**On the stock market liquidity and the business cycle: a multi country approach**

**Abstract**

We provide original results on national and global stock market liquidity and its interaction with macro-economic variables for six of the G7 economies, namely: Canada, France, Germany, Italy, Japan and UK, building on the methodology and on the US evidence by Naes et al. (2011). Using a number of additional tests, we find that different markets do not behave in a uniform manner. National liquidity has diminished ability in Granger causing macroeconomic variables for our sample countries, and in additional tests the same holds for an extended US sample, contrary to Naes et al. As regards global liquidity there is a two-way causality with macroeconomic indicators for the six nations in our sample while for the US there is no causality in either direction. We also show that there is no superior information in small firm liquidity in Granger causing macroeconomic variables even for the US in contrast to the sample period employed by Naes et al. implying an unstable relationship over time for the US.

Keywords: Market Liquidity; Real Economy; Economic Indicators; Granger Causality, Panel Data, Dumitrescu Hurlin,

JEL: G15, F37, F44, F47

**1. Introduction**

Liquidity is linked to the state of the economy (Eisfeldt, 2004) and problems in financial markets can spread to the real economy. Naes, Skjeltorp, and Odegaard (2011) (henceforth NSO), show that at least since WWII, US market liquidity contains information about the real economy. However, Bernanke (2010) states that the understanding of this relationship is an incomplete chore for researchers, while NSO highlight the importance of looking at a larger cross-section of stock markets. We offer original evidence for six different countries namely: Canada, France, Germany, Italy, Japan and the UK. We are further motivated by the fact that this issue is ever more important following the recent financial crisis (Mclean and Zhao, 2014), thus we start below by verifying the relationship of liquidity and recessions for the above named markets in Figure 1.

Figure 1, exhibits time series for illiquidity (Roll’s effective spread and the Amihud ratio[[1]](#footnote-1)) in relation to periods where there is negative GDP growth for two consecutive quarters. The figure shows that although there exists a relationship between liquidity and the business cycle for these markets as in NSO, it is only in Canada that liquidity variables consistently predict the onset of a recession, while for the rest of the economies this relationship is not to a single direction. For example, the national Amihud ratio (NAM henceforth) behaves as expected with regards to a recession except for Japan and Germany, where it exhibits the opposite and mixed behaviour respectively. The national Roll effective spread estimator (NRO henceforth) is not as consistent as it moves to different directions before different recessions for all countries in the sample except again for Canada[[2]](#footnote-2).

**[Insert Figure 1 about here]**

The above results are consistent with the broad literature. They can be linked to recession related uncertainty of future asset prices as in Watanabe and Watanabe (2008) and the effect that liquidity has on changes in productivity on investment and volume (see Eisfeldt, 2004). Furthermore, similarities for US and Canada, are often documented given the close ties of their neighbouring economies, and similarly between European economies especially following the onset of deeper European economic integration. The different behaviour of the Japanese market can be explained by the geographical and economic setting. Given these results, the issue of stock market liquidity and the business cycle is clearly worth further examination.

The results of this paper are relevant to two strands of the literature. Firstly, they are relevant to the field of macroeconomic forecasting using stock market measures of trading activity, such as order flow. Fujimoto (2004) systematically links the evolution of the macroeconomy to market liquidity. Beber et al. (2010) find that order flow movements can predict the state of the economy with results that are robust to the evolution of the economy and future stock and bond market returns. Along the same line Kaul and Kayacetin (2009) use two measures: the cross sectional average of individual stock order flows, and the difference between the average order flow for big stocks and small stocks. Both measures predict industrial production and real GDP, while the latter measure also predicts corporate earnings. Soederberg (2008) investigates if in Scandinavian order-driven markets, macroeconomic indicators forecast changes in liquidity. Secondly, our study is relevant to the market microstructure literature on liquidity, which has concentrated mainly on commonality (see for the US market Chordia et al., 2000; Huberman and Halka, 2001; Hasbrouck and Seppi, 2001; and Galariotis and Giouvris, 2007 for the UK); and time variation in liquidity and asset returns (see Pastor and Stambaugh, 2003; and Acharya and Pedersen, 2005). In this paper we investigate the effects of liquidity on macroeconomic indicators and we show that US results are sensitive to time and that certain liquidity measures have predictive ability over macroeconomic indicators (albeit not universally) after controlling for well-known variables such as the term structure of interest rates, momentum and volatility/standard deviation, SMB, HML, market excess returns, the risk free asset, and dividends[[3]](#footnote-3).

Our work also has implications for that of NSO not only by augmenting their methodology but also by providing an out-of-sample-period test for US, and in addition original tests for the rest of the G7 nations. More specifically, we show that as in NSO there is a relationship of liquidity variables and the real economy but that this relationship is time varying consistent with Lu-Andrews and Glascock (2010), and Fujimoto (2004). For just one example, even for the US, the effect of small firm liquidity on macroeconomic variables is unstable over time. In addition, the direction of the relationship of liquidity and the economy seems to depend more to the level of integration of the different economies (more integration is linked to more similarity) rather than the type of financial system (market based system vs. bank based system) [[4]](#footnote-4).

**2. Liquidity Measures Analytically and Data**

*2.1. Liquidity Measures Analytically*

Our study brings together two very different areas, those of macroeconomics and of market microstructure, and although if this was a pure market microstructure study we would probably employ high frequency data, here our main concern is to create times series measures of liquidity that extend to the past as much as possible. For this reason we employ the following liquidity measures: the national Amihud ratio[[5]](#footnote-5) (NAM) which is called ILR in NSO and national Roll’s implicit spread estimator (NRO) called Roll in NSO. All measures used in this study measure illiquidity, i.e. an increase for any measure is consistent with a decrease of liquidity.

The first liquidity measure is Roll’s effective spread (NRO, the prefix N stands for National and it is used to distinguish it from global RO: GRO) and it is obtained by calculating the first order autocovariance of the returns for each stock in each country. The second measure we use in our analysis is Amihud’s (2002) ratio (NAM the prefix N stands for National and it is used to distinguish it from global AM: GAM). This measure captures changes in prices for a given trading volume, and is particularly important as it has been recently shown to be strongly priced in the cross-section of stock returns only in negative return days by Brennan et al. (2011), which undoubtedly include recessions. In the nominator we have absolute returns (r) divided by trading volume (TVOL), []. We calculate NAM for every sample stock and sample day and then we average over the quarter in each country. NAM implies that if there is a big change in absolute returns for a given trading volume, then this particular stock is illiquid. We would not expect big changes for a liquid stock (i.e. trading volume will have minimal impact on prices).

*2.2. Liquidity Data*

All data are from DataStream. For all countries in our sample we use for comparison reasons with NSO all dead and alive stocks available excluding penny shares[[6]](#footnote-6). Stocks are deleted if they have more than five values missing per month. Our start date is Q4 1995 and was determined by liquidity data unavailability for Germany[[7]](#footnote-7), while our end date is Q4 2013 (73 quarterly observations). Table 1, panel A presents descriptive statistics for all countries and liquidity measures, and panel B presents correlations between liquidity variables. All liquidity variables are significantly correlated with each other except for Italy (p-values are in brackets). Results for the US are presented in the appendix (Table 1), and as can be seen, liquidity variables are not correlated for the US (panel b). In appendix Table 2 (panels A, B and C) you can see correlations for all variables. The signs are as expected.

**[Insert Table 1 about here]**

*2.3. Macroeconomic and Market Data*

To capture the state of the economy we employ real GDP *growth* (GDP), unemployment *growth* rate for full time workers (UN), real personal consumption *growth* (CONS) and real private fixed investment *growth* (INV). Volatility/standard deviation (SD) is calculated as the standard deviation of daily average returns for the same stocks over each quarter. Term spread (TERM) is calculated as the difference between the yield on a 10 year Treasury bond benchmark and the yield on the 3 month Treasury bill. MOM stands for momentum, SMB stands for small minus big, HML stands for high minus low and are calculated as in Fama and French (1993), DIV is dividends, RF is the risk free rate and XS is excess market return. Our global liquidity factor is formed as in Brockman et al. (2009) based on a value weighted average across all firms in our data except the ones that belong to the specific country for which the regression is estimated. For example, if we regress Italian GDP on national Italian liquidity, the global liquidity factor is based on all sample firms except the firms that trade in Italy. In our global liquidity factor we also include US liquidity[[8]](#footnote-8).

*2.4. Time Series Adjustments of Series and Correlations*

Before we undertake any further analysis, we test data for stationarity using the Augmented Dickey Fuller (ADF) test, Dickey Fuller with GLS detrending (DFGLS), Kwiatkowski, Phillips, Schmidt and Shin (KPSS), Ng and Perron (NP), and the Phillips-Perron test[[9]](#footnote-9). All macroeconomic variables have been differenced to become stationary, while for some liquidity variables this is not required as they are stationary. If there is a D in front of the name of the variable then this means that the variables have been differenced. All our variables are orthogonalised.

Table 2 shows the contemporaneous correlations between different variables for all six countries, with correlation tables presented in alphabetical order by county. The correlations presented are for raw data before differencing and orthogonalization. In order to make correlation tables more comprehensible, we first present correlations between macroeconomic indicators and liquidity (national and global) in panel A. In panel B we present correlations between macroeconomic indicators and financial variables, while in panel C we present correlations between liquidity and financial variables.

Correlations between macroeconomic indicators and national/global liquidity (Table 2, panel A) are strong for most countries. In the case of Germany correlations are very weak for macroeconomic variables and global/national liquidity. Both national and global liquidity variables correlate negatively with GDP, INV and CONS and positively with UN as expected.

Regarding correlations between financial variables and macroeconomic indicators (Table 2, panel B), volatility/standard deviation (SD) correlates strongly with most macroeconomic indicators. Correlations between SD and the three macroeconomic indicators (GDP, CONS, and INV) are negative, but they are positive for UN and the signs obtained are always consistent. For Canada Japan and the UK, SD correlates with all macroeconomic indicators. Term structure (TERM) exhibits less correlation with our macroeconomic indicators (4 out of 24, or 17%) and in the case of Canada, Japan and France there is no correlation at all. Momentum (significant only for Canada), SMB and HML, exhibit the weakest set of correlations. RF correlates significantly with macroeconomic indicators for Japan and the UK mostly. Similarly XS correlate positively with GDP, CONS and INV and negatively with UN for all countries. XS correlates significantly with all Canadian macroeconomic indicators while there is no correlation at all in Germany. Dividends correlate negatively with GDP, CONS and INV and positively with UN. Canada, Italy and the UK exhibit the strongest correlations.

Correlation results between our financial variables and liquidity (panel C) show that volatility/standard deviation (SD) correlates with at least one liquidity variable in every single country under examination. More specifically SD correlates with both RO and AM in France, Italy UK and Japan[[10]](#footnote-10). TERM correlates with both liquidity variables in the UK only while in Germany there is no correlation at all. Correlations between Momentum (MOM) and national liquidity are weak. In Germany, Italy, Japan and the UK there is no correlation at all. Correlations between our financial variables and global liquidity show that standard deviation (SD) correlates with at least one global liquidity variable in every single country under examination. TERM correlates with at least one global liquidity variable for every single country except in Germany. Momentum (MOM) appears to correlate with at least one global liquidity variable except for Canada and Japan**.** Finally SMB and HML exhibit the lowest percentage of correlations (Canada is an exception). XS exhibits significant positive correlations with both global liquidity variables in Germany only, while in France there is no correlation at all. DIV correlates with every single global liquidity variable except in the UK in which it correlates only with one and with at least one national liquidity variable for all countries in the sample.

**[Insert Table 2 about here]**

**3. Predicting Economic Growth with Market Illiquidity**

*3.1. In Sample Evidence*

We estimate the following model to assess the predictive ability of market illiquidity:

where Yt+1 is the realised growth of our macroeconomic variables one quarter ahead (t+1); LIQt is the national market illiquidity for the contemporaneous quarter t (namely the national Amihud ratio, NAM; and the national Roll implicit spread estimator, NRO); Xt contains the following control variables: risk free rate (RF), small minus big (SMB), high minus low (HML), momentum (MOM), term structure (TERM), standard deviation/volatility (SD), excess returns (XS), dividends (DIV), at least one lag of the dependent variable (DEP) and more if the residuals remain correlated; and global liquidity (namely the global Amihud ratio, GAM; and the global Roll implicit spread estimator, GRO); γ’ is the vector of coefficient estimates for the control variables and u is the error term. Our macroeconomic variables (Yt+1) are real GDP *growth* (GDP), *growth* in the unemployment rate (UN), real consumption *growth* (CONS) and real *growth* in private investments (INV). As explained, all variables are orthogonalised to avoid multicollinearity, and if there is a D in brackets then it means that the variable in question has been differenced. Also all coefficients presented are standardised coefficients so that the reader can assess the economic significance of each variable and its effect on macroeconomic indicators[[11]](#footnote-11).

We start by replicating the NSO study using US data from 1995 to 2013, so as to make an effective comparison between the NSO sample period results and our results for the US, as well as between the US results and those for other countries in our sample. All results for the US are presented in the appendix and are discussed first. Appendix, Table 3 presents results from predicting macro variables using national liquidity, global liquidity and financial variables. Based on the Amihud measure (AM), results indicate that national AM (NAM) and global AM (GAM) are statistically significant when controlling for TERM, CRED, SD and XS[[12]](#footnote-12). Comparison between adjusted r-squared values R2Adj DEP+FIN and R2Adj DEP+FIN+NL when national liquidity (NL) is captured by NAM shows that there is an increase in 1 out of the 4 cases (see CONS, R2 adj increases from 0.331 to 0.348) while when national liquidity is captured by NRO there is a decrease. Generally speaking, the explanatory power of national liquidity has reduced considerably compared to NSO findings. Comparison between R2Adj DEP+FIN+NL and R2Adj DEP+FIN+NL+GL shows that global liquidity (GL) performs much better. For GRO, R2Adj DEP+FIN+NL+GL increases in 2 out of the 4 cases (see GDP and CONS). In the case of GAM, R2Adj DEP+FIN+NL+GL compared to R2Adj DEP+FIN+NL increases only for CONS. The results provided here show that global liquidity has a contribution in explaining US macroeconomic indicators compared to national liquidity especially for consumption. Unfortunately we cannot compare our global factor findings with NSO, simply because they do not use global factors. To summarize, the predictive ability of national liquidity has reduced considerably in the most recent period compared to the NSO sample period, while global liquidity appears to have some predictive ability.

