0.23%	1.31%	-0.12%			3.70%	-0.05%	4.26%	-0.09%	-2.51%	-0.61%	6.21%	-0.20%	9.10%	-0.08%
	High	5.69%	0.04%	3.97%	0.02%			3.89%	0.02%	5.25%	0.02%	8.94%	0.11%	7.29%	0.03%	9.72%	-0.07%
Three-Month Interest	Low	2.29%	-0.09%	2.04%	-0.04%			2.34%	-0.02%	3.34%	-0.05%	2.46%	-0.25%	2.38%	-0.08%	6.19%	-0.06%
	High	4.41%	-0.08%	4.05%	-0.08%			7.31%	0.00%	9.49%	-0.03%	4.81%	-0.21%	16.92%	-0.04%	16.66%	-0.07%
Ten Year Interest Rates	Low	2.51%	-0.09%	2.23%	-0.04%			2.09%	-0.04%	3.37%	-0.06%	3.12%	-0.28%	2.49%	-0.08%	5.51%	-0.09%
	High	4.58%	-0.04%	3.81%	-0.02%			6.36%	-0.03%	8.37%	-0.03%	5.07%	-0.11%	13.84%	-0.07%	15.83%	-0.05%

Table 4 (*continued*)

PANEL B:

		Mkt Ret	SMB	HML	CFP	WML
GDP	Low	1.11%	-0.50%	0.36%	0.08%	-0.08%
	High	0.47%	0.27%	0.55%	0.98%	0.95%
	P-Val	0.02	0.01	0.60	0.01	0.00
Private Consumption	Low	1.21%	-0.18%	0.54%	0.19%	-0.01%
	High	0.58%	-0.28%	0.16%	0.72%	1.21%
	P-Val	0.23	0.83	0.48	0.38	0.00
Industrial Manufacturing	Low	0.52%	-0.39%	-0.75%	0.36%	0.44%
	High	0.29%	0.59%	1.05%	0.33%	0.95%
	P-Val	0.71	0.22	0.03	0.97	0.20
Consumer Prices	Low	1.18%	-0.28%	0.41%	0.32%	0.39%
	High	0.39%	0.02%	0.52%	0.86%	0.65%
	P-Val	0.00	0.27	0.75	0.10	0.29
Wage	Low	0.99%	-0.24%	0.44%	0.47%	0.36%
	High	0.43%	-0.33%	0.51%	1.13%	1.46%
	P-Val	0.12	0.80	0.85	0.10	0.00
Industrial Production	Low	0.72%	-0.16%	0.76%	0.11%	-0.71%
	High	-0.07%	0.16%	0.66%	1.54%	0.79%
	P-Val	0.06	0.38	0.80	0.00	0.00
Three-Month Interest	Low	0.82%	-0.21%	0.45%	0.44%	0.06%
	High	0.38%	-0.62%	0.30%	0.86%	0.64%
	P-Val	0.13	0.16	0.64	0.23	0.03
Ten Year Interest Rates	Low	0.77%	-0.26%	0.53%	0.31%	0.09%
	High	0.87%	0.49%	0.14%	0.56%	0.82%
	P-Val	0.77	0.02	0.23	0.50	0.00

Table 5 – Mean Forecasts and Portfolio Returns by Expansion/Recession

This table shows the mean macro economic forecasts and forecast changes (Panel A), as well as factor returns (Panel B) by forecasted economic growth. For each market we sort the time series data on forecasted real GDP growth. We then define the bottom 1/7 months with the lowest forecasted growth as implied recessions. We subsequently calculate the mean macro economic forecast as well as factor returns for the market/month observations that have been defined as an implied recession as well as those that are not (expansion). In Panel B, we also report the p-value which corresponds to a test of differences in mean returns between the country/time observations in the highest and lowest quartiles.

PANEL A:

	Expansion		Implied Recession	
	Mean	Std	Mean	Std
GDP	5.11%	2.00%	-0.16%	2.76%
Δ GDP	-0.03%	0.30%	-0.27%	0.51%
Private Consumption	3.65%	1.94%	0.92%	2.10%
Δ Private Consumption	-0.04%	0.31%	-0.09%	0.38%
Industrial Manufacturing	6.92%	3.66%	-2.17%	6.57%
Δ Industrial Manufacturing	-0.11%	0.83%	-0.59%	1.93%
Consumer Prices	5.47%	3.61%	4.50%	3.77%
Δ Consumer Prices	0.00%	0.26%	-0.07%	0.34%
Wage	6.04%	2.63%	5.06%	3.62%
Δ Wage	-0.01%	0.22%	-0.10%	0.29%
Industrial Production	5.55%	3.13%	-4.92%	7.28%
Δ Industrial Production	-0.12%	0.63%	-0.54%	1.58%
Three-Month Interest	9.01%	5.61%	7.38%	6.44%
Δ Three-Month Interest	-0.04%	0.48%	-0.22%	0.59%
Ten Year Interest Rates	10.20%	4.17%	9.08%	4.54%
Δ Ten Year Interest Rates	-0.06%	0.35%	-0.04%	0.39%