Table 3 presents results for all liquidity variables for all other countries. We estimate four different regressions for each macroeconomic indicator for each country; but to save space we present full results only for the final regression that includes both national and global liquidity and all financial variables. In order to assess the predictive ability of financial variables, national liquidity, global liquidity and all variables together, we present four R2 Adj. values each time. As can be seen, liquidity variables do not always have the same explanatory power in all countries, there is a lot of variation in the significance of β’s. Liquidity regression coefficients (national and global) carry the correct sign, i.e. negative in relation to GDP, INV and CONS and positive with respect to UN. Canada (Japan) is the only exception for national (global) liquidity that is rarely significant or carries the wrong sign, while for France national liquidity is always insignificant. According to NSO, for the US, an increase in illiquidity predicts an increase in full time unemployment and decline in GDP, private fixed investment, and personal consumption. However, for the countries in our sample, an increase in illiquidity does not always precede a recession (actually in some cases it is the opposite) therefore it is very likely to obtain signs that do not always comply with NSO. Another variable which is worth discussing is dividend yield (DIV). It is rarely insignificant, actually it is significant more often than national liquidity and the signs obtained are consistent for all regressions. An increase in dividend yield predicts a decrease in GDP, private fixed investment, and consumption and an increase in full time unemployment. This can be explained as follows: higher dividends mean lower investment overall, which translates to lower industrial production, GDP, and higher unemployment. As regards volatility (SD), NSO find that it is insignificant, however for the rest of the G7 countries in our sample it is significant more often than liquidity variables and with signs that are consistent with expectations. An increase in volatility predicts a decrease in GDP, private fixed investment, and personal income and an increase in full time unemployment. This can be explained as follows: higher volatility makes investors nervous and they withdraw their funds from the stocks markets (see for example the recent case of Greece), making capital more expensive which leads to decreased investment and slower development for the whole economy. TERM appears to be insignificant more often than we expected in the first place, very similar to NSO results. For every single country in the sample, for every set of regressions it is significant only once (except for Canada in which it is significant twice). The risk free rate (RF) exhibits the same behaviour as TERM. Excess returns (XS) is not significant as often as expected, while in the case of Germany it is never significant. Finally among HML, SMB and MOM, the last is significant more often than the rest.

Summary results are presented in the last panel. National AM (NAM) fails to increase average R2 Adj. when added to our first regression that includes only financial variables (see columns 2 and 3 of the summary table, penultimate row). Global AM (GAM) has no explanatory power over financial variables (grand average reduces slightly; see columns 2 and 4 of the summary table). Generally speaking AM (national and global) when included in a regression together don’t have great explanatory power over financial variables (grand average increases only by 0.6%, see columns 2 and 5 of the summary table). National RO (NRO) appears to have no extra explanatory power over our financial variables as the grand average reduces slightly between financial variables and ‘financial variables + national liquidity’ (see columns 2 and 3 of summary table, last row). Global RO (GRO) also has no extra explanatory power as the grand average actually decreases from 30.5% for financial variables only to 29.5% for ‘financial variables + global liquidity only’ (see columns 2 and 4 of the summary table, last row). The summary table shows that the addition of liquidity variables be it global, national or both has a marginal (non-existent) impact when captured by AM (RO). However, when looking at individual results for each country one can clearly see that the coefficients for national and global liquidity can be significant. It is very difficult to generalise across countries and each country must be viewed individually. France is a country where national liquidity is in all cases insignificant. In stark contrast to France, in Germany and Italy, national liquidity has good predictive ability when captured by national Amihud (NAM). To summarize, results obtained for Canada, France, Germany, Italy, Japan, and the UK are very similar to the US as far as national liquidity is concerned with limited predictive ability. Global liquidity exhibits some minor predictive ability for US macro fundamentals but not for the rest of the countries.

**[Insert Table 3 about here]**

*3.1.1 Causality*

In this paper we are mainly interested in investigating the effect of liquidity on macroeconomic variables, yet, there remains a high chance that the direction of the relationship is inverse, or that there exists a two-way relationship. For example contrary to NSO, Goyenko et al. (2011), find that in the bond market setting, liquidity conditions are significantly affected by the economic environment. Soederberg (2008) also searches in the same direction, contrary to the theoretical proposition of Eisfeldt (2004). In addition, Pereira and Zhang (2010) find a strong two-way relationship in their tests. Lu-Andrews and Glascock (2010) also find an impact of the macroeconomy such as business cycles and growth on liquidity during recessions. In order to investigate these possibilities, we perform Granger causality tests in a panel data framework. We also present results of the Dumitrescu Hurlin D-H non homogenous causality test. We perform tests using all liquidity variables and all macroeconomic variables. Results of all Granger causality tests panel data, are presented in Table 4 (for the US, as before, they are presented only in the appendix, same table number). We first test the null hypothesis that our liquidity variable does not Granger cause (or does not homogeneously cause, for the Dumitrescu Hurlin test) the macroeconomic variable in question and then we test the null hypothesis that our macroeconomic variable does not Granger cause (or does not homogeneously cause, for the Dumitrescu Hurlin test) the liquidity variable in question. We report the F-test and p-value (in parentheses) for the standard panel Granger causality test and the W-stat, Z bar and probability (in parentheses) for the D-H test. We use 2 and 4 lags for our tests. For the US Granger causality tests, the first number in each cell is the χ2 value and numbers in parentheses are p-values.

Results for the US (Appendix Table 4, panel A) show that there is almost no causality running from national liquidity to macroeconomic indicators. Only national Roll (NRO) Granger causes unemployment (line 7 of the table). On the contrary it appears that GDP and INV Granger cause national liquidity (lines 2 and 4). The relationship between liquidity and macroeconomic indicators appears to be quite unstable in the US over time. NSO report a one way causality running from national liquidity to macroeconomic indicators (sample range: 1947-2008). From 1995 to 2010 (results not tabulated for the economy of the paper) we find a one way relationship running from national liquidity (when captured by NRO) to macroeconomic indicators. However, from 1995 to 2013, this relationship disappears as discussed above, which is not unusual given that (systematic) liquidity varies a lot over time. With respect to Global liquidity and US macroeconomic indicators we find that there is a stable two-way causality over time (see panel B, lines 3-4 and 7-8). Consistent results are obtained over 1995-2010 and 1995-2013. Again this not an unexpected finding given that the global liquidity factor used in the US Granger causality regressions includes all other G7 countries excluding the US. Unfortunately, no direct comparison can be made with NSO findings since they do not use global factors.

Original panel data results for the rest of the countries in the sample (Table 4, panel A) show that there is not much interaction between national liquidity and macroeconomic indicators, very similar to US results. We find that there is a two-way causality between national AM (NAM) only and GDP (lines 1-2). There is no causality in either direction between national RO (NRO) and macroeconomic indicators. Comparing these results to results obtained for the US, one can clearly see that the US is behaving similarly to the rest of the countries in our sample for the period 1995 to 2013. Looking at causality between global liquidity and macroeconomic indicators for the remaining G7, we find that there is a two-way relationship between GAM and CONS (Table 4, panel B, lines 5-6). Also GDP and INV Granger cause both global liquidity variables while it is only global AM (GAM) that causes unemployment. Generally speaking results for Granger causality between global liquidity and macroeconomic indicators are similar for both US and the rest of the G7. To summarize, the ability of national liquidity is quite diminished in Granger causing macroeconomic indicators for the US, and is small for the rest of the G7, contrary to NSO and it is very unstable for the US over time consistent with Lu-Andrews and Glascock (2010) and Fujimoto (2004). When we observe Granger causality between national liquidity and macroeconomic indicators, this is for all countries except the US and it is strictly between national AM (NAM) and GDP. It is a two-way relationship (see Table 4, panel A, lines 1-2) and it is consistent for different time periods, 1995-2010 and 1995-2013.

**[Insert Table 4 about here]**

*3.2. Out-of-Sample Evidence*

In the previous section we showed that certain liquidity variables had predictive power for certain macroeconomic variables even after controlling for financial variables known to affect macroeconomic growth. In this section we perform out-of-sample tests to check if the national liquidity variables that ‘survived’ the inclusion of financial variables and global liquidity in the previous section are able to forecast all macroeconomic variables. Given the characteristics of our sample, we do not use a rolling estimation scheme as in NSO but instead we split our sample in half and use the first half of the sample to predict the second half for all countries in the sample. We perform two kinds of tests. Firstly, we predict macro variables using an unrestricted model and a restricted one, and we compare their performance. The unrestricted model contains the following predictors: national liquidity and financial variables and global liquidity. The restricted model contains only financial variables and global liquidity. Secondly, in a similar spirit we try to predict macroeconomic indicators comparing the performance of two models: an unrestricted model that contains liquidity (national and global) + financial variables + an autoregressive term of the macro variable, against a restricted or baseline model that contains just the autoregressive term[[13]](#footnote-13).

The forecast performance is evaluated using the ratio of mean squared errors (MSE) of the unrestricted model to the mean squared errors of the restricted model (MSEu/MSEr), and two other tests, namely the ENC-NEW test proposed by Clark and McCracken (2001) and MSE-F test by McCracken (2007). The ratio MSEu/MSEr indicates which model’s mean squared errors are greater. If the ratio is equal to 1, then this means that the mean squared errors from both models are equal. If the ratio is less (more) than 1 then it means that the MSE of the unrestricted model are smaller (bigger). The second test used for evaluation is called ENC-NEW and answers if the restricted/baseline model (financial variables + global liquidity) encompasses the unrestricted one (national liquidity + financial variables + global liquidity). If the restricted/baseline model does not encompass the unrestricted one, then this indicates that the extra variable in the unrestricted model (national liquidity) improves forecasting accuracy. The ENC-NEW test statistic is given as:

where P is the number of forecasts (i.e. the second half of the sample), εr,t+1 is the out-of-sample errors from the restricted model (r stands for restricted) and εu,t+1 is the out-of-sample errors of the unrestricted model (u stands for unrestricted). The final test, called MSE-F, tests for equality between MSEs from the restricted and unrestricted models. The formula is given by:

where ε2r,t+1 are the squared errors from the restricted model and ε2u,t+1 are the squared errors from the unrestricted model, P is the number of forecasts as before. Both statistics are non-standard and we need to use bootstrapped critical values kindly provided by Todd Clark.

Table 5, presents results for all countries with each panel dedicated to a specific country. We have used numbered columns to make it easier to follow the analysis. For example, C1 stands for column 1, C2 stands for column 2 and so on. Generally speaking, the results show that national liquidity variables have no forecasting ability over financial variables and global liquidity however all the variables together have forecasting power over the AR term, not an unexpected result. More specifically, for Canada, national liquidity has no extra explanatory power over financial variables and global liquidity (see C6 and C7, where both tests are insignificant). However the ENC-NEW in the autoregressive model (see C6 and C7, both tests are significant) rejects the H0 that the restricted model encompasses the unrestricted one, therefore national and global liquidity and financial variables have extra predictive power over the AR term. Germany, Japan and the UK are very similar to Canada in the sense that national and global liquidity have extra predictive ability over AR but national liquidity itself has no predictive ability over global liquidity and financial variables. In the case of Italy, national and global liquidity have good predictive ability. National liquidity improves forecasting over global and financial variables and all variables together improve forecasting over the AR term, perhaps as a result of the ongoing debt crisis and the importance of national liquidity. To summarize, there is a very clear pattern emerging, where national and global liquidity and financial variables have some forecasting ability over the AR term but national liquidity itself does not have predictive ability over global and financial variables except in Italy. The results obtained are not unexpected. Regressions in the previous section indicated that R2 adj does not increase once national liquidity is added over financial variables.

**[Insert Table 5 about here]**

**4. Firm Size and the Information Content of Liquidity**

NSO find that in the US, the liquidity of small firms is more informative about future macro fundamentals compared to that of large firms using a sample from 1947 to 2008. This section examines whether this result is wider or universal using the markets in our sample (1995-2013). To do so, we estimate in sample predictive regressions but the liquidity variables this time are based on different firm size quintiles. Firms are assigned into quintiles based on their market capitalization on the last trading day of the previous year. Liquidity variables are reconstructed using the two extreme quintiles and are named accordingly. For instance, we now have large/small national and large/small global, with the suffix L (S) indicating the variables made up of the largest (smallest) 20% of firms.

Table 6 presents results for the in-sample predictive regressions (for the US results are presented in the Appendix, Table 5), while Table 7 presents results on Granger causality (for the US results are presented in the Appendix, Table 6).

We start by discussing the US results, presented in the Appendix, Table 5. The liquidity of small national firms appears to have no explanatory power on any macroeconomic indicator. More specifically, if one compares R2 adj FIN with R2 adj FIN+SN (small national) for both NAMS and NROS, one can see that the latter decreases (singe exception: NAMS with respect to GDP). While NSO report that the liquidity of small national firms explains macroeconomic indicators from 1947 to 2008, we show for our more recent sample that the relation has changed. NSO do not look into sub-periods explicitly as far as the effect of small firm liquidity on macroeconomic indicators is concerned. The liquidity of large national firms does not have any effect either on macro indicators (single exception: the effect of NROL on UN). Global liquidity (both small and large) does not have explanatory power either, with only the case of the effect of GAMS on INV standing out.

For the rest of the countries in our sample, original results in Table 6 (last panel) show that there is not much improvement over R2 adj FIN which is obtained by regressing macroeconomic indicators on financial variables only. Actually R2 adj FIN + SN (small national) shows almost no increase (the last two lines of the first three columns). Generally speaking size (national or global) appears to have no superior explanatory power.

Granger causality tests for the US for the period 1995-2013 between small firm liquidity and macroeconomic indicators (Appendix Table 6, panel B) show that there is no causality running from national small firm liquidity to macroeconomic indicators (only ROS appears to Granger cause UN, see line 7 of the same panel). No small firm liquidity effect can be confirmed in contrast to NSO. On the contrary it seems that macroeconomic indicators Granger cause small firm liquidity even though the effect is not strong (see lines 2, 6 and 8, of the same panel). For the smaller period 1995-2010, Granger causality tests for the US (results not tabulated for the economy of the paper) show that there is also a two-way causality contrary to NSO who report strictly a one way causality running from small firm liquidity to macroeconomic indicators. We believe that this is a direct result of the subprime debt crisis in the US. NSO’s sample ends in 2008 and obviously during that period the liquidity of small firms was seriously affected and this passed on the real/macro economy. This is a plausible reason for the one-way small firm liquidity effect on macroeconomic indicators captured by NSO. However, as we extend the sample we find that this one way relationship changes to a two-way relationship for the period 1995-2010 and then disappears when adding data up to 2013 after the US economy recovered following a prolonged period of low interest rates and quantitative easing that promote investment and increase liquidity. This is supported by a recent study by Fernandez-Amador et al. (2013) for EU countries between 1993 and 2009. They find that an expansionary monetary policy increases smaller stock liquidity to a greater extent than larger stock liquidity. Keeping this in mind, one can see why the effect of size has disappeared for the most recent period following an expansive monetary policy in the US and the EU. US national large firm liquidity (NAML and NROL) for the larger sample (1995-2013) appears to Granger cause UN (see Appendix Table 6, panel A, line 7). There is a two-way causality between NAML and CONS (see lines 5-6 of the same panel). As far as global small firm liquidity is concerned, there is not much causality in either direction. Global small firm liquidity (GAMS) Granger causes INV only (panel C, line 3). Also, there is no much causality in either direction between large global firm liquidity and US macroeconomic indicators, just a one way relationship running from INV to GAML and GROL (panel D, line 4).

As regards causality between liquidity of national small companies and macroeconomic indicators for the rest of the countries (Table 7 panels A and B), results indicate that there is not much interaction. NROS does not Granger cause any macroeconomic indicator (see panel B). We can report a two-way Granger causality between NAMS and GDP only and no other variables (see panel A, lines 1-2). There is no superiority of small firm liquidity in Granger causing macroeconomic indicators for the 6 countries in our sample. This can be explained by the asymmetric impact of expansive monetary policy on small firm liquidity (see Fernandez-Amador et al., 2013, on European Union expansive monetary policy and the subsequent increase in small firm liquidity). Small firm liquidity does not suffer if there is an expansive monetary policy and this is what has been happening in the EU and the UK the last few years, therefore the small firm liquidity effect disappears. Generally speaking, US results for the period 1995-2013 are consistent with the rest of the countries in our sample, implying that the one way causality reported for the US in NSO is not stable over time. National large firm liquidity also has no effect on macroeconomic indicators (see Table 7 panels A and B, NAML and NROL, lines 1, 3, 5 and 7), the only exception being NROL (see panel B, line 7). When we look at causality between liquidity of global small/large companies and macroeconomic indicators for our six countries, results indicate that: i) that there is a two-way relationship between global liquidity (either small or large) and macroeconomic indicators; ii) macroeconomic indicators (GDP, INV, CONS and UN) Granger cause global small firm liquidity (captured by GAMS only, no causality when considering GROS, Table 7, panel C, lines 2, 4, 6 and 8); and iii) global large liquidity (GAML) Granger causes GDP (see line 1 of the same panel). Results for the US for the same period (1995-2013) show that there is not much causality in either direction between (small/large) global liquidity and macroeconomic indicators. Only a two-way causality between global small liquidity (GAMS) and INV (Appendix Table 6, panel C, lines 3-4).

**[Insert Tables 6 and 7 about here]**

**5. Conclusion**

This paper contributes to the macro forecasting and liquidity literature for the G7 countries offering original evidence for six of these large economies as well as out-of-sample evidence for the US. Firstly, the paper shows that stock market liquidity may contain some information for estimating the current and future state of the economy. This is found to be very much country specific and liquidity-variable dependent, i.e. different liquidity variables for different countries are better at predicting the future conditions of the economy, while for the US the relationship is also time varying. Contrary to NSO findings, the predictive ability of national liquidity for the US has diminished quite a lot for our more recent sample ending in 2013. This is in line with the rest of the countries in the sample where the effect of national liquidity is marginal at best. Global liquidity appears to have no explanatory power for the rest of the countries but it does have some predictive ability for the US, consistent with the findings, of Bekaert et al. (2014) albeit in a different context. We also observe no causality running from national liquidity (only NRO Granger causes UN) to macroeconomic indicators in the US[[14]](#footnote-14). We obtain similar results for the rest of the countries. For global liquidity, we observe two-way causality for the US and for the rest of the countries. When we look at how liquidity and company size interact, we find that national small firm liquidity has no explanatory power over financial variables for all countries in the sample including the US. This contrasts with NSO implying the relationship is not stable over time but is consistent with Fujimoto (2004) who shows that the relationship of the macroeconomy and liquidity changes dramatically over time. We also report that small firm liquidity does not Granger cause macroeconomic indicators in the US or any other country in our sample. Finally, there is a two-way relationship between global liquidity and macroeconomic indicators and it is mostly macroeconomic indicators that Granger cause small firm liquidity. Results for the US for the same period show that there is no causality in either direction.

Overall, our results show that the NSO findings do not hold in a more recent sample period for the same market (US) and relationships within the US are unstable. When looking into the rest of the G7 countries, we show that NSO findings are country and variable dependent. What is most interesting though is that the US behaves like the rest of the countries for a more recent sample. This suggests that although liquidity is pertinent to macroeconomic policy issues, caution must be exercised with generalizations from specific markets and periods within markets.

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Figure 1

Liquidity and the Business Cycle

The figure shows time series plots of the Amihud ratio (AM) and the effective Roll estimator (RO) for all countries in our sample. The grey lines are recession periods. A recession period is identified as a period for which there is negative GDP growth for two consecutive terms. Sample range Q4 1995-Q4 2013, 73 quarterly observations.

|  |  |  |
| --- | --- | --- |
|  | **AM** | **RO** |
| **Panel A: Canada** |  |  |
| **Panel B: France** |  |  |
| **Panel C: Germany** |  |  |
| **Panel D: Italy** |  |  |
| **Panel E: Japan** |  |  |
| **Panel F: UK** |  |  |
| **USA** |  |  |

Table 1

Descriptive Statistics and Correlations between Liquidity Variables

**Panel A: Descriptive Statistics**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | CANADA | | FRANCE | | GERMANY | | ITALY | | JAPAN | | UK | |
|  | NAM | NRO | NAM | NRO | NAM | NRO | NAM | NRO | NAM | NRO | NAM | NRO |
| Mean | 0.643 | 0.012 | 3.677 | 0.009 | 3.512 | 0.011 | 0.086 | 0.007 | 0.04 | 0.008 | 0.0002 | 0.006 |
| Median | 0.117 | 0.01 | 2.122 | 0.009 | 0.965 | 0.009 | 0.041 | 0.007 | 0.002 | 0.007 | 0.0001 | 0.005 |
| S.D | 0.91 | 0.006 | 4.148 | 0.003 | 7.120 | 0.015 | 0.105 | 0.002 | 0.004 | 0.002 | 0.0004 | 0.002 |
| Min | 0.002 | 0.004 | 0.114 | 0.005 | 0.000 | 0.003 | 0.002 | 0.004 | 0.000 | 0.004 | 0.0000 | 0.003 |
| Max | 4.012 | 0.026 | 16.929 | 0.023 | 36.74 | 0.136 | 0.463 | 0.013 | 0.016 | 0.014 | 0.0023 | 0.013 |

**Panel b: Correlations between Liquidity Variables**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **CANADA** | **FRANCE** | **GERMANY** | **ITALY** | **JAPAN** | **UK** |
|  | **RO** | **RO** | **RO** | **RO** | **RO** | **RO** |
| **AM** | **0.557**  **(0.00)** | **0.507**  **(0.00)** | **0.235**  **(0.04)** | 0.094  (0.41) | **0.577**  **(0.00)** | **0.307**  **(0.01)** |

Panel A shows descriptive statistics (mean and median) for liquidity measures for 6 countries. Panel B shows correlations between liquidity variables for 6 countries. The number in brackets is the p-value. The correlations are calculated across all stocks and time i.e. the liquidity measures are calculated for each available stock once each quarter and the correlations are pairwise correlations between these liquidity measures. Sample range Q4 1995-Q4 2013, 73 quarterly observations.

Table 2

Correlations of All Variables for All Six Countries

**Panel a: correlations between macroeconomic variables and liquidity (national and global)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CANADA** | | | | | **FRANCE** | | | |
|  | **GDP** | **CONS** | **INV** | **UN** | **GDP** | **CONS** | **INV** | **UN** |
| **NAM** | 0.143  (0.21) | 0.022  (0.84) | 0.030  (0.79) | 0.042  (0.71) | **-0.341**  **(0.00)** | 0.079  (0.49) | **-0.279**  **(0.01)** | **0.405**  **(0.00)** |
| **NRO** | **0.269**  **(0.02)** | 0.000  (0.99) | -0.119  (0.30) | -0.001  (0.99) | **-0.236**  **(0.04)** | 0.013  (0.90) | **-0.328**  **(0.00)** | 0.126  (0.27) |
| **GAM** | **-0.342**  **(0.00)** | **-0.317**  **(0.01)** | **-0.294**  **(0.01)** | **0.209**  **(0.07)** | **-0.343**  **(0.02)** | 0.029  (0.79) | **-0.390**  **(0.00)** | **0.227**  **(0.05)** |
| **GRO** | 0.100  (0.38) | **-0.271**  **(0.02)** | -0.003  (0.97) | 0.011  (0.92) | **-0.227**  **(0.04)** | -0.09  (0.42) | -0.01  (0.91) | 0.066  (0.56) |
|  | | | | | | | | |
| **GERMANY** | | | | | **ITALY** | | | |
|  | **GDP** | **CONS** | **INV** | **UN** | **GDP** | **CONS** | **INV** | **UN** |
| **NAM** | **-0.300**  **(0.00)** | 0.008  (0.94) | -0.163  (0.15) | 0.051  (0.65) | **-0.399**  **(0.00)** | -0.03  (0.82) | **-0.288**  **(0.01)** | **0.417**  **(0.00)** |
| **NRO** | -0.08  (0.50) | -0.001  (0.99) | -0.164  (0.15) | 0.097  (0.39) | **-0.316**  **(0.00)** | -0.120  (0.29) | **-0.236**  **(0.04)** | **0.280**  **(0.01)** |
| **GAM** | -0.178  (0.12) | -0.05  (0.68) | -0.129  (0.26) | **0.194**  **(0.09)** | **-0.422**  **(0.00)** | -0.111  (0.33) | **-0.335**  **(0.00)** | **0.368**  **(0.00)** |
| **GRO** | -0.03  (0.80) | 0.105  (0.36) | 0.027  (0.81) | -0.006  (0.95) | **-0.306**  **(0.00)** | 0.184  (0.11) | **-0.197**  **(0.09)** | **0.555**  **(0.00)** |
|  | | | | | | | | |
| **JAPAN** | | | | | **UK** | | | |
|  | **GDP** | **CONS** | **INV** | **UN** | **GDP** | **CONS** | **INV** | **UN** |
| **NAM** | -0.106  (0.35) | -0.05  (0.69) | **-0.212**  **(0.06)** | **0.427**  **(0.00)** | **-0.208**  **(0.07)** | **-0.290**  **(0.01)** | -0.02  (0.87) | 0.170  (0.13) |
| **NRO** | **-0.282**  **(0.01)** | -0.156  (0.17) | **-0.327**  **(0.00)** | **0.370**  **(0.00)** | **-0.392**  **(0.00)** | -0.174  (0.13) | **-0.242**  **(0.03)** | **0.387**  **(0.00)** |
| **GAM** | -0.188  (0.10) | -0.08  (0.49) | -0.05  (0.64) | -0.04  (0.69) | **-0.410**  **(0.00)** | **-0.351**  **(0.00)** | -0.111  (0.33) | **0.336**  **(0.00)** |
| **GRO** | -0.03  (0.80) | 0.058  (0.61) | **0.247**  **(0.03)** | **-0.206**  **(0.07)** | -0.103  (0.37) | -0.165  (0.15) | -0.004  (0.97) | 0.014  (0.89) |

**Panel b: correlations between macroeconomic variables and financial variables**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CANADA** | | | | | **FRANCE** | | | |
|  | **GDP** | **CONS** | **INV** | **UN** | **GDP** | **CONS** | **INV** | **UN** |
| **RF** | **0.214**  **(0.06)** | 0.159  (0.16) | 0.115  (0.31) | -0.127  (0.27) | 0.122  (0.28) | 0.043  (0.70) | 0.108  (0.34) | **-0.239**  **(0.04)** |
| **SMB** | 0.083  (0.46) | 0.084  (0.47) | -0.09  (0.44) | 0.057  (0.61) | -0.09  (0.44) | -0.05  (0.63) | **-0.221**  **(0.05)** | 0.042  (0.71) |
| **HML** | **-0.298**  **(0.01)** | -0.172  (0.13) | -0.118  (0.30) | **0.263**  **(0.02)** | -0.02  (0.88) | -0.09  (0.44) | 0.012  (0.91) | -0.184  (0.11) |
| **MOM** | **0.369**  **(0.00)** | 0.133  (0.24) | **0.516**  **(0.00)** | **-0.476**  **(0.00)** | -0.139  (0.22) | 0.167  (0.14) | 0.019  (0.86) | 0.056  (0.62) |
| **SD** | **-0.361**  **(0.00)** | **-0.437**  **(0.00)** | **-0.622**  **(0.00)** | **0.365**  **(0.00)** | **-0.352**  **(0.00)** | 0.057  (0.62) | **-0.340**  **(0.00)** | **0.202**  **(0.08)** |
| **TERM** | 0.017  (0.88) | -0.005  (0.96) | 0.088  (0.44) | 0.092  (0.43) | 0.112  (0.33) | -0.100  (0.38) | -0.169  (0.14) | 0.184  (0.11) |
| **XS** | **0.325**  **(0.00)** | **0.497**  **(0.00)** | **0.448**  **(0.00)** | **-0.426**  **(0.00)** | **0.507**  **(0.00)** | -0.06  (0.62) | **0.441**  **(0.00)** | **-0.227**  **(0.05)** |
| **DIV** | **-0.597**  **(0.00)** | **-0.415**  **(0.00)** | **-0.437**  **(0.00)** | **0.435**  **(0.00)** | **-0.683**  **(0.00)** | -0.02  (0.87) | **-0.662**  **(0.00)** | **0.680**  **(0.00)** |
|  | | | | | | | | |
| **GERMANY** | | | | | **ITALY** | | | |
|  | **GDP** | **CONS** | **INV** | **UN** | **GDP** | **CONS** | **INV** | **UN** |
| **RF** | -0.08  (0.48) | 0.029  (0.79) | -0.129  (0.26) | -0.04  (0.70) | 0.131  (0.25) | -0.07  (0.53) | 0.090  (0.43) | **-0.246**  **(0.03)** |
| **SMB** | 0.076  (0.50) | -0.07  (0.52) | 0.049  (0.66) | -0.04  (0.74) | -0.184  (0.11) | -0.03  (0.79) | **-0.240**  **(0.04)** | -0.08  (0.51) |
| **HML** | -0.120  (0.29) | -0.153  (0.18) | -0.137  (0.23) | 0.070  (0.54) | 0.015  (0.89) | 0.025  (0.82) | 0.126  (0.27) | -0.154  (0.18) |
| **MOM** | 0.050  (0.66) | 0.040  (0.72) | 0.071  (0.53) | -0.03  (0.77) | 0.018  (0.86) | 0.039  (0.73) | 0.134  (0.24) | 0.061  (0.59) |
| **SD** | **-0.327**  **(0.00)** | 0.059  (0.60) | **-0.200**  **(0.08)** | 0.106  (0.35) | **-0.464**  **(0.00)** | -0.01  (0.39) | **-0.329**  **(0.00)** | **0.433**  **(0.00)** |
| **TERM** | **0.257**  **(0.02)** | -0.03  (0.78) | 0.147  (0.20) | **0.271**  **(0.01)** | -0.126  (0.27) | 0.105  (0.36) | -0.100  (0.40) | **0.455**  **(0.00)** |
| **XS** | 0.144  (0.20) | -0.05  (0.64) | 0.137  (0.23) | 0.029  (0.79) | **0.405**  **(0.00)** | 0.059  (0.60) | 0.173  (0.13) | -0.149  (0.19) |
| **DIV** | **-0.416**  **(0.00)** | -0.123  (0.28) | **0.137**  **(0.08)** | 0.035  (0.76) | **-0.675**  **(0.00)** | -0.100  (0.38) | **-0.543**  **(0.00)** | **0.555**  **(0.00)** |
|  | | | | | | | | |
| **JAPAN** | | | | | **UK** | | | |
|  | **GDP** | **CONS** | **INV** | **UN** | **GDP** | **CONS** | **INV** | **UN** |
| **RF** | -0.182  (0.11) | -0.161  (0.16) | **-0.218**  **(0.05)** | **0.258**  **(0.02)** | **0.295**  **(0.01)** | **0.397**  **(0.00)** | 0.083  (0.46) | **-0.234**  **(0.04)** |
| **SMB** | 0.031  (0.78) | -0.02  (0.83) | 0.017  (0.87) | 0.083  (0.46) | 0.142  (0.21) | 0.013  (0.91) | 0.070  (0.54) | -0.04  (0.70) |
| **HML** | 0.060  (0.60) | 0.024  (0.83) | 0.048  (0.67) | 0.036  (0.75) | -0.06  (0.62) | 0.007  (0.95) | -0.03  (0.79) | -0.07  (0.5) |
| **MOM** | -0.05  (0.65) | 0.089  (0.43) | -0.001  (0.99) | -0.169  (0.14) | -0.05  (0.65) | -0.07  (0.55) | -0.007  (0.95) | 0.062  (0.59) |
| **SD** | **-0.425**  **(0.00)** | **-0.220**  **(0.05)** | **-0.363**  **(0.00)** | **0.234**  **(0.04)** | **-0.504**  **(0.00)** | **-0.331**  **(0.00)** | **-0.215**  **(0.06)** | **0.514**  **(0.00)** |
| **TERM** | 0.132  (0.24) | 0.089  (0.43) | 0.096  (0.40) | 0.109  (0.34) | -0.165  (0.15) | **-0.234**  **(0.04)** | 0.018  (0.86) | 0.063  (0.58) |
| **XS** | **0.286**  **(0.01)** | **0.208**  **(0.07)** | **0.302**  **(0.00)** | **-0.193**  **(0.09)** | **0.274**  **(0.02)** | **0.254**  **(0.03)** | 0.083  (0.46) | **-0.278**  **(0.02)** |
| **DIV** | **-0.263**  **(0.02)** | -0.100  (0.38) | -0.105  (0.35) | -0.02  (0.87) | **-0.664**  **(0.00)** | **-0.548**  **(0.00)** | **-0.196**  **(0.09)** | **0.558**  **(0.00)** |