PANEL B:

	Expansion		Implied Recession			
	Mean	Std	Mean	Std	Diff	P-Val
Mkt Ret	0.49%	6.35%	1.63%	8.02%	-1.14%	0.00
SMB	0.00%	0.07%	0.01%	0.07%	-0.01%	0.01
HML	0.49%	7.76%	0.33%	8.86%	0.16%	0.66
CFP	0.86%	7.82%	-0.24%	9.27%	1.10%	0.00
WML	0.95%	4.72%	-0.59%	6.97%	1.54%	0.00

Table 6 – Correlation Coefficients

This table shows Pearson correlation coefficients between the variables in our sample. The data has been pooled across all markets before calculating the correlation coefficients.

	SMB	HML	CFP	WML	GDP	Δ GDP	Private Con.	Δ Private Cons.	Industrial Manu.	Δ Industrial Manu.	Consumer Prices	Δ Consumer Prices	Wage	Δ Wage	Industrial Prod.	Δ Industrial Prod.	Three-Month Int.	Δ Three-Month Int.	Ten Year Interest	Δ Ten Year Interest	Term Spread	Dividend Yield	Short Term Interest
SMB	1																						
HML	0.18	1																					
CFP	-0.03	0.14	1																				
WML	-0.02	-0.06	0.08	1																			
GDP	0.04	0.00	0.03	0.10	1																		
Δ GDP	0.01	0.00	0.00	0.11	0.32	1																	
Private Con.	0.01	-0.03	0.02	0.09	0.78	0.15	1																
Δ Private Cons.	0.07	0.00	-0.02	0.01	0.13	0.59	0.17	1															
Industrial Manu.	0.05	0.02	0.00	0.09	0.88	0.29			1														
Δ Industrial Manu.	0.01	-0.02	0.01	0.13	0.16	0.40			0.26	1													
Consumer Prices	0.02	0.00	0.02	0.02	0.26	-0.06	0.26	-0.10	0.33	-0.01	1												
Δ Consumer Prices	0.03	0.01	0.03	0.07	0.09	0.12	0.09	0.10	0.10	0.10	0.09	1											
Wage	-0.02	0.00	0.02	0.08	0.34	-0.02	0.50	0.00			0.75	-0.02	1										
Δ Wage	0.01	0.02	0.02	0.04	0.17	0.28	0.13	0.26			0.06	0.26	0.11	1									
Industrial Prod.	0.05	-0.02	0.03	0.18	0.83	0.29	0.52	0.16			0.17	0.16	0.22	0.17	1								
Δ Industrial Prod.	0.06	-0.03	-0.03	0.11	0.24	0.68	0.10	0.39			-0.01	0.29	-0.03	0.25	0.32	1							
Three-Month Int.	-0.03	-0.02	0.03	0.03	0.24	-0.03	0.33	-0.02			0.81	0.05	0.78	0.05	0.16	0.03	1						
Δ Three-Month Int.	0.02	0.00	0.03	0.03	0.14	0.28	0.10	0.19			-0.03	0.22	-0.06	0.18	0.13	0.27	0.05	1					
Ten Year Interest	0.04	-0.02	0.02	0.05	0.27	0.02	0.28	0.01			0.79	0.02	0.69	0.06	0.12	0.05	0.91	0.02	1				
Δ Ten Year Interest	0.05	0.00	-0.02	0.06	0.00	0.22	0.03	0.20			-0.05	0.24	-0.07	0.13	-0.04	0.14	0.01	0.56	0.04	1			
Term Spread	0.01	-0.01	0.00	0.01	0.11	-0.04	0.21	-0.01	0.07	0.00	0.70	-0.01	0.67	0.04	0.12	0.02	0.92	0.03	0.99	0.04	1		
Dividend Yield	-0.05	-0.03	-0.01	-0.04	-0.29	-0.29	-0.11	-0.15	-0.32	-0.22	0.19	-0.03	0.28	-0.05	-0.33	-0.23	0.22	-0.10	0.17	-0.05	0.18	1	
Short Term Interest	0.02	-0.01	0.02	0.02	0.19	-0.06	0.26	-0.04	0.30	0.03	0.81	0.00	0.76	0.03	0.13	0.01	0.95	0.06	0.89	0.00	0.76	0.17	1
MktRet	-0.42	-0.05	-0.09	-0.20	-0.04	0.03	-0.06	0.03	-0.04	-0.05	-0.03	-0.08	-0.02	-0.05	-0.07	0.01	-0.05	-0.04	-0.01	-0.04	-0.02	-0.08	-0.02