**Panel c: correlations between financial variables and liquidity variables (national and global)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CANADA** | | | | | **FRANCE** | | | |
|  | **NAM** | **NRO** | **GAM** | **GRO** | **NAM** | **NRO** | **GAM** | **GRO** |
| **RF** | **0.520**  **(0.00)** | **0.665**  **(0.00)** | **-0.567**  **(0.00)** | **-0.538**  **(0.00)** | **-0.397**  **(0.00)** | 0.078  (0.49) | **-0.204**  **(0.08)** | **-0.551**  **(0.00)** |
| **SMB** | 0.090  (0.43) | 0.035  (0.75) | **0.314**  **(0.00)** | **-0.214**  **(0.06)** | **0.206**  **(0.07)** | 0.180  (0.11) | -0.08  (0.51) | 0.037  (0.34) |
| **HML** | -0.02  (0.85) | -0.160  (0.16) | **0.280**  **(0.01)** | 0.092  (0.42) | -0.02  (0.86) | 0.128  (0.26) | -0.07  (0.55) | -0.09  (0.43) |
| **MOM** | **0.077**  **(0.50)** | 0.047  (0.68) | -0.06  (0.61) | -0.07  (0.56) | **0.211**  **(0.07)** | -0.04  (0.75) | -0.02  (0.89) | **0.409**  **(0.00)** |
| **SD** | 0.042  (0.71) | **0.357**  **(0.00)** | **0.242**  **(0.04)** | 0.0018  (0.98) | **0.335**  **(0.00)** | **0.677**  **(0.00)** | **0.407**  **(0.00)** | 0.141  (0.22) |
| **TERM** | -0.169  (0.14) | -0.165  (0.15) | **0.284**  **(0.01)** | -0.03  (0.81) | **0.203**  **(0.08)** | -0.01  (0.39) | 0.090  (0.43) | **0.296**  **(0.01)** |
| **XS** | -0.113  (0.32) | -0.04  (0.73) | **-0.323**  **(0.01)** | -0.114  (0.32) | **-0.248**  **(0.03)** | **-0.280**  **(0.01)** | -0.180  (0.11) | -0.04  (0.73) |
| **DIV** | **-0.540**  **(0.00)** | **-0.564**  **(0.00)** | **0.571**  **(0.00)** | **0.487**  **(0.00)** | **0.528**  **(0.00)** | **0.210**  **(0.06)** | **0.390**  **(0.00)** | **0.257**  **(0.03)** |
|  | | | | | | | | |
| **GERMANY** | | | | | **ITALY** | | | |
|  | **NAM** | **NRO** | **GAM** | **GRO** | **NAM** | **NRO** | **GAM** | **GRO** |
| **RF** | **-0.206**  **(0.07)** | 0.084  (0.46) | **-0.402**  **(0.00)** | **-0.580**  **(0.00)** | **-0.223**  **(0.05)** | **0.306**  **(0.00)** | **-0.380**  **(0.00)** | **-0.374**  **(0.00)** |
| **SMB** | -0.01  (0.90) | -0.09  (0.45) | **0.223**  **(0.05)** | 0.168  (0.14) | 0.007  (0.93) | 0.034  (0.76) | 0.120  (0.29) | 0.053  (0.64) |
| **HML** | -0.08  (0.47) | 0.059  (0.60) | -0.128  (0.26) | -0.08  (0.48) | 0.036  (0.75) | -0.160  (0.16) | -0.04  (0.29) | -0.164  (0.15) |
| **MOM** | -0.01  (0.39) | -0.04  (0.75) | **0.590**  **(0.00)** | **0.776**  **(0.00)** | 0.172  (0.13) | 0.081  (0.48) | 0.125  (0.27) | **0.292**  **(0.01)** |
| **SD** | **0.351**  **(0.00)** | 0.183  (0.11) | **0.209**  **(0.07)** | 0.069  (0.54) | **0.198**  **(0.09)** | **0.824**  **(0.00)** | **0.374**  **(0.00)** | **0.310**  **(0.00)** |
| **TERM** | -0.000  (0.99) | -0.07  (0.55) | 0.022  (0.84) | 0.116  (0.31) | **0.425**  **(0.00)** | 0.824  (0.14) | **0.402**  **(0.00)** | **0.661**  **(0.00)** |
| **XS** | -0.000  (0.66) | **-0.191**  **(0.09)** | **0.234**  **(0.04)** | **0.483**  **(0.00)** | -0.100  (0.40) | **-0.296**  **(0.01)** | **-0.268**  **(0.02)** | -0.08  (0.50) |
| **DIV** | **0.451**  **(0.00)** | -0.01  (0.90) | **0.04**  **(0.00)** | **0.405**  **(0.00)** | **0.468**  **(0.00)** | 0.128  (0.12) | **0.541**  **(0.00)** | **0.219**  **(0.05)** |
|  | | | | | | | | |
| **JAPAN** | | | | | **UK** | | | |
|  | **NAM** | **NRO** | **GAM** | **GRO** | **NAM** | **NRO** | **GAM** | **GRO** |
| **RF** | 0.121  (0.29) | 0.126  (0.27) | **-0.196**  **(0.09)** | -0.179  (0.11) | -0.253  (0.03) | 0.045  (0.69) | **-0.535**  **(0.00)** | **-0.602**  **(0.00)** |
| **SMB** | **-0.196**  **(0.08)** | -0.131  (0.25) | 0.098  (0.39) | 0.125  (0.27) | -0.003  (0.97) | -0.114  (0.32) | 0.042  (0.71) | 0.018  (0.87) |
| **HML** | -0.114  (0.32) | 0.011  (0.92) | 0.034  (0.76) | -0.080  (0.46) | -0.05  (0.66) | 0.003  (0.98) | **-0.310**  **(0.01)** | -0.05  (0.63) |
| **MOM** | 0.092  (0.42) | 0.067  (0.55) | 0.018  (0.87) | -0.004  (0.97) | -0.000  (0.99) | -0.030  (0.76) | 0.170  (0.13) | **0.429**  **(0.00)** |
| **SD** | **0.230**  **(0.04)** | **0.691**  **(0.00)** | **0.361**  **(0.00)** | 0.045  (0.69) | **0.430**  **(0.00)** | **0.805**  **(0.00)** | **0.453**  **(0.00)** | 0.079  (0.49) |
| **TERM** | **0.236**  **(0.04)** | 0.064  (0.57) | **-0.463**  **(0.00)** | **-0.449**  **(0.00)** | **0.218**  **(0.06)** | **-0.303**  **(0.01)** | **0.373**  **(0.00)** | **0.332**  **(0.00)** |
| **XS** | **-0.260**  **(0.02)** | **-0.247**  **(0.03)** | **-0.254**  **(0.03)** | 0.068  (0.55) | -0.142  (0.21) | **-0.443**  **(0.00)** | **-0.192**  **(0.09)** | -0.004  (0.97) |
| **DIV** | **-0.487**  **(0.00)** | **-0.201**  **(0.08)** | **0.557**  **(0.00)** | **0.583**  **(0.00)** | **0.265**  **(0.02)** | 0.088  (0.44) | **0.399**  **(0.00)** | 0.125  (0.27) |

The table shows correlation coefficients between all variables used in our analysis. The associated p-values are reported in parentheses below each correlation coefficient. AM and RO are the 2 liquidity measures. TERM is our proxy for the term spread, SD is market volatility/standard deviation which is calculated as the cross sectional average volatility for all stocks in our sample, MOM stands for momentum, SMB stands for small minus big, HML stands for high minus low and are calculated as in Fama and French (1993), DID is dividends, RF is the risk free rate and XS is excess market returns. GDP is real GDP growth, INV is growth in investments, UN is growth in unemployment and CONS is real consumption growth. The prefix ‘N’ in front of each liquidity variable refers to national while the prefix ‘G’ refers to global. Global liquidity is constructed as in Brockman et al. (2009). Correlations presented below are for raw data. Sample range Q4 1995-Q4 2013, 73 quarterly observations.

Table 3

In Sample Prediction Macro Variables (all countries except for the US)

**Panel A: Canada**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEP** | **CON** | **DEP** | **(D) RF** | **SMB** | **HML** | **MOM** | **(D) TERM** | **SD** | **XS** | **(D) DIV** | **NAM** | **(D) GAM** | **R2Adj**  **FIN** | **R2Adj**  **FIN+ NL** | **R2Adj FIN+ GL** | **R2Adj ALL/**  **[PL-B]** |
| GDPt+1 | **0.003**  **(0.00)** | **0.539**  **(0.00)** | -0.057  (0.42) | 0.019  (0.58) | 0.046  (0.51) | -0.103  (0.23) | -0.029  (0.46) | **-0.157**  **(0.07)** | -0.018  (0.85) | **-0.321**  **(0.00)** | 0.114  (0.15) | **0.170**  **(0.00)** | 0.421 | 0.426 | 0.444 | 0.450/  [0.88] |
| UNt+1 | **-0.004**  **(0.06)** | 0.183  (0.17) | **-0.057**  **(0.09)** | -0.061  (0.24) | -0.093  (0.21) | -0.019  (0.85) | **0.136**  **(0.09)** | 0.420  (0.00) | 0.046  (0.39) | **0.545**  **(0.00)** | 0.021  (0.79) | 0.056  (0.47) | 0.546 | 0.539 | 0.542 | 0.535/  [0.39] |
| CONSt+1 | **0.007**  **(0.00)** | 0.096  (0.33) | -0.106  (0.40) | 0.095  (0.18) | -0.175  (0.12) | -0.054  (0.43) | **-0.139**  **(0.09)** | **-0.254**  **(0.00)** | -0.070  (0.61) | -0.149  (0.12) | -0.096  (0.44) | 0.111  (0.13) | 0.090 | 0.086 | 0.090 | 0.086/  [0.37] |
| INVt+1 | **0.006**  **(0.00v)** | **0.508**  **(0.00)** | **-0.102**  **(0.00)** | **-0.039**  **(0.01)** | 0.056  (0.52) | **-0.290**  **(0.00)** | -0.024  (0.43) | **-0.307**  **(0.03)** | **-0.167**  **(0.01)** | **-0.356**  **(0.00)** | **0.080**  **(0.07)** | 0.018  (0.62) | 0.690 | 0.692 | 0.685 | 0.687/  [0.97] |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **DEP** | **CON** | **DEP** | **(D) RF** | **SMB** | **HML** | **MOM** | **(D) TERM** | **SD** | **XS** | **(D) DIV** | **(D) NRO** | **GRO** | **R2Adj**  **FIN** | **R2Adj**  **FIN+ NL** | **R2Adj FIN+ GL** | **R2Adj ALL/**  **[PL-B]** |
| GDPt+1 | **0.003**  **(0.00)** | **0.511**  **(0.00)** | -0.057  (0.47) | 0.024  (0.73) | 0.040  (0.43) | -0.098  (0.37) | -0.034  (0.57) | **-0.166**  **(0.04)** | -0.011  (0.88) | **-0.329**  **(0.00)** | **0.176**  **(0.04)** | **-0.212**  **(0.00)** | 0.421 | 0.448 | 0.465 | 0.450/  [0.75] |
| UNt+1 | -0.005  (0.05) | 0.160  (0.18) | -0.062  (0.17) | -0.063  (0.20) | -0.090  (0.18) | -0.024  (0.77) | **0.141**  **(0.09)** | **0.428**  **(0.00)** | 0.035  (0.44) | **0.548**  **(0.00)** | -0.139  (0.11) | **0.072**  **(0.00)** | 0.546 | 0.560 | 0.545 | 0.559/  [0.86] |
| CONSt+1 | **0.007**  **(0.00)** | 0.069  (0.54) | -0.106  (0.38) | 0.099  (0.32) | -0.176  (0.11) | -0.052  (0.55) | **-0.140**  **(0.09)** | **-0.260**  **(0.00)** | -0.064  (0.66) | -0.163  (0.12) | 0.088  (0.44) | -0.014  (0.81) | 0.090 | 0.084 | 0.075 | 0.069/  [0.21] |
| INVt+1 | **0.006**  **(0.00)** | **0.515**  **(0.00)** | **-0.101**  **(0.01)** | **-0.040**  **(0.00)** | 0.056  (0.513) | **-0.291**  **(0.00)** | -0.023  (0.41) | **-0.303**  **(0.03)** | **-0.169**  **(0.00)** | **-0.354**  **(0.00)** | -0.032  (0.41) | 0.021  (0.60) | 0.690 | 0.686 | 0.685 | 0.681/  [0.90] |

**Panel B: France**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEP** | **CON** | **DEP** | **(D) RF** | **SMB** | **HML** | **MOM** | **TERM** | **SD** | **XS** | **(D) DIV** | **NAM** | **(D) GAM** | **R2Adj**  **FIN** | **R2Adj**  **FIN+ NL** | **R2Adj FIN+ GL** | **R2Adj ALL/**  **[PL-B]** |
| GDPt+1 | **0.002**  **(0.00)** | **0.533**  **(0.00)** | -0.126  (0.45) | 0.000  (0.99) | 0.072  (0.22) | **0.145**  **(0.00)** | 0.120  (0.15) | **-0.303**  **(0.00)** | **-0.136**  **(0.10)** | **-0.180**  **(0.01)** | -0.059  (0.51) | -0.003  (0.95) | 0.422 | 0.417 | 0.413 | 0.407/  [0.33] |
| UNt+1 | -0.001  (0.76) | 0.260  (0.13) | **-0.220**  **(0.07)** | 0.044  (0.62) | **-0.121**  **(0.07)** | **-0.061**  **(0.04)** | 0.022  (0.80) | **0.312**  **(0.00)** | -0.124  (0.12) | **0.189**  **(0.08)** | 0.064  (0.50) | 0.079  (0.15) | 0.322 | 0.315 | 0.318 | 0.311/  [0.70] |
| CONSt+1 | **0.005**  **(0.02)** | **-0.104**  **(0.07)** | -0.035  (0.67) | 0.126  (0.28) | -0.047  (0.55) | -0.017  (0.48) | 0.030  (0.62) | -0.005  (0.93) | -0.017  (0.74) | 0.090  (0.49) | -0.040  (0.75) | 0.140  (0.14) | -0.11 | -0.12 | -0.11 | -0.12/  [0.97] |
| INVt+1 | 0.001  (0.25) | **0.366**  **(0.00)**  **0.481**  **(0.00)** | 0.038  (0.63) | -0.029  (0.76) | -0.044  (0.47) | **0.008**  **(0.00)** | **0.210**  **(0.01)** | **-0.127**  **(0.07)** | **-0.100**  **(0.06)** | **-0.186**  **(0.00)** | 0.023  (0.71) | -0.075  (0.11) | 0.473 | 0.466 | 0.465 | 0.564/  [0.99] |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **DEP** | **CON** | **DEP** | **(D) RF** | **SMB** | **HML** | **MOM** | **TERM** | **SD** | **XS** | **(D) DIV** | **NRO** | **(D) GRO** | **R2Adj**  **FIN** | **R2Adj**  **FIN+ NL** | **R2Adj FIN+ GL** | **R2Adj ALL/**  **[PL-B]** |
| GDPt+1 | **0.002**  **(0.00)** | **0.557**  **(0.00)** | -0.135  (0.42) | 0.001  (0.99) | 0.071  (0.22) | **0.145**  **(0.00)** | 0.122  (0.12) | **-0.300**  **(0.00)** | **-0.146**  **(0.08)** | **-0.172**  **(0.01)** | -0.041  (0.57) | **-0.085**  **(0.05)** | 0.497 | 0.414 | 0.421 | 0.413/  [0.34] |
| UNt+1 | -0.001  (0.76) | 0.274  (0.11) | **-0.212**  **(0.08)** | 0.045  (0.60) | **-0.118**  **(0.06)** | **-0.061**  **(0.02)** | 0.019  (0.84) | **0.310**  **(0.00)** | -0.121  (0.15) | 0.188  (0.07) | -0.070  (0.23) | -0.026  (0.64) | 0.322 | 0.317 | 0.312 | 0.306/  [0.68] |
| CONSt+1 | 0.004  (0.02) | -0.031  (0.68) | -0.039  (0.62) | 0.135  (0.19) | -0.039  (0.62) | -0.023  (0.22) | 0.038  (0.48) | -0.009  (0.83) | -0.012  (0.84) | 0.092  (0.48) | -0.024  (0.52) | 0.024  (0.72) | -0.10 | -0.12 | -0.13 | -0.14/  [0.99] |
| INVt+1 | 0.001  (0.27) | **0.388**  **(0.00)**  **0.449**  **(0.00)** | 0.042  (0.65) | -0.029  (0.77) | -0.045  (0.49) | **0.007**  **(0.00)** | **0.204**  **(0.01)** | **-0.133**  **(0.07)** | -0.105  (0.11) | **-0.185**  **(0.00)** | -0.079  (0.20) | -0.021  (0.46) | 0.474 | 0.477 | 0.465 | 0.565/  [0.99] |

**Panel C: Germany**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEP** | **CON** | **DEP** | **(D) RF** | **SMB** | **HML** | **MOM** | **(D) TERM** | **SD** | **XS** | **(D) DIV** | **(D) NAM** | **GAM** | **R2Adj**  **FIN** | **R2Adj**  **FIN+ NL** | **R2Adj FIN+ GL** | **R2Adj ALL/**  **[PL-B]** |
| GDPt+1 | **0.003**  **(0.01)** | 0.111  (0.41) | 0.087  (0.59) | **0.131**  **(0.00)** | 0.048  (0.48) | 0.096  (0.22) | 0.071  (0.33) | **-0.302**  **(0.00)** | 0.095  (0.42) | **-0.379**  **(0.01)** | **-0.102**  **(0.00)** | -0.103  (0.31) | 0.247 | 0.246 | 0.246 | 0.246/  [0.89] |
| UNt+1 | -0.003  (0.17) | **0.437**  **(0.00)** | -0.100  (0.36) | **-0.134**  **(0.02)** | -0.174  (0.22) | **-0.106**  **(0.00)** | 0.056  (0.46) | 0.127  (0.15) | -0.066  (0.38) | **0.146**  **(0.03)** | **0.071**  **(0.06)** | **0.152**  **(0.01)** | 0.257 | 0.251 | 0.272 | 0.265/  [0.51] |
| CONSt+1 | **0.002**  **(0.00)** | -0.180  (0.21) | 0.009  (0.94) | -0.027  (0.74) | 0.107  (0.25) | **-0.096**  **(0.05)** | -0.039  (0.76) | -0.083  (0.39) | -0.158  (0.11) | 0.121  (0.20) | 0.070  (0.36) | -0.061  (0.49) | -0.02 | -0.03 | -0.03 | -0.05/  [0.58] |
| INVt+1 | **0.005**  **(0.04)** | **-0.199**  **(0.08)** | **0.185**  **(0.03)** | **0.101**  **(0.00)** | **-0.162**  **(0.08)** | **0.077**  **(0.04)** | **-0.118**  **(0.06)** | **-0.324**  **(0.00)** | 0.042  (0.46) | **-0.289**  **(0.01)** | **-0.216**  **(0.00)** | **-0.167**  **(0.01)** | 0.163 | 0.206 | 0.182 | 0.228/  [0.71] |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **DEP** | **CON** | **DEP** | **(D) RF** | **SMB** | **HML** | **MOM** | **(D) TERM** | **SD** | **XS** | **(D) DIV** | **NRO** | **(D) GRO** | **R2Adj**  **FIN** | **R2Adj**  **FIN+ NL** | **R2Adj FIN+ GL** | **R2Adj ALL/**  **[PL-B]** |
| GDPt+1 | 0.003  (0.03) | 0.163  (0.25) | 0.071  (0.67) | **0.137**  **(0.00)** | 0.052  (0.40) | **0.089**  **(0.09)** | 0.081  (0.23) | **-0.289**  **(0.00)** | 0.108  (0.36) | **-0.365**  **(0.02)** | -0.017  (0.65) | -0.049  (0.47) | 0.247 | 0.235 | 0.237 | 0.224/  [0.81] |
| UNt+1 | -0.003  (0.23) | **0.456**  **(0.00)** | -0.095  (0.36) | -0.132  (0.03) | -0.174  (0.23) | **-0.101**  **(0.00)** | 0.055  (0.47) | 0.126  (0.15) | -0.072  (0.39) | **0.152**  **(0.02)** | 0.020  (0.49) | **-0.096**  **(0.01)** | 0.257 | 0.245 | 0.255 | 0.243/  [0.69] |
| CONSt+1 | **0.003**  **(0.00)** | -0.148  (0.36) | 0.010  (0.93) | -0.022  (0.80) | 0.113  (0.22) | **-0.097**  **(0.00)** | -0.035  (0.77) | -0.083  (0.41) | -0.156  (0.11) | 0.122  (0.19) | 0.011  (0.83) | **-0.112**  **(0.07)** | -0.02 | -0.04 | -0.03 | -0.04/  [0.54] |
| INVt+1 | **0.005**  **(0.04)** | **-0.223**  **(0.04)** | **0.189**  **(0.00)** | **0.097**  **(0.03)** | **-0.166**  **(0.06)** | **0.070**  **(0.05)** | **-0.122**  **(0.05)** | **-0.333**  **(0.00)** | 0.037  (0.28) | **-0.299**  **(0.01)** | **-0.093**  **(0.00)** | **0.168**  **(0.00)** | 0.163 | 0.157 | 0.179 | 0.176/  [0.58] |

**Panel D: Italy**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEP** | **CON** | **DEP** | **(D) RF** | **SMB** | **HML** | **MOM** | **(D) TERM** | **SD** | **XS** | **(D) DIV** | **NAM** | **(D) GAM** | **R2Adj**  **FIN** | **R2Adj**  **FIN+ NL** | **R2Adj FIN+ GL** | **R2Adj ALL/**  **[PL-B]** |
| GDPt+1 | 0.001  (0.27) | **0.435**  **(0.00)** | **-0.143**  **(0.03)** | 0.082  (0.16) | 0.025  (0.76) | -0.026  (0.55) | **0.131**  **(0.06)** | **-0.275**  **(0.00)** | -0.027  (0.48) | **-0.263**  **(0.03)** | **-0.169**  **(0.00)** | -0.055  (0.38) | 0.471 | 0.490 | 0.466 | 0.485  [0.41] |
| UNt+1 | 0.001  (0.56) | **0.530**  **(0.00)** | -0.007  (0.93) | 0.075 (0.41) | -0.073  (0.40) | -0.072  (0.36) | -0.014  (0.81) | **0.178**  **(0.01)** | -0.058  (0.37) | 0.033  (0.49) | **0.242**  **(0.00)** | -0.043  (0.48) | 0.444 | 0.491 | 0.438 | 0.485/  [0.17] |
| CONSt+1 | 0.005  (0.19) | -0.031  (0.13) | -0.209  (0.10) | 0.208  (0.18) | -0.235  (0.24) | **0.035**  **(0.00)** | -0.005  (0.91) | -0.071  (0.13) | **0.098**  **(0.03)** | **-0.117**  **(0.04)** | **-0.126**  **(0.07)** | **-0.179**  **(0.07)** | 0.051 | 0.052 | 0.066 | 0.068/  [0.51] |
| INVt+1 | 0.001  (0.72) | **0.249**  **(0.03)**  -0.124  (0.41)  0.108  (0.40) | 0.026  (0.82) | 0.060  (0.40) | 0.048  (0.67) | -0.042  (0.18) | 0.068  (0.20) | **-0.157**  **(0.00)** | **0.210**  **(0.03)** | -0.199  (0.13) | **-0.247**  **(0.00)** | 0.091  (0.33) | 0.109 | 0.161 | 0.107 | 0.149/  [0.27] |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **DEP** | **CON** | **DEP** | **(D) RF** | **SMB** | **HML** | **MOM** | **(D) TERM** | **SD** | **XS** | **(D) DIV** | **NRO** | **(D) GRO** | **R2Adj**  **FIN** | **R2Adj**  **FIN+ NL** | **R2Adj FIN+ GL** | **R2Adj ALL/**  **[PL-B]** |
| GDPt+1 | 0.000  (0.42) | **0.524**  **(0.00)** | **-0.164**  **(0.02)** | 0.089  (0.15) | 0.026  (0.75) | -0.041  (0.38) | **0.135**  **(0.05)** | **-0.245**  **(0.00)** | -0.053  (0.29) | **-0.229**  **(0.03)** | 0.003  (0.97) | -0.016  (0.48) | 0.471 | 0.462 | 0.462 | 0.453/  [0.57] |
| UNt+1 | 0.001  (0.58) | **0.426**  **(0.00)**  **0.297**  **(0.01)** | 0.017  (0.80) | 0.112  (0.12) | -0.045  (0.53) | **-0.054**  **(0.00)** | -0.065  (0.31) | 0.118  (0.17) | -0.018  (0.72) | **0.075**  **(0.07)** | -0.107  (0.23) | **-0.061**  **(0.05)** | 0.444 | 0.456 | 0.445 | 0.492/  [0.33] |
| CONSt+1 | 0.005  (0.17) | 0.096  (0.23) | **-0.235**  **(0.09)** | 0.211  (0.22) | -0.235  (0.21) | **0.036**  **(0.04)** | -0.027  (0.70) | -0.062  (0.26) | 0.096  (0.15) | **-0.107**  **(0.09)** | -0.153  (0.31) | -0.073  (0.37) | 0.051 | 0.062 | 0.038 | 0.048/  [0.78] |
| INVt+1 | 0.001  (0.74) | **0.289**  **(0.01)**  -0.021  (0.90)  0.171  (0.17) | -0.012  (0.92) | 0.056  (0.57) | 0.038  (0.74) | **-0.054**  **(0.05)** | 0.101  (0.18) | **-0.123**  **(0.00)** | **0.177**  **(0.06)** | **-0.203**  **(0.09)** | -0.076  (0.22) | -0.003  (0.94) | 0.109 | 0.096 | 0.095 | 0.079  [0.36] |

**Panel E: Japan**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEP** | **CON** | **DEP** | **(D) RF** | **SMB** | **HML** | **MOM** | **(D) TERM** | **SD** | **XS** | **(D) DIV** | **NAM** | **(D) GAM** | **R2Adj**  **FIN** | **R2Adj**  **FIN+ NL** | **R2Adj FIN+ GL** | **R2Adj ALL/**  **[PL-B]** |
| GDPt+1 | **0.002**  **(0.01)** | -0.091  (0.41) | -0.089  (0.52) | -0.162  (0.16) | **-0.235**  **(0.01)** | **-0.088**  **(0.05)** | **0.088**  **(0.06)** | **-0.463**  **(0.00)** | **0.136**  **(0.05)** | **-0.413**  **(0.00)** | 0.003  (0.94) | 0.017  (0.84) | 0.385 | 0.375 | 0.375 | 0.364/  [0.47] |
| UNt+1 | 0.001  (0.74) | **0.265**  **(0.01)** | **-0.123**  **(0.01)** | **-0.153**  **(0.04)** | -0.061  (0.46) | 0.037  (0.66) | -0.044  (0.66) | **0.351**  **(0.00)** | **-0.315**  **(0.00)** | **0.246**  **(0.00)** | **-0.167**  **(0.00)** | **-0.108**  **(0.10)** | 0.417 | 0.440 | 0.421 | 0.444/  [0.37] |
| CONSt+1 | **0.003**  **(0.00)** | -0.150  (0.25) | 0.055  (0.68) | -0.057  (0.54) | -0.143  (0.13) | **-0.120**  **(0.00)** | -0.068  (0.21) | **-0.255**  **(0.00)** | 0.145  (0.21) | **-0.335**  **(0.00)** | -0.005  (0.89) | -0.046  (0.60) | 0.136 | 0.122 | 0.124 | 0.109/  [0.34] |
| INVt+1 | -0.001  (0.57) | 0.318  (0.01) | -0.042  (0.51) | -0.061  (0.60) | **-0.133**  **(0.04)** | **-0.138**  **(0.03)** | -0.079  (0.45) | **-0.216**  **(0.03)** | 0.063  (0.46) | **-0.312**  **(0.00)** | **-0.149**  **(0.03)** | -0.048  (0.43) | 0.334 | 0.248 | 0.225 | 0.238/  [0.59] |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **DEP** | **CON** | **DEP** | **(D) RF** | **SMB** | **HML** | **MOM** | **(D) TERM** | **SD** | **XS** | **(D) DIV** | **NRO** | **(D) GRO** | **R2Adj**  **FIN** | **R2Adj**  **FIN+ NL** | **R2Adj FIN+ GL** | **R2Adj ALL/**  **[PL-B]** |
| GDPt+1 | **0.002**  **(0.01)** | -0.082  (0.37) | -0.092  (0.52) | -0.162  (0.16) | **-0.236**  **(0.01)** | **-0.088**  **(0.05)** | **0.088**  **(0.06)** | **-0.461**  **(0.00)** | **0.136**  **(0.05)** | **-0.410**  **(0.01)** | -0.025  (0.69) | 0.007  (0.89) | 0.385 | 0.375 | 0.375 | 0.365/  [0.56] |
| UNt+1 | 0.001  (0.78) | **0.252**  **(0.04)** | **-0.123**  **(0.04)** | **-0.152**  **(0.05)** | -0.063  (0.47) | 0.037  (0.72) | -0.041  (0.69) | **0.355**  **(0.00)** | **-0.321**  **(0.00)** | **0.245**  **(0.00)** | **0.060**  **(0.00)** | 0.013  (0.73) | 0.417 | 0.411 | 0.407 | 0.401/  [0.23] |
| CONSt+1 | **0.003**  **(0.00)** | -0.160  (0.11) | 0.052  (0.70) | -0.059  (0.51) | -0.141  (0.15) | **-0.120**  **(0.00)** | -0.070  (0.19) | **-0.257**  **(0.00)** | 0.150  (0.21) | **-0.337**  **(0.00)** | -0.083  (0.23) | **0.113**  **(0.02)** | 0.136 | 0.130 | 0.136 | 0.130/  [0.55] |
| INVt+1 | -0.001  (0.56) | **0.269**  **(0.03)** | -0.036  (0.51) | -0.063  (0.61) | **-0.124**  **(0.08)** | **-0.142**  **(0.02)** | -0.080  (0.44) | **-0.232**  **(0.03)** | 0.082  (0.37) | **-0.316**  **(0.01)** | -0.137  (0.16) | **0.144**  **(0.00)** | 0.235 | 0.243 | 0.246 | 0.255/  [0.49] |