Table 7 – Pooled regressions with changes in GDP forecasts

This table shows regression of the factors portfolio, including their individual components on changes in GDP forecasts. Panel A through Panel E shows regressions on the Market, HML, CFP (Cash Flow to price), SMB, and Momentum portfolios respectively. The sample refers to monthly data on macro economic forecasts and returns for 20 markets from July 1990 until December 2011. Standard Errors are clustered on both market and time (year/month). Month dummies are included in all specification models. T-Statistics are presented underneath each coefficients and stars denote 10% (*) ,5% (**), and 1%(***) significance respectively.

PANEL A:

	Market
Implied Recession $_{t-1}$	1.530**
	(2.49)
Δ GDP$_{t-1}$	87.564*
	(1.86)
Δ GDP $_{t-1}$ x Implied Rec. $_{t-1}$	89.225
	(0.59)
Term Spread $_{t-1}$	-0.015
	(0.13)
Dividend Yield $_{t-1}$	0.144
	(0.64)
Short Rates $_{t-1}$	-23.944
	(0.23)
R^2	0.05
Adj. R^2	

PANEL B:

	Value$_{HML}$	High Value$_{HML}$	Low Value$_{HML}$
Implied Recession $_{t-1}$	0.285	1.817	1.532
	0.39	(1.79)*	(2.91)***
Δ GDP$_{t-1}$	-63.818	1.263	65.081
	2.18**	(0.02)	(0.95)
Δ GDP $_{t-1}$ x Implied Rec. $_{t-1}$	166.684	310.447	143.764
	2.65***	(1.69)*	(1.02)
Term Spread $_{t-1}$	-0.153	-0.104	0.049
	1.42	(0.60)	(0.36)
Dividend Yield $_{t-1}$	-0.049	0.173	0.223
	0.30	(0.66)	(1.01)
Short Rates $_{t-1}$	139.248	10.079	-129.169
	1.34	(0.06)	(0.98)
R^2	0.02	0.04	0.04
Adj. R^2	0.02	0.04	0.04

Table 7 (*continued*)

PANEL C:

	$Value_{CFP}$	High $Value_{CFP}$	Low $Value_{CFP}$
Implied Recession $_{t-1}$	-0.862	1.551	2.413
	(1.90)*	(1.80)*	(2.61)***
Δ GDP_{t-1}	-73.629	60.796	134.424
	(1.24)	(0.96)	(1.44)
Δ GDP $_{t-1}$ x Implied Rec. $_{t-1}$	80.110	156.736	76.626
	(1.21)	(0.68)	(0.35)
Term Spread $_{t-1}$	-0.100	-0.070	0.029
	(1.79)*	(0.42)	(0.19)
Dividend Yield $_{t-1}$	-0.121	0.136	0.257
	(0.82)	(0.50)	(0.92)
Short Rates $_{t-1}$	139.499	23.623	-115.875
	(2.19)**	(0.14)	(0.77)
R^2	0.01	0.04	0.04
Adj. R^2	0.01	0.04	0.04

PANEL D:

	Size	Big	Small
Implied Recession $_{t-1}$	-0.478	1.467	0.989
	(1.16)	(2.33)**	(1.53)
Δ GDP_{t-1}	-12.376	89.033	76.657
	(0.30)	(1.78)*	(1.35)
Δ GDP $_{t-1}$ x Implied Rec. $_{t-1}$	-109.534	85.581	-23.952
	(1.02)	(0.57)	(0.19)
Term Spread $_{t-1}$	0.086	-0.026	0.060
	(0.87)	(0.23)	(0.42)
Dividend Yield $_{t-1}$	-0.469	0.152	-0.317
	(2.82)***	(0.66)	(1.83)*
Short Rates $_{t-1}$	-46.754	-5.364	-52.118
	(0.46)	(0.05)	(0.36)
R^2	0.04	0.05	0.04
Adj. R^2	0.04	0.05	0.04

PANEL E:

	Momentum	Winners	Losers
Implied Recession $_{t-1}$	-1.075	1.801	2.876
	(2.42)**	(2.87)***	(3.16)***
Δ GDP_{t-1}	68.659	99.298	30.639
	(1.55)	(1.39)	(0.38)
Δ GDP $_{t-1}$ x Implied Rec. $_{t-1}$	101.392	107.859	6.467
	(0.86)	(1.05)	(0.03)
Term Spread $_{t-1}$	0.044	0.047	0.003
	(0.57)	(0.26)	(0.02)
Dividend Yield $_{t-1}$	-0.192	-0.108	0.084
	(1.22)	(0.50)	(0.34)
Short Rates $_{t-1}$	9.121	-23.120	-32.241
	(0.11)	(0.12)	(0.15)
R^2	0.05	0.05	0.06
Adj. R^2	0.06	0.05	0.06