**Panel F: UK**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEP** | **CON** | **DEP** | **(D) RF** | **SMB** | **HML** | **MOM** | **(D) TERM** | **SD** | **XS** | **(D) DIV** | **NAM** | **(D) GAM** | **R2Adj**  **FIN** | **R2Adj**  **FIN+ NL** | **R2Adj FIN+ GL** | **R2Adj ALL/**  **[PL-B]** |
| GDPt+1 | **0.002**  **(0.03)** | **0.596**  **(0.00)** | -0.059  (0.26) | -0.074  (0.27) | -0.012  (0.87) | **0.057**  **(0.00)** | 0.083  (0.22) | **-0.201**  **(0.03)** | 0.054  (0.52) | **-0.221**  **(0.06)** | -0.064  (0.29) | 0.042  (0.75) | 0.515 | 0.511 | 0.509 | 0.505/  [0.15] |
| UNt+1 | -0.003  (0.41) | **0.696**  **(0.00)** | 0.030  (0.61) | 0.053  (0.30) | 0.076  (0.22) | -0.033  (0.33) | -0.009  (0.80) | **0.136**  **(0.10)** | 0.000  (0.99) | 0.186  (0.17) | 0.025  (0.59) | -0.042  (0.24) | 0.583 | 0.576 | 0.578 | 0.571/  [0.58] |
| CONSt+1 | **0.002**  **(0.00)** | **0.274**  **(0.04)**  **0.355**  **(0.00)** | **0.057**  **(0.00)** | 0.038  (0.64) | -0.043  (0.69) | **-0.033**  **(0.05)** | -0.001  (0.99) | -0.175  (0.02) | -0.138  (0.13) | -0.157  (0.21) | -0.013  (0.87) | **-0.138**  **(0.00)** | 0.233 | 0.220 | 0.235 | 0.306/  [0.91] |
| INVt+1 | **0.008**  **(0.00)** | **-0.384**  **(0.00)** | **0.107**  **(0.09)** | **0.071**  **(0.08)** | 0.130  (0.39) | 0.032  (0.19) | **-0.178**  **(0.01)** | **-0.317**  **(0.00)** | **0.149**  **(0.00)** | **-0.176**  **(0.08)** | 0.080  (0.26) | 0.007  (0.79) | 0.162 | 0.155 | 0.148 | 0.141/  [0.32] |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **DEP** | **CON** | **DEP** | **(D) RF** | **SMB** | **HML** | **MOM** | **(D) TERM** | **SD** | **XS** | **(D) DIV** | **NRO** | **(D) GRO** | **R2Adj**  **FIN** | **R2Adj**  **FIN+ NL** | **R2Adj FIN+ GL** | **R2Adj ALL/**  **PL-Box** |
| GDPt+1 | **0.002**  **(0.04)** | **0.598**  **(0.00)** | -0.059  (0.22) | -0.074  (0.26) | -0.013  (0.85) | **0.057**  **(0.00)** | 0.082  (0.26) | **-0.204**  **(0.06)** | 0.055  (0.50) | **-0.222**  **(0.08)** | 0.020  (0.76) | -0.000  (0.99) | 0.515 | 0.507 | 0.507 | 0.499/  [0.19] |
| UNt+1 | -0.003  (0.44) | 0.696  (0.00) | 0.030  (0.64) | 0.053  (0.27) | 0.076  (0.21) | -0.033  (0.38) | -0.009  (0.88) | **0.134**  **(0.08)** | 0.001  (0.99) | 0.186  (0.17) | 0.064  (0.37) | 0.071  (0.35) | 0.646 | 0.580 | 0.581 | 0.579/  [0.51] |
| CONSt+1 | **0.002**  **(0.01)** | **0.283**  **(0.04)**  **0.348**  **(0.00)** | **0.058**  **(0.07)** | 0.037  (0.58) | -0.040  (0.75) | -0.034  (0.27) | -0.002  (0.98) | **-0.170**  **(0.00)** | -0.140  (0.19) | -0.154  (0.23) | -0.149  (0.18) | -0.027  (0.54) | 0.232 | 0.237 | 0.221 | 0.307/  [0.99] |
| INVt+1 | **0.008**  **(0.00)** | **-0.384**  **(0.00)** | **0.109**  **(0.09)** | **0.072**  **(0.02)** | 0.133  (0.37) | **0.032**  **(0.03)** | **-0.179**  **(0.01)** | **-0.310**  **(0.00)** | **0.148**  **(0.00)** | **-0.175**  **(0.05)** | **-0.148**  **(0.00)** | **0.051**  **(0.07)** | 0.162 | 0.170 | 0.151 | 0.159/  [ 0.24] |

**Panel G: Summary**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Average R2 Adj. (all countries) | | | |
|  | Financial variables only | Financial variables + National liquidity only | Financial variables + Global liquidity only | Financial variables + National liquidity + Global liquidity |
| Column 1 | Column 2 | Column 3 | Column 4 | Column 5 |
| AM→GDP | 0.41 | 0.41 | 0.41 | 0.41 |
| RO→GDP | 0.42 | 0.41 | 0.41 | 0.40 |
| AM→INV | 0.43 | 0.44 | 0.43 | 0.43 |
| RO→INV | 0.44 | 0.43 | 0.42 | 0.43 |
| AM→CONS | 0.06 | 0.05 | 0.06 | 0.07 |
| RO→CONS | 0.06 | 0.06 | 0.05 | 0.06 |
| AM→UN | 0.32 | 0.32 | 0.30 | 0.33 |
| RO→UN | 0.30 | 0.30 | 0.30 | 0.32 |
| AM→MACROS (GRAND AVERAGE) | 0.305 | 0.305 | 0.300 | 0.311 |
| RO→MACROS (GRAND AVERAGE) | 0.305 | 0.300 | 0.295 | 0.303 |

The table shows the results from predictive regression where we regress next quarter growth in different macro variables (GDPt+1, INVt+1, CONS t+1 and UN t+1) on 2 proxies for market illiquidity. Market illiquidity (LIQ) is captured by the Amihud ratio (AM) and Roll’s effective spread (RO). The prefix ‘N’ means national and the prefix ‘G’ means global. The cross sectional liquidity measures are calculated as equally weighted averages across stocks. The model estimated is Y t+1= α+β LIQt+γ’**X**t+ut+1 where Yt+1 is real GDP growth GDPt+1, investment growth INVt+1, real consumption growth CONSt+1 and growth in the unemployment rate UNt+1. We also include one lag of the dependent variable which we call DEP (and we include more lags if there is autocorrelation in the residuals), and RF (RISK FREE); SMB (SMALL MINUS BIG) ; HML (HIGH MINUS LOW); MOM (MOMENTUM); TERM (TERM STRUCTURE); SD (STANDARD DEVIATION); XS (EXCESS RETURNS); DIV (DIVIDENDS); NATIONAL LIQUIDITY (NL); and GLOBAL LIQUIDITY (GL). The coefficients reported are standardised. R2Adj FIN presents the adjusted R2 value of the dependent variable (DEP) and financial variables (FIN). R2Adj FIN+NL presents R2Adj of the dependent variable (DEP)+financial variables (FIN)+ national liquidity (NL). R2Adj FIN+GL presents R2Adj of the dependent variable (DEP)+financial variables (FIN)+global liquidity (GL) R2Adj ALL presents R2Adj of ALL VARIABLES. Please note that this and other summarising tables were motivated by Brockman et al. (2009). The number in parentheses is the Newey-West corrected (with four lags) probability value. The number in brackets in the last column below the adjusted R2 value is the Ljung-Box test probability values testing for autocorrelation in the residuals. The null hypothesis is that there is no autocorrelation and a probability value above 0.05 indicates that there is no autocorrelation. Where there is correlation the regression is repeated and the final results are presented where the residuals are free from autocorrelation. Both the old and new Ljung-box Probability value are presented and the additional lagged variable is presented below the original one for as many lags as were necessary. Sample range Q4 1995-Q4 2013, 73 quarterly observations.

Table 4

Granger Causality Tests (PANEL DATA)

**Panel A: national liquidity (NAM AND NRO)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | NAM (2 lags) | NAM (4 lags) | NAM (2 lags) D-H | NAM (4 lags) D-H | NRO (2 lags) | NRO (4 lags) | NRO (2 lags) D-H | NRO (4 lags) D-H |
| Line 1 | H0: N LIQ does not →GDP | **4.90**  **(0.00)** | **2.68**  **(0.03)** | **3.55**  **1.71**  **(0.08)** | 4.50  0.28  (0.77) | 0.30  (0.74) | 0.42  (0.78) | 1.48  -0.66  (0.50) | 3.79  -0.27  (0.78) |
| Line 2 | H0: GDP does not → N LIQ | 1.98  (0.13) | **2.05**  **(0.08)** | **3.75**  **1.94**  **(0.05)** | **7.64**  **2.78**  **(0.00)** | 0.18  (0.82) | 0.09  (0.98) | 1.45  -0.69  (0.48) | 2.25  -1.49  (0.13) |
| Line 3 | H0: N LIQ does not → INV | 2.22  (0.10) | 1.13  (0.33) | 3.48  1.63  (0.10) | 5.33  0.95  (0.34) | 0.20  (0.81) | 0.07  (0.98) | 1.38  -0.77  (0.43) | 2.57  -1.24  (0.21) |
| Line 4 | H0: INV does not → N LIQ | 0.79  (0.45) | 1.07  (0.37) | 2.00  -0.16  (0.94) | 5.39  1.00  (0.31) | 0.11  (0.88) | 0.26  (0.97) | 1.87  -0.21  (0.82) | 3.06  -0.85  (0.39) |
| Line 5 | H0: N LIQ does not → CONS | 0.03  (0.96) | 0.12  (0.97) | 1.96  -0.11  (0.91) | 3.90  -0.18  (0.85) | 0.07  (0.92) | 0.11  (0.97) | 1.02  -1.12  (0.23) | 3.17  -0.76  (0.44) |
| Line 6 | H0: CONS does not → N LIQ | 0.56  (0.56) | 0.72  (0.57) | 2.22  0.18  (0.84) | 5.12  0.78  (0.43) | 0.42  (0.65) | 0.22  (0.92) | 2.31  0.28  (0.77) | 3.57  -0.44  (0.63) |
| Line 7 | H0: N LIQ does not → UN | 0.39  (0.67) | 0.20  (0.91) | 2.01  -0.05  (0.95) | 3.26  -0.69  (0.48 | 0.75  (0.55) | 0.78  (0.53) | 1.25  -0.92  (0.35) | 3.82  -0.25  (0.80) |
| Line 8 | H0: UN does not → N LIQ | 1.00  (0.36) | 0.56  (0.69) | 2.66  0.68  (0.49) | 6.29  1.71  (0.08) | 0.08  (0.92) | 0.25  (0.90) | 1.22  -0.96  (0.33) | 3.63  -0.40  (0.68) |

**Panel B: global liquidity (GAM AND GRO)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | GAM (2 lags) | GAM (4 lags) | GAM (2 lags) D-H | GAM (4 lags) D-H | GRO (2 lags) | GRO (4 lags) | GRO (2 lags) D-H | GRO (4 lags) D-H |
| Line 1 | H0: G LIQ does not →GDP | 0.50  (0.60) | 1.22  (0.30) | 1.68  -0.43  (0.66) | 2.90  -0.97  (0.32) | 1.47  (0.22) | 1.05  (0.37) | 2.69  0.72  (0.46) | 3.85  -0.22  (0.82) |
| Line 2 | H0: GDP does not → G LIQ | 0.61  (0.54) | **5.97**  **(0.00)** | 3.23  1.35  (0.17) | **6.72**  **2.05**  **(0.04)** | 0.60  (0.54) | **2.59**  **(0.03)** | 1.45  -0.70  (0.48) | 4.36  0.17  (0.85) |
| Line 3 | H0: G LIQ does not → INV | 0.21  (0.80) | 0.44  (0.77) | 1.34  -0.82  (0.40) | 2.16  -1.57  (0.11) | 1.07  (0.34) | 0.53  (0.71) | 0.88  -1.35  (0.17) | **1.92**  **-1.76**  **(0.07)** |
| Line 4 | H0: INV does not → G LIQ | 0.81  (0.44) | **2.29**  **(0.05)** | 2.23  0.19  (0.84) | 5.53  1.11  (0.26) | 1.36  (0.28) | **2.53**  **(0.03)** | 1.44  -0.71  (0.47) | 4.20  0.04  (0.96) |
| Line 5 | H0: G LIQ does not → CONS | 0.58  (0.55) | 0.34  (0.84) | **12.0**  **11.4**  **(0.00)** | **15.2**  **8.85**  **(0.00)** | 0.03  (0.96) | 0.11  (0.97) | **0.59**  **-1.68**  **(0.09)** | **1.43**  **-2.14**  **(0.03)** |
| Line 6 | H0: CONS does not → G LIQ | 0.68  (0.50) | 0.61  (0.65) | **4.60**  **2.92**  **(0.00)** | **9.82**  **4.51**  **(0.00)** | 0.06  (0.93) | 0.36  (0.83) | 2.48  0.47  (0.69) | 3.60  -0.42  (0.66) |
| Line 7 | H0: G LIQ does not → UN | **2.99**  **(0.05)** | 1.50  (0.19) | **3.72**  **1.91**  **(0.05)** | 5.70  1.24  (0.21) | 0.60  (0.54) | 0.41  (0.80) | 2.21  0.17  (0.86) | 3.77  -0.29  (0.76) |
| Line 8 | H0: UN does not → G LIQ | 2.09  (0.12) | 1.83  (0.12) | 2.07  0.01  (0.98) | 3.28  -0.67  (0.49) | 0.90  (0.40) | 1.50  (0.20) | 1.45  -0.68  (0.48) | 3.09  -0.83  (0.40) |

The table shows Panel Granger causality tests between quarterly macroeconomic variables (GDP, INV, CONS and UN) and all liquidity variables. All liquidity variables are orthogonalised. The prefix ‘N’ means national and the prefix ‘G’ means global. Besides the standard Granger causality panel data test, we also use the Dumitrescu-Hurlin (D-H) panel data test. We first test the null hypothesis that our liquidity variable does not Granger cause the macroeconomic variable in question and then we test the null hypothesis that our macroeconomic variable does not Granger cause the liquidity variable in question. The null for the D-H test is that that our liquidity variable does not homogeneously cause the macroeconomic variable in question and then we test the null hypothesis that our macroeconomic variable does not homogeneously cause the liquidity variable in question. We do this for all macroeconomic and liquidity variables. We report the F-test and p-value (in parenthesis) for the standard panel Granger causality test and the W-stat, Z bar and probability (in parenthesis) for the D-H test. We use 2 and 4 lags for our tests. This is based on a number of different lag length determination criteria namely sequential modified LR test statistic (each test at 5% level), Final prediction error, Akaike information criterion, Schwarz information criterion and Hannan-Quinn information criterion. Sample range Q4 1995-Q4 2013, 73 quarterly observations.