* p<0.1; ** p<0.05; *** p<0.01

Table 8 – Pooled regressions with changes in inflation forecasts

This table shows regression of the factors portfolio, including their individual components on changes in inflation forecasts. Panel A through Panel E shows regressions on the Market, HML, CFP (Cash Flow to price), SMB, and Momentum portfolios respectively. The sample refers to monthly data on macro economic forecasts and returns for 20 markets from July 1990 until December 2011. Standard Errors are clustered on both market and time (year/month). Month dummies are included in all specification models. T-Statistics are presented underneath each coefficients and stars denote 10% (*) ,5% (**), and 1%(***) significance respectively.

PANEL A:

	Market
Implied Recession $_{t-1}$	1.163
	(1.60)
Δ Inflation$_{t-1}$	-203.668
	(2.87)***
Δ Inflation $_{t-1}$ x Implied Rec. $_{t-1}$	236.884
	(1.34)
Term Spread $_{t-1}$	-0.010
	(0.09)
Dividend Yield $_{t-1}$	0.080
	(0.33)
Short Rates $_{t-1}$	-35.463
	(0.34)
R^2	0.05
Adj. R^2	0.05

PANEL B:

	Value$_{HML}$	High Value$_{HML}$	Low Value$_{HML}$
Implied Recession $_{t-1}$	-0.030	1.083	1.113
	(0.04)	(0.95)	(1.70)*
Δ Inflation$_{t-1}$	119.764	-220.643	-340.407
	(2.05)**	(2.27)**	(3.61)***
Δ Inflation $_{t-1}$ x Implied Rec. $_{t-1}$	-146.383	285.266	431.650
	(1.41)	(1.26)	(2.43)**
Term Spread $_{t-1}$	-0.156	-0.106	0.050
	(1.43)	(0.60)	(0.37)
Dividend Yield $_{t-1}$	-0.065	0.107	0.172
	(0.41)	(0.37)	(0.73)
Short Rates $_{t-1}$	149.974	4.906	-145.067
	(1.46)	(0.03)	(1.13)
R^2	0.02	0.04	0.05
Adj. R^2	0.02	0.04	0.05

Table 8 (*continued*)

PANEL C:

	$Value_{CFP}$	High $Value_{CFP}$	Low $Value_{CFP}$
Implied Recession $_{t-1}$	-0.834	1.021	1.855
	(1.73)*	(0.94)	(1.81)*
Δ $Inflation_{t-1}$	59.544	-213.817	-273.362
	(1.36)	(2.47)**	(3.04)***
Δ Inflation $_{t-1}$ x Implied Rec. $_{t-1}$	42.207	198.330	156.123
	(0.31)	(0.70)	(0.78)
Term Spread $_{t-1}$	-0.109	-0.065	0.044
	(1.80)*	(0.39)	(0.28)
Dividend Yield $_{t-1}$	-0.089	0.065	0.154
	(0.61)	(0.21)	(0.51)
Short Rates $_{t-1}$	153.164	8.966	-144.198
	(2.36)**	(0.05)	(0.97)
R^2	0.01	0.04	0.04
Adj. R^2	0.01	0.04	0.04

PANEL D:

	Size	Big	Small
Implied Recession $_{t-1}$	-0.100	1.111	1.011
	(0.24)	(1.49)	(1.70)*
Δ $Inflation_{t-1}$	33.866	-231.868	-198.002
	(0.75)	(2.81)***	(2.35)**
Δ Inflation $_{t-1}$ x Implied Rec. $_{t-1}$	66.985	261.096	328.081
	(0.65)	(1.43)	(2.74)***
Term Spread $_{t-1}$	0.082	-0.023	0.060
	(0.83)	(0.20)	(0.42)
Dividend Yield $_{t-1}$	-0.422	0.088	-0.334
	(2.52)**	(0.35)	(1.81)*
Short Rates $_{t-1}$	-42.508	-20.317	-62.825
	(0.42)	(0.20)	(0.44)
R^2	0.04	0.05	0.05
Adj. R^2	0.04	0.05	0.05

PANEL E:

	Momentum	Winners	Losers
Implied Recession $_{t-1}$	-1.356	1.413	2.768
	(2.33)**	(2.24)**	(2.65)***
Δ $Inflation_{t-1}$	97.945	-213.977	-311.922
	(2.55)**	(2.44)**	(2.93)***
Δ Inflation $_{t-1}$ x Implied Rec. $_{t-1}$	34.495	288.784	254.289
	(0.30)	(1.88)*	(1.22)
Term Spread $_{t-1}$	0.055	0.052	-0.003
	(0.76)	(0.28)	(0.02)
Dividend Yield $_{t-1}$	-0.254	-0.184	0.070
	(1.45)	(0.79)	(0.25)
Short Rates $_{t-1}$	0.692	-43.501	-44.193
	(0.01)	(0.22)	(0.21)
R^2	0.05	0.05	0.07
Adj. R^2	0.05	0.05	0.07