Table 5

Results of Out-of-Sample Tests

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Panel A: CANADA | | | | | | |
| NATIONAL ILLIQUIDITY VS CONTROL VARIABLES | | | | | | |
| C1 | C2 | C3 | C4 | C5 | C6 | C7 |
|  |  | UNRESTRICTED | RESTRICTED | / | MSE-F | ENC-NEW |
| INV | NAM | NAM + FIN VAR + Global L | FIN VAR + Global L | 1.00 | -0.02 | -0.012 |
| GDP | NRO | NRO + FIN VAR + Global L | FIN VAR + Global L | 0.95 | 1.67\* | 1.05 |
| AUTOREGRESSIVE MODEL | | | | | | |
|  |  | UNRESTRICTED | RESTRICTED | / | MSE-F | ENC-NEW |
| INV | NAM | AR(1) + NAM + FIN VAR + Global L | AR(1) | 0.38 | 57.8\* | 51.2\* |
| GDP | NRO | AR(1) + NRO + FIN VAR + Global L | AR(1) | 0.50 | 34.7\* | 27.1\* |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Panel B: GERMANY | | | | | | |
| NATIONAL ILLIQUIDITY VS CONTROL VARIABLES | | | | | | |
| C1 | C2 | C3 | C4 | C5 | C6 | C7 |
|  |  | UNRESTRICTED | RESTRICTED | / | MSE-F | ENC-NEW |
| GDP | NAM | NAM + FIN VAR + Global L | FIN VAR + Global L | 0.98 | 0.51 | 0.54 |
| UN | NAM | NAM + FIN VAR + Global L | FIN VAR + Global L | 0.99 | 0.19 | 0.11 |
| INV | NAM | NRO + FIN VAR + Global L | FIN VAR + Global L | 0.98 | 0.39 | 0.43 |
| INV | NRO | NRO + FIN VAR + Global L | FIN VAR + Global L | 0.97 | 1.04\* | 0.60 |
| AUTOREGRESSIVE MODEL | | | | | | |
|  |  | UNRESTRICTED | RESTRICTED | / | MSE-F | ENC-NEW |
| GDP | NAM | AR(1) + NAM + FIN VAR + Global L | AR(1) | 0.55 | 28.8\* | 25.5\* |
| UN | NAM | AR(1) + NAM + FIN VAR + Global L | AR(1) | 0.76 | 10.9\* | 7.94\* |
| INV | NAM | AR(1) + NRO + FIN VAR + Global L | AR(1) | 0.65 | 19.2\* | 15.3\* |
| INV | NRO | AR(1) + NRO + FIN VAR + Global L | AR(1) | 0.54 | 30\* | 25\* |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Panel C: ITALY | | | | | | |
| NATIONAL ILLIQUIDITY VS CONTROL VARIABLES | | | | | | |
| C1 | C2 | C3 | C4 | C5 | C6 | C7 |
|  |  | UNRESTRICTED | RESTRICTED | / | MSE-F | ENC-NEW |
| GDP | NAM | NAM + FIN VAR + Global L | FIN VAR + Global L | 0.82 | 7.50\* | 8.24\* |
| UN | NAM | NAM + FIN VAR + Global L | FIN VAR + Global L | 0.79 | 9.31\* | 8.22\* |
| INV | NAM | NAM + FIN VAR + Global L | FIN VAR + Global L | 0.83 | 6.98\* | 7.03\* |
| CONS | NAM | NRO + FIN VAR + Global L | FIN VAR + Global L | 0.99 | 0.05 | 0.03 |
| AUTOREGRESSIVE MODEL | | | | | | |
|  |  | UNRESTRICTED | RESTRICTED | / | MSE-F | ENC-NEW |
| GDP | NAM | AR(1) + NAM + FIN VAR + Global L | AR(1) | 0.50 | 34.6\* | 31.3\* |
| UN | NAM | AR(1) + NAM + FIN VAR + Global L | AR(1) | 0.67 | 17.1\* | 13.8\* |
| INV | NAM | AR(1) + NAM + FIN VAR + Global L | AR(1) | 0.44 | 45.3\* | 41.8\* |
| CONS | NAM | AR(1) + NRO + FIN VAR + Global L | AR(1) | 0.76 | 11.08\* | 9.70\* |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Panel D: JAPAN | | | | | | |
| NATIONAL ILLIQUIDITY VS CONTROL VARIABLES | | | | | | |
| C1 | C2 | C3 | C4 | C5 | C6 | C7 |
|  |  | UNRESTRICTED | RESTRICTED | / | MSE-F | ENC-NEW |
| UN | NAM | NAM + FIN VAR + Global L | FIN VAR + Global L | 1.00 | -0.10 | -0.05 |
| INV | NAM | NAM + FIN VAR + Global L | FIN VAR + Global L | 1.01 | -0.55 | -0.25 |
| UN | NRO | NAM + FIN VAR + Global L | FIN VAR + Global L | 0.93 | 2.30\* | 1.94 |
| AUTOREGRESSIVE MODEL | | | | | | |
|  |  | UNRESTRICTED | RESTRICTED | / | MSE-F | ENC-NEW |
| UN | NAM | AR(1) + NAM + FIN VAR + Global L | AR(1) | 0.68 | 16.8\* | 12.9\* |
| INV | NAM | AR(1) + NAM + FIN VAR + Global L | AR(1) | 0.84 | 6.82\* | 7.63\* |
| UN | NRO | AR(1) + NAM + FIN VAR + Global L | AR(1) | 0.52 | 32.3\* | 25.3\* |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Panel E: UK | | | | | | |
| NATIONAL ILLIQUIDITY VS CONTROL VARIABLES | | | | | | |
| C1 | C2 | C3 | C4 | C5 | C6 | C7 |
|  |  | UNRESTRICTED | RESTRICTED | / | MSE-F | ENC-NEW |
| INV | NRO | NRO + FIN VAR + Global L | FIN VAR + Global L | 0.99 | 0.05 | 0.07 |
| AUTOREGRESSIVE MODEL | | | | | | |
|  |  | UNRESTRICTED | RESTRICTED | / | MSE-F | ENC-NEW |
| INV | NRO | AR(1) + NRO + FIN VAR + Global L | AR(1) | 0.76 | 10.9\* | 9.06\* |

Table 5 reports results from model comparisons for predicting macroeconomic growth out-of-sample. We have two competing models: unrestricted and restricted. We have numbered columns to make it easier for readers to follow our analysis. ‘UN’ stands for unrestricted, ‘R’ stands for restricted. MSE-F and ENC NEW are the two tests we use to draw conclusions. MSE-F tests for MSE equality between restricted and unrestricted models (H0: MSEr=MSEu) while ENC-NEW tests whether the restricted model encompasses the unrestricted model (H0: R encompasses UN). \* denotes a rejection of the null hypotheses above at 5%. We also present results for MSEu/MSEr, where the subscripts u and r stand for unrestricted and restricted. Each panel is dedicated to a specific country. We present results for ‘ILLIQUIDITY VARIABLES VS. CONTROL VARIABLES’ and ‘AUTOREGRESSIVE MODELS’. Our illiquidity variables are NAM and NRO and our control variables are our financial variables (FIN) and global AM (GAM) or RO (GRO). Model comparisons are undertaken for illiquidity variables (NAM and NRO) which survived the in-sample regressions of the previous section. Sample range Q4 1995-Q4 2013, 73 quarterly observations.

Table 6

Predicting Macro Variables with Market Liquidity – Size Portfolios

**Panel A: Canada**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DEP | CON | DEP | (D) RF | SMB | HML | MOM | (D) TERM | SD | XS | (D) DIV | (D) NAMS | NAML | (D) GAMS | GAML | R2Adj FIN | R2Adj FIN +SN | R2Adj FIN +LN | R2Adj FIN +SG | R2Adj FIN +LG | R2Adj FIN +SN +SG | R2Adj FIN +LN  +LG | R2Adj ALL/  [PL-B] |
| GDPt+1 | **0.003**  **(0.00)** | **0.486**  **(0.00)** | -0.058  (0.45) | 0.029  (0.69) | 0.034  (0.66) | -0.089  (0.37) | -0.039  (0.39) | **-0.171**  **(0.06)** | -0.005  (0.95) | **-0.331**  **(0.00)** | **0.113**  **(0.00)** | -0.011  (0.85) | **-0.086**  **(0.06)** | **0.220**  **(0.00)** | 0.421 | 0.426 | 0.412 | 0.420 | 0.468 | 0.426 | 0.460 | 0.465/  [0.49] |
| UNt+1 | **-0.005**  **(0.05)** | 0.127  (0.32) | **-0.067**  **(0.10)** | -0.067  (0.21) | -0.083  (0.17) | -0.034  (0.77) | **0.148**  **(0.08)** | **0.436**  **(0.00)** | 0.019  (0.70) | **0.549**  **(0.00)** | **0.093**  **(0.02)** | -0.024  (0.57) | **0.145**  **(0.05)** | **-0.134**  **(0.00)** | 0.546 | 0.549 | 0.539 | 0.562 | 0.558 | 0.565 | 0.551 | 0.571/  [0.67] |
| CONSt+1 | **0.007**  **(0.00)** | 0.043  (0.70) | -0.107  (0.37) | 0.104  (0.24) | -0.178  (0.11) | -0.049  (0.46) | **-0.142**  **(0.07)** | **-0.265**  **(0.00)** | -0.058  (0.70) | **-0.176**  **(0.10)** | 0.024  (0.70) | 0.017  (0.84) | **-0.116**  **(0.03)** | **-0.097**  **(0.00)** | 0.090 | 0.076 | 0.075 | 0.090 | 0.086 | 0.075 | 0.071 | 0.055/  [0.12] |
| INVt+1 | **0.006**  **(0.00)** | **0.479**  **(0.00)** | **-0.106**  **(0.01)** | **-0.036**  **(0.00)** | 0.056  (0.52) | **-0.281**  **(0.00)** | -0.028  (0.46) | **-0.323**  **(0.02)** | **-0.156**  **(0.02)** | **-0.364**  **(0.00)** | 0.052  (0.21) | 0.064  (0.24) | -0.050  (0.42) | 0.000  (0.99) | 0.690 | 0.688 | 0.689 | 0.687 | 0.685 | 0.685 | 0.684 | 0.679/  [0.80] |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DEP | CON | DEP | (D) RF | SMB | HML | MOM | (D) TERM | SD | XS | (D) DIV | (D) NROS | NROL | (D) GROS | GROL | R2Adj FIN | R2Adj FIN +SN | R2Adj FIN +LN | R2Adj FIN +SG | R2Adj FIN +LG | R2Adj FIN +SN +SG | R2Adj FIN +LN  +LG | R2Adj ALL/ |
| GDPt+1 | **0.003**  **(0.000)** | **0.492**  **(0.00)** | -0.056  (0.36) | 0.027  (0.70) | 0.037  (0.54) | -0.096  (0.31) | -0.037  (0.61) | **-0.174**  **(0.04)** | -0.006  (0.95) | **-0.336**  **(0.00)** | **0.163**  **(0.00)** | **0.152 (0.05)** | **-0.173**  **(0.03)** | -0.009  (0.85) | 0.421 | 0.441 | 0.434 | 0.445 | 0.412 | 0.465 | 0.425 | 0.473/  [0.67] |
| UNt+1 | **-0.005**  **(0.03)** | 0.192  (0.13) | **-0.057**  **(0.06)** | -0.059  (0.26) | -0.096  (0.22) | -0.013  (0.89) | **0.134**  **(0.09)** | **0.420**  **(0.00)** | 0.050  (0.40) | **0.548**  **(0.00)** | -0.048  (0.46) | **-0.148**  **(0.07)** | **0.023**  **(0.00)** | -0.030  (0.59) | 0.546 | 0.540 | 0.561 | 0.539 | 0.539 | 0.534 | 0.555 | 0.543/  [0.48] |
| CONSt+1 | **0.007**  **(0.00)** | 0.066  (0.55) | -0.107  (0.38) | 0.100  (0.29) | -0.177  (0.11) | -0.052  (0.47) | **-0.140**  **(0.09)** | **-0.261**  **(0.00)** | -0.063  (0.67) | -0.165  (0.11) | 0.044  (0.68) | -0.020  (0.86) | -0.026  (0.61) | 0.081  (0.25) | 0.090 | 0.077 | 0.076 | 0.075 | 0.083 | 0.062 | 0.067 | 0.090/  [0.23] |
| INVt+1 | **0.006**  **(0.00)** | **0.508**  **(0.00)** | **-0.103**  **(0.00)** | **-0.039**  **(0.00)** | 0.056  (0.51) | **-0.289**  **(0.00)** | -0.024  (0.38) | **-0.306**  **(0.03)** | **-0.167**  **(0.00)** | **-0.355**  **(0.00)** | **-0.054**  **(0.00)** | -0.023  (0.65) | 0.021  (0.59) | 0.017  (0.60) | 0.690 | 0.688 | 0.685 | 0.685 | 0.685 | 0.683 | 0.680 | 0.67/  [0.94] |