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Table 9 – Pooled regressions with changes in GDP and inflation forecasts

This table shows regression of the factors portfolio, including their individual components on changes in GDP and Inflation forecasts. Panel A through Panel E shows regressions on the Market, HML, CFP (Cash Flow to price), SMB, and Momentum portfolios respectively. The sample refers to monthly data on macro economic forecasts and returns for 20 markets from July 1990 until December 2011. Standard Errors are clustered on both market and time (year/month). Month dummies are included in all specification models. T-Statistics are presented underneath each coefficients and stars denote 10% (*) ,5% (**), and 1%(***) significance respectively.

PANEL A:

	Market
Implied Recession $_{t-1}$	1.521
	(2.44)**
Δ GDP$_{t-1}$	101.274
	(2.02)**
Δ GDP $_{t-1}$ x Implied Rec. $_{t-1}$	77.983
	(0.54)
Δ Inflation$_{t-1}$	-212.434
	(2.90)***
Δ Inflation $_{t-1}$ x Implied Rec. $_{t-1}$	204.297
	(1.27)
Term Spread $_{t-1}$	-0.022
	(0.21)
Dividend Yield $_{t-1}$	0.161
	(0.75)
Short Rates $_{t-1}$	-20.977
	(0.21)
R^2	0.06
Adj. R^2	0.06

PANEL B:

	Value$_{HML}$	High Value$_{HML}$	Low Value$_{HML}$
Implied Recession $_{t-1}$	0.258	1.806	1.548
	(0.35)	(1.75)*	(2.92)***
Δ GDP$_{t-1}$	-67.001	6.264	73.264
	(2.47)**	(0.09)	(1.03)
Δ GDP $_{t-1}$ x Implied Rec. $_{t-1}$	176.407	308.204	131.797
	(3.05)***	(1.74)*	(0.95)
Δ Inflation$_{t-1}$	121.416	-221.498	-342.914
	(2.07)**	(2.27)**	(3.54)***
Δ Inflation $_{t-1}$ x Implied Rec. $_{t-1}$	-178.322	206.082	384.403
	(1.78)*	(1.02)	(2.34)**
Term Spread $_{t-1}$	-0.149	-0.109	0.040
	(1.40)	(0.64)	(0.31)
Dividend Yield $_{t-1}$	-0.062	0.188	0.250
	(0.38)	(0.73)	(1.16)
Short Rates $_{t-1}$	140.023	7.057	-132.966
	(1.39)	(0.04)	(1.08)
R^2	0.02	0.05	0.05
Adj. R^2	0.02	0.05	0.05

Table 9 (*continued*)

PANEL C:

	$Value_{CFP}$	High $Value_{CFP}$	Low $Value_{CFP}$
Implied Recession $_{t-1}$	-0.809	65.295	2.321
	(1.67)*	(0.98)	(2.46)**
Δ GDP_{t-1}	-74.368	161.838	139.663
	(1.26)	(0.74)	(1.47)
Δ GDP $_{t-1}$ x Implied Rec. $_{t-1}$	68.206	1.512	93.632
	(0.94)	(1.65)*	(0.44)
Δ $Inflation_{t-1}$	61.653	-216.148	-277.802
	(1.39)	(2.45)**	(2.99)***
Δ Inflation $_{t-1}$ x Implied Rec. $_{t-1}$	39.048	144.993	105.945
	(0.27)	(0.55)	(0.57)
Term Spread $_{t-1}$	-0.100	-0.074	0.026
	(1.57)	(0.46)	(0.18)
Dividend Yield $_{t-1}$	-0.118	0.146	0.265
	(0.80)	(0.56)	(0.98)
Short Rates $_{t-1}$	141.640	19.918	-121.722
	(2.21)**	(0.12)	(0.85)
R^2	0.01	0.05	0.04
Adj. R^2	0.01	0.05	0.04

PANEL D:

	Size	Big	Small
Implied Recession $_{t-1}$	-0.408	1.460	1.052
	(0.98)	(2.28)**	(1.66)*
Δ GDP_{t-1}	-13.504	102.067	88.563
	(0.32)	(1.88)*	(1.42)
Δ GDP $_{t-1}$ x Implied Rec. $_{t-1}$	-125.072	75.307	-49.765
	(1.13)	(0.52)	(0.38)
Δ $Inflation_{t-1}$	35.113	-239.414	-204.302
	(0.76)	(2.82)***	(2.32)**
Δ Inflation $_{t-1}$ x Implied Rec. $_{t-1}$	100.333	227.283	327.616
	(0.89)	(1.37)	(2.69)***
Term Spread $_{t-1}$	0.085	-0.035	0.050
	(0.85)	(0.32)	(0.35)
Dividend Yield $_{t-1}$	-0.462	0.171	-0.291
	(2.86)***	(0.77)	(1.69)*
Short Rates $_{t-1}$	-45.466	-4.437	-49.903
	(0.44)	(0.04)	(0.35)
R^2	0.04	0.06	0.05
Adj. R^2	0.04	0.06	0.05

Table 9 (*continued*)

PANEL E:

	Momentum	Winners	Losers
Implied Recession $_{t-1}$	-1.033	1.823	2.856
	(2.26)**	(2.90)***	(3.05)***
Δ GDP$_{t-1}$	65.990	107.017	41.027
	(1.59)	(1.43)	(0.51)
Δ GDP $_{t-1}$ x Implied Rec. $_{t-1}$	91.514	98.229	6.715
	(0.76)	(0.96)	(0.03)
Δ Inflation$_{t-1}$	94.706	-219.111	-313.817
	(2.60)***	(2.43)**	(2.91)***
Δ Inflation $_{t-1}$ x Implied Rec. $_{t-1}$	-3.838	240.491	244.329
	(0.03)	(1.68)*	(1.20)
Term Spread $_{t-1}$	0.046	0.037	-0.009
	(0.61)	(0.21)	(0.04)
Dividend Yield $_{t-1}$	-0.191	-0.094	0.097
	(1.24)	(0.43)	(0.40)
Short Rates $_{t-1}$	11.637	-25.955	-37.592
	(0.14)	(0.13)	(0.18)
R^2	0.06	0.05	0.07
Adj. R^2	0.06	0.05	0.07

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Table 10 – Pooled regressions with contemporaneous changes in GDP and inflation forecasts

This table shows regression of the factors portfolio, including their individual components on changes in GDP and Inflation forecasts. Panel A through Panel E shows regressions on the Market, HML, CFP (Cash Flow to price), SMB, and Momentum portfolios respectively. The sample refers to monthly data on macro economic forecasts and returns for 20 markets from July 1990 until December 2011. Standard Errors are clustered on both market and time (year/month). Month dummies are included in all specification models. T-Statistics are presented underneath each coefficients and stars denote 10% (*) ,5% (**), and 1%(***) significance respectively.

PANEL A:

	Market
Implied Recession $_t$	1.441
	(2.22)**
Δ Inflation$_t$	-179.846
	(2.97)***
Δ Inflation $_t$ x Implied Rec. $_t$	263.514
	(1.69)*
Δ GDP$_t$	271.188
	(3.23)***
Δ GDP $_t$ x Implied Rec. $_t$	28.891
	(0.19)
Term Spread $_{t-1}$	-0.031
	(0.30)
Dividend Yield $_{t-1}$	0.267
	(1.23)
Short Rates $_{t-1}$	-7.871
	(0.08)
R^2	0.07
Adj. R^2	0.07

PANEL B:

	Value$_{HML}$	High Value$_{HML}$	Low Value$_{HML}$
Implied Recession $_t$	0.410	1.703	1.275
	(0.50)	(2.32)**	(2.27)**
Δ Inflation$_t$	50.170	-171.060	-211.357
	(0.72)	(2.52)**	(2.62)***
Δ Inflation $_t$ x Implied Rec. $_t$	94.674	453.725	334.291
	(1.35)	(3.06)***	(2.09)**
Δ GDP$_t$	17.921	274.258	256.584
	(0.33)	(3.00)***	(2.76)***
Δ GDP $_t$ x Implied Rec. $_t$	145.124	163.716	13.448
	(1.63)	(1.49)	(0.09)
Term Spread $_{t-1}$	-0.159	-0.287	0.031
	(1.41)	(1.91)*	(0.25)
Dividend Yield $_{t-1}$	0.014	0.389	0.342
	(0.08)	(2.08)*	(1.57)
Short Rates $_{t-1}$	153.407	94.346	-111.705
	(1.46)	(0.69)	(0.91)
R^2	0.02	0.06	0.05
Adj. R^2	0.02	0.05	0.05

Table 10 (*continued*)

PANEL C:

	$Value_{CFP}$	High $Value_{CFP}$	Low $Value_{CFP}$
Implied Recession $_t$	-0.902	1.262	2.165
	(1.48)	(1.29)	(2.26)**
Δ $Inflation_t$	49.045	-162.373	-211.418
	(0.78)	(2.18)**	(2.59)***
Δ Inflation $_t$ x Implied Rec. $_t$	-93.261	283.079	376.340
	(0.63)	(1.30)	(1.87)*
Δ GDP_t	-80.952	322.600	403.552
	(1.02)	(3.24)***	(3.13)***
Δ GDP $_t$ x Implied Rec. $_t$	116.852	14.746	-102.106
	(1.22)	(0.06)	(0.54)
Term Spread $_{t-1}$	-0.105	-0.094	0.010
	(1.85)*	(0.59)	(0.07)
Dividend Yield $_{t-1}$	-0.103	0.302	0.405
	(0.49)	(1.16)	(1.48)
Short Rates $_{t-1}$	144.456	52.039	-92.418
	(2.35)**	(0.32)	(0.65)
R^2	0.01	0.06	0.05
Adj. R^2	0.01	0.06	0.05

PANEL D:

	Size	Big	Small
Implied Recession $_t$	-0.035	1.390	1.354
	(0.09)	(2.08)**	(2.27)**
Δ $Inflation_t$	28.630	-202.746	-174.116
	(0.66)	(3.03)***	(3.11)***
Δ Inflation $_t$ x Implied Rec. $_t$	-40.563	304.626	264.063
	(0.40)	(1.88)*	(1.63)
Δ GDP_t	-12.403	294.694	282.290
	(0.25)	(3.34)***	(3.85)***
Δ GDP $_t$ x Implied Rec. $_t$	34.220	0.813	35.033
	(0.40)	(0.01)	(0.36)
Term Spread $_{t-1}$	0.086	-0.044	0.042
	(0.90)	(0.42)	(0.32)
Dividend Yield $_{t-1}$	-0.438	0.285	-0.153
	(2.63)***	(1.26)	(0.96)
Short Rates $_{t-1}$	-44.373	14.380	-29.994
	(0.45)	(0.15)	(0.24)
R^2	0.04	0.07	0.06
Adj. R^2	0.04	0.07	0.06

Table 10 (*continued*)

PANEL E:

	Momentum	Winners	Losers
Implied Recession $_t$	-1.911	1.495	3.406
	(3.43)***	(2.46)**	(3.37)***
Δ Inflation$_t$	49.923	-131.047	-180.970
	(1.29)	(2.34)**	(2.51)**
Δ Inflation $_t$ x Implied Rec. $_t$	62.683	241.547	178.863
	(0.38)	(1.95)*	(0.70)
Δ GDP$_t$	-0.820	360.888	361.709
	(0.02)	(3.82)***	(3.27)***
Δ GDP $_t$ x Implied Rec. $_t$	-68.761	-24.802	43.959
	(0.72)	(0.22)	(0.25)
Term Spread $_{t-1}$	0.046	0.024	-0.022
	(0.63)	(0.14)	(0.12)
Dividend Yield $_{t-1}$	-0.228	0.054	0.282
	(1.40)	(0.27)	(1.17)
Short Rates $_{t-1}$	4.875	1.085	-3.790
	(0.06)	(0.01)	(0.02)
R^2	0.06	0.07	0.08
Adj. R^2	0.06	0.07	0.08

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Table 11 – Pooled Global regressions with changes in GDP and Inflation forecasts

This table shows regression of the factor portfolios, including their components on changes in global GDP and global Inflation forecasts. Panel A through Panel E shows regressions on the Global Market, Global HML, Global CFP (Cash Flow to price), Global SMB, and Global Momentum portfolios respectively. The sample refers to a value weighted global forecast, calculated from individual economic forecasts and returns for 20 markets from July 1990 until December 2011. Month dummies are included in all specification models. T-Statistics are presented underneath each coefficients and stars denote 10% (*) ,5% (**), and 1%(***) significance respectively.

PANEL A:

	Market
Implied Recession $_{t-1}$	0.915
	(0.83)
Δ GDP$_{t-1}$	238.539
	(1.49)
Δ GDP $_{t-1}$ x Implied Rec. $_{t-1}$	-148.980
	(0.34)
Δ Inflation$_{t-1}$	-244.975
	(1.30)
Δ Inflation $_{t-1}$ x Implied Rec. $_{t-1}$	1,224.344
	(2.11)**
Term Spread $_{t-1}$	-0.310
	(0.65)
Dividend Yield $_{t-1}$	1.667
	(1.44)
Short Rates $_{t-1}$	175.631
	(0.42)
R^2	0.10
Adj. R^2	0.03

PANEL B:

	Value$_{HML}$	High Value$_{HML}$	Low Value$_{HML}$
Implied Recession $_{t-1}$	1.300	2.004	0.704
	(1.34)	(1.25)	(0.73)
Δ GDP$_{t-1}$	-168.155	116.653	284.808
	(1.09)	(0.74)	(1.35)
Δ GDP $_{t-1}$ x Implied Rec. $_{t-1}$	74.488	-28.945	-103.433
	(0.32)	(0.07)	(0.24)
Δ Inflation$_{t-1}$	-109.295	-295.246	-185.951
	(0.53)	(1.51)	(0.70)
Δ Inflation $_{t-1}$ x Implied Rec. $_{t-1}$	732.463	1,702.523	970.060
	(1.77)*	(2.52)**	(1.61)
Term Spread $_{t-1}$	0.052	-0.249	-0.301
	(0.15)	(0.48)	(0.61)
Dividend Yield $_{t-1}$	-0.408	1.367	1.775
	(0.52)	(1.04)	(1.52)
Short Rates $_{t-1}$	-87.179	149.775	236.954
	(0.32)	(0.32)	(0.57)
R^2	0.12	0.11	0.10
Adj. R^2	0.05	0.04	0.03

Table 11 (*continued*)

PANEL C:

	$Value_{CFP}$	High $Value_{CFP}$	Low $Value_{CFP}$
Implied Recession $_{t-1}$	1.328	1.636	0.308
	(1.68)*	(1.20)	(0.18)
Δ GDP_{t-1}	-382.866	106.515	489.381
	(1.67)*	(0.69)	(1.60)
Δ GDP $_{t-1}$ x Implied Rec. $_{t-1}$	682.267	-33.189	-715.456
	(2.12)**	(0.07)	(1.09)
Δ $Inflation_{t-1}$	-4.070	-278.222	-274.152
	(0.02)	(1.43)	(0.89)
Δ Inflation $_{t-1}$ x Implied Rec. $_{t-1}$	-1,183.676	1,456.787	2,640.462
	(2.93)***	(2.15)**	(2.99)***
Term Spread $_{t-1}$	-0.190	-0.299	-0.109
	(0.48)	(0.60)	(0.16)
Dividend Yield $_{t-1}$	-1.798	1.067	2.864
	(1.71)*	(0.86)	(1.63)
Short Rates $_{t-1}$	302.041	237.291	-64.750
	(1.00)	(0.54)	(0.11)
R^2	0.11	0.10	0.12
Adj. R^2	0.03	0.03	0.05

PANEL D:

	Size	Big	Small
Implied Recession $_{t-1}$	0.927	0.917	1.844
	(0.91)	(0.84)	(1.73)*
Δ GDP_{t-1}	153.389	216.769	370.158
	(0.90)	(1.30)	(2.22)**
Δ GDP $_{t-1}$ x Implied Rec. $_{t-1}$	-31.616	-120.582	-152.198
	(0.10)	(0.27)	(0.50)
Δ $Inflation_{t-1}$	-326.933	-242.362	-569.295
	(1.60)	(1.23)	(2.60)**
Δ Inflation $_{t-1}$ x Implied Rec. $_{t-1}$	453.455	1,214.174	1,667.630
	(0.99)	(2.09)**	(2.72)***
Term Spread $_{t-1}$	0.217	-0.263	-0.046
	(0.52)	(0.55)	(0.09)
Dividend Yield $_{t-1}$	-0.672	1.631	0.958
	(0.70)	(1.42)	(0.80)
Short Rates $_{t-1}$	-373.133	167.944	-205.189
	(1.03)	(0.40)	(0.46)
R^2	0.19	0.11	0.19
Adj. R^2	0.13	0.04	0.13

Table 11 (*continued*)

PANEL E:

	Momentum	Winners	Losers
Implied Recession $_{t-1}$	-1.545	0.512	2.058
	(1.47)	(0.44)	(1.13)
Δ GDP$_{t-1}$	-32.750	232.296	265.046
	(0.23)	(1.30)	(1.18)
Δ GDP $_{t-1}$ x Implied Rec. $_{t-1}$	348.409	-148.003	-496.412
	(1.04)	(0.45)	(0.86)
Δ Inflation$_{t-1}$	148.306	-365.957	-514.263
	(1.09)	(1.67)*	(1.97)**
Δ Inflation $_{t-1}$ x Implied Rec. $_{t-1}$	-834.760	1,174.361	2,009.121
	(1.26)	(2.37)**	(1.92)*
Term Spread $_{t-1}$	0.074	-0.059	-0.133
	(0.21)	(0.12)	(0.22)
Dividend Yield $_{t-1}$	-2.271	0.775	3.046
	(2.24)**	(0.69)	(1.79)*
Short Rates $_{t-1}$	149.221	-229.405	-378.625
	(0.51)	(0.50)	(0.67)
R^2	0.22	0.09	0.17
Adj. R^2	0.15	0.02	0.10

* $p<0.1$; ** $p<0.05$; *** $p<0.01$