**Panel B: France**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DEP | CON | DEP | (D) RF | SMB | HML | MOM | TERM | SD | XS | (D) DIV | NAMS | NAML | (D) GAMS | GAML | R2Adj FIN | R2Adj FIN +SN | R2Adj FIN +LN | R2Adj FIN +SG | R2Adj FIN +LG | R2Adj FIN +SN +SG | R2Adj FIN +LN  +LG | R2Adj ALL/  [PL-B] |
| GDPt+1 | **0.002**  **(0.00)** | **0.551**  **(0.00)** | -0.113  (0.39) | 0.022  (0.99) | 0.026  (0.22) | **-0.048**  **(0.00)** | -0.063  (0.14) | **-0.201**  **(0.00)** | **-0.009**  **(0.09)** | **-0.708**  **(0.00)** | 0.643  (0.32) | -0.786  (0.95) | -0.095  (0.52) | 0.004  (0.48) | 0.422 | 0.415 | 0.413 | 0.416 | 0.417 | 0.409 | 0.408 | 0.393/  [0.23] |
| UNt+1 | -0.001  (0.76) | 0.272  (0.11) | **-0.139**  **(0.09)** | -0.052  (0.53) | **-0.067**  **(0.05)** | **-0.019**  **(0.00)** | 0.253  (0.83) | 0.546  (0.01) | 0.035  (0.18) | 1.245  (0.09) | 0.562  (0.43) | -1.793  (0.00) | 0.170  (0.62) | -0.002  (0.81) | 0.322 | 0.316 | 0.321 | 0.313 | 0.311 | 0.307 | 0.310 | 0.293/  [0.57] |
| CONSt+1 | **0.005**  **(0.00)** | -0.045  (0.45)  -0.044  (0.73)  0.075  (0.37) | -0.043  (0.25) | **0.015**  **(0.01)** | -0.027  (0.25) | -0.005  (0.50) | -0.046  (0.63) | -0.063  (0.99) | -0.020  (0.76) | -0.076  (0.14) | **0.028**  **(0.00)** | 0.240  (0.37) | **-0.026**  **(0.00)** | -0.000  (0.92) | -0.107 | -0.113 | -0.112 | 0.160 | -0.125 | 0.158 | -0.131 | 0.118/  [0.11] |
| INVt+1 | 0.001  (0.30) | **0.369**  **(0.00)**  **0.466**  **(0.00)** | -0.321  (0.63) | -0.042  (0.73) | 0.066  (0.49 | -0.234  (0.36) | **-0.071**  **(0.01)** | **-0.591**  **(0.06)** | **-0.417**  **(0.09)** | **-1.205**  **(0.00)** | 0.458  (0.29) | **7.030**  **(0.00)** | **-0.086**  **(0.05)** | 0.000  (0.49) | 0.473 | 0.465 | 0.471 | 0.471 | 0.471 | 0.463 | 0.469 | 0.565/  [0.99] |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DEP | CON | DEP | (D) RF | SMB | HML | MOM | TERM | SD | XS | (D) DIV | (D) NROS | NROL | (D) GROS | GROL | R2Adj FIN | R2Adj FIN +SN | R2Adj FIN +LN | R2Adj FIN +SG | R2Adj FIN +LG | R2Adj FIN +SN +SG | R2Adj FIN +LN  +LG | R2Adj ALL/  [PL-B] |
| GDPt+1 | **0.002**  **(0.00)** | **0.507**  **(0.00)** | -0.118  (0.44) | -0.001  (0.99) | 0.073  (0.28) | **0.145**  **(0.00)** | **0.119**  **(0.10)** | **-0.307**  **(0.00)** | -0.126  (0.12) | **-0.188**  **(0.01)** | **-0.118**  **(0.09)** | 0.079  (0.26) | -0.050  (0.50) | -0.181  (0.13) | 0.422 | 0.428 | 0.419 | 0.416 | 0.453 | 0.421 | 0.449 | 0.448/  [.43] |
| UNt+1 | -0.001  (0.74) | 0.247  (0.13) | **-0.226**  **(0.08)** | 0.043  (0.61) | **-0.123**  **(0.03)** | **-0.062**  **(0.02)** | 0.026  (0.77) | **0.313**  **(0.01)** | -0.127  (0.14) | **0.190**  **(0.07)** | 0.025  (0.69) | -0.107  (0.40) | 0.037  (0.50) | -0.041  (0.21) | 0.322 | 0.311 | 0.323 | 0.314 | 0.313 | 0.302 | 0.314 | 0.292/  [0.80] |
| CONSt+1 | **0.004**  **(0.01)** | -0.043  (0.65) | -0.039  (0.61) | **0.132**  **(0.06)** | -0.042  (0.59) | -0.024  (0.46) | 0.035  (0.66) | -0.006  (0.91) | -0.014  (0.84) | 0.093  (0.45) | -0.227  (0.20) | 0.186  (0.21) | 0.021  (0.81) | -0.052  (0.44) | -0.107 | -0.066 | -0.085 | -0.124 | -0.121 | -0.084 | -0.101 | -0.077/  [0.96] |
| INVt+1 | **0.002**  **(0.02)** | **0.606**  **(0.00)** | **0.125**  **(0.10)** | -0.038  (0.64) | -0.059  (0.41) | **-0.018**  **(0.00)** | 0.084  (0.13) | **-0.233**  **(0.00)** | **-0.130**  **(0.03)** | **-0.154**  **(0.00)** | **-0.149**  **(0.00)** | 0.040  (0.60) | **0.102**  **(0.01)** | **-0.273**  **(0.00)** | 0.474 | 0.492 | 0.466 | 0.476 | 0.553 | 0.495 | 0.547 | 0.568/  [0.90] |

**Panel C: Germany**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DEP | CON | DEP | (D) RF | SMB | HML | MOM | (D) TERM | SD | XS | (D) DIV | (D) NAMS | NAML | GAMS | GAML | R2Adj FIN | R2Adj FIN +SN | R2Adj FIN +LN | R2Adj FIN +SG | R2Adj FIN +LG | R2Adj FIN +SN +SG | R2Adj FIN +LN  +LG | R2Adj ALL/  [PL-B] |
| GDPt+1 | **0.003**  **(0.00)** | 0.086  (0.49) | 0.095  (0.56) | **0.128**  **(0.00)** | 0.046  (0.48) | 0.100  (0.14) | 0.066  (0.32) | **-0.308**  **(0.00)** | 0.089  (0.38) | **-0.387**  **(0.01)** | **-0.054**  **(0.06)** | 0.026  (0.75) | **-0.182**  **(0.01)** | 0.015  (0.77) | 0.246 | 0.237 | 0.235 | 0.271 | 0.235 | 0.262 | 0.222 | 0.237/  [0.91] |
| UNt+1 | -0.003  (0.15) | **0.440**  **(0.00)** | -0.099  (0.36) | **-0.134**  **(0.03)** | -0.174  (0.24) | **-0.105**  **(0.00)** | 0.056  (0.47) | 0.127  (0.13) | -0.067  (0.44) | **0.148**  **(0.01)** | 0.053  (0.31) | 0.033  (0.51) | **0.171**  **(0.00)** | 0.005  (0.87) | 0.257 | 0.248 | 0.246 | 0.280 | 0.245 | 0.271 | 0.233 | 0.246/  [0.31] |
| CONSt+1 | **0.003**  **(0.00)** | -0.147  (0.38) | 0.100  (0.93) | -0.023  (0.77) | 0.113  (0.25) | **-0.101**  **(0.03)** | -0.036  (0.75) | -0.085  (0.38) | **-0.156**  **(0.10)** | 0.119  (0.23) | 0.076  (0.34) | -0.058  (0.43) | 0.036  (0.56) | **0.092**  **(0.01)** | -0.022 | -0.034 | -0.036 | -0.038 | -0.031 | -0.050 | -0.045 | -0.073/  [0.68] |
| INVt+1 | **0.005**  **(0.04)** | -0.189  (0.12) | **0.182**  **(0.03)** | **0.101**  **(0.00)** | **-0.162**  **(0.09)** | **0.073**  **(0.03)** | **-0.118**  **(0.06)** | **-0.324**  **(0.01)** | 0.045  (0.33) | **-0.290**  **(0.01)** | **-0.195**  **(0.00)** | -0.090  (0.33) | **-0.180**  **(0.00)** | -0.046  (0.26) | 0.163 | 0.196 | 0.159 | 0.189 | 0.152 | 0.224 | 0.148 | 0.210/  [0.56] |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DEP | CON | DEP | (D) RF | SMB | HML | MOM | (D) TERM | SD | XS | (D) DIV | (D) NROS | NROL | (D) GROS | GROL | R2Adj FIN | R2Adj FIN +SN | R2Adj FIN +LN | R2Adj FIN +SG | R2Adj FIN +LG | R2Adj FIN +SN +SG | R2Adj FIN +LN  +LG | R2Adj ALL/  [PL-B] |
| GDPt+1 | **0.003**  **(0.02)** | 0.187  (0.15) | 0.063  (0.69) | **0.139**  **(0.00)** | 0.053  (0.31) | **0.082**  **(0.02)** | 0.084  (0.17) | **-0.285**  **(0.00)** | 0.114  (0.23) | **-0.361**  **(0.00)** | -0.152  (0.14) | -0.089  (0.17) | **-0.141**  **(0.02)** | -0.024  (0.69) | 0.247 | 0.262 | 0.245 | 0.257 | 0.235 | 0.272 | 0.232 | 0.257/  [0.81] |
| UNt+1 | -0.003  (0.25) | **0.462**  **(0.00)** | -0.093  (0.35) | **-0.132**  **(0.03)** | -0.175  (0.22) | **-0.103**  **(0.00)** | 0.054  (0.47) | 0.125  (0.17) | -0.073  (0.39) | **0.151**  **(0.01)** | 0.046  (0.66) | 0.043  (0.48) | -0.052  (0.19) | -0.074  (0.16) | 0.257 | 0.246 | 0.247 | 0.248 | 0.251 | 0.238 | 0.241 | 0.220/  [0.61] |
| CONSt+1 | **0.003**  **(0.00)** | -0.139  (0.38) | 0.011  (0.92) | -0.021  (0.80) | 0.115  (0.14) | **-0.098**  **(0.00)** | -0.034  (0.75) | -0.083  (0.43) | **-0.156**  **(0.09)** | 0.122  (0.18) | 0.022  (0.85) | **-0.008**  **(0.00)** | **-0.194**  **(0.00)** | 0.000  (0.99) | -0.022 | -0.039 | -0.039 | 0.001 | -0.039 | -0.016 | -0.057 | -0.051/  [0.36] |
| INVt+1 | **0.005**  **(0.06)** | -0.184  (0.13) | **0.180**  **(0.00)** | 0.100  (0.11) | **-0.162**  **(0.04)** | **0.067**  **(0.00)** | **-0.120**  **(0.03)** | **-0.326**  **(0.00)** | 0.047  (0.18) | **-0.294**  **(0.00)** | **-0.155**  **(0.05)** | **-0.161**  **(0.07)** | 0.082  (0.20) | 0.053  (0.36) | 0.163 | 0.178 | 0.181 | 0.156 | 0.153 | 0.172 | 0.171 | 0.181/  [0.53] |

**Panel D: Italy**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DEP | CON | DEP | (D) RF | SMB | HML | MOM | (D) TERM | SD | XS | (D) DIV | NAMS | NAML | (D) GAMS | GAML | R2Adj FIN | R2Adj FIN +SN | R2Adj FIN +LN | R2Adj FIN +SG | R2Adj FIN +LG | R2Adj FIN +SN +SG | R2Adj FIN +LN  +LG | R2Adj ALL/  [PL-B] |
| GDPt+1 | 0.000  (0.38) | **0.504**  **(0.00)** | **-0.159**  **(0.00)** | 0.088  (0.13) | 0.026  (0.74) | -0.037  (0.36) | **0.134**  **(0.06)** | **-0.251**  **(0.00)** | -0.047  (0.20) | **-0.237**  **(0.05)** | **-0.085**  **(0.05)** | **-0.055**  **(0.09)** | -0.031  (0.60) | **-0.075**  **(0.03)** | 0.471 | 0.470 | 0.466 | 0.463 | 0.468 | 0.462 | 0.463 | 0.454/  [0.34] |
| UNt+1 | 0.000  (0.58) | **0.361 (0.00)**  **0.347**  **(0.00**) | 0.014  (0.81) | **0.109**  **(0.08)** | -0.048  (0.45) | -0.058  (0.03) | -0.070  (0.12) | 0.130  (0.09) | -0.022  (0.63) | 0.087  (0.13) | 0.129  (0.00) | 0.035  (0.22) | -0.045  (0.33) | 0.357  (0.00 | 0.444 | 0.461 | 0.435 | 0.437 | 0.569 | 0.454 | 0.562 | 0.64/  [0.38] |
| CONSt+1 | 0.005  (0.25) | -0.013  (0.68) | **-0.213**  **(0.07)** | 0.209  (0.21) | -0.235  (0.27) | 0.036  (0.41) | -0.008  (0.88) | -0.070  (0.14) | **0.098**  **(0.04)** | **-0.116**  **(0.08)** | -0.097  (0.14) | -0.095  (0.29) | **-0.146**  **(0.04)** | **-0.119**  **(0.09)** | 0.050 | 0.044 | 0.046 | 0.056 | 0.052 | 0.051 | 0.047 | 0.046/  [0.54] |
| INVt+1 | 0.000  (0.76) | **0.258**  **(0.02)**  -0.056  (0.70)  0.143  (0.25) | 0.008  (0.94) | 0.051 (0.54) | 0.042  (0.68) | -0.049  (0.16) | 0.092  (0.21) | **-0.140**  **(0.00)** | **0.191**  **(0.05)** | -0.203  (0.12) | **-0.152**  **(0.01)** | -0.057  (0.21) | 0.130  (0.30) | -0.044  (0.24) | 0.109 | 0.123 | 0.095 | 0.116 | 0.100 | 0.130 | 0.085 | 0.098/  [0.30] |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DEP | CON | DEP | (D) RF | SMB | HML | MOM | (D) TERM | SD | XS | (D) DIV | NROS | NROL | (D) GROS | GROL | R2Adj FIN | R2Adj FIN +SN | R2Adj FIN +LN | R2Adj FIN +SG | R2Adj FIN +LG | R2Adj FIN +SN +SG | R2Adj FIN +LN  +LG | R2Adj ALL/  [PL-B] |
| GDPt+1 | 0.000  (0.51) | **0.586**  **(0.00)** | **-0.178**  **(0.01)** | 0.097  (0.13) | 0.029  (0.72) | -0.048  (0.38) | **0.136**  **(0.05)** | **-0.225**  **(0.00)** | -0.068  (0.16) | **-0.209**  **(0.05)** | **-0.153**  **(0.04)** | -0.035  (0.70) | -0.001  (0.98) | **-0.091**  **(0.03)** | 0.471 | 0.486 | 0.463 | 0.462 | 0.470 | 0.477 | 0.462 | 0.470/  [0.31] |
| UNt+1 | 0.001  (0.62) | **0.632**  **(0.00)** | 0.008  (0.93) | 0.091  (0.36) | -0.062  (0.41) | -0.064  (0.24) | -0.017  (0.79) | **0.135**  **(0.09)** | -0.040  (0.61) | 0.027  (0.54) | -0.017  (0.78) | 0.007  (0.93) | -0.032  (0.57) | **-0.050**  **(0.00)** | 0.444 | 0.435 | 0.435 | 0.436 | 0.437 | 0.426 | 0.428 | 0.409/  [0.17] |
| CONSt+1 | 0.005  (0.16) | 0.076  (0.48) | **-0.231**  **(0.09)** | 0.211  (0.21) | -0.235  (0.21) | **0.036**  **(0.08)** | -0.023  (0.74) | -0.063  (0.19) | 0.096  (0.22) | **-0.109**  **(0.08)** | -0.140  (0.18) | -0.153  (0.20) | -0.022  (0.82) | -0.045  (0.51) | 0.051 | 0.057 | 0.061 | 0.035 | 0.036 | 0.041 | 0.046 | 0.037/  [0.89] |
| INVt+1 | 0.001  (0.72) | **0.289**  **(0.07)** | 0.001  (0.99) | 0.064  (0.59) | 0.022  (0.85) | -0.030  (0.43) | 0.061  (0.47) | **-0.126**  **(0.00)** | **0.199**  **(0.00)** | **-0.169**  **(0.09)** | -0.024  (0.81) | **-0.184**  **(0.07)** | 0.014  (0.69) | -0.049  (0.40) | 0.109 | 0.095 | 0.137 | 0.095 | 0.097 | 0.080 | 0.125 | 0.095/  [0.17] |

**Panel E: Japan**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DEP | CON | DEP | (D) RF | SMB | HML | MOM | (D) TERM | SD | XS | (D) DIV | (D) NAMS | (D) NAML | (D) GAMS | GAML | R2Adj FIN | R2Adj FIN +SN | R2Adj FIN +LN | R2Adj FIN +SG | R2Adj FIN +LG | R2Adj FIN +SN +SG | R2Adj FIN +LN  +LG | R2Adj ALL/  [PL-B] |
| GDPt+1 | -0.001  (0.52) | **-0.168**  **(0.06)** | 0.086  (0.51) | **-0.459**  **(0.09)** | 0.084  (0.65) | 0.203  (0.31) | -0.003  (0.97) | -0.003  (0.99) | 0.055  (0.45) | **-1.110**  **(0.02)** | -0.149  (0.18) | 0.030  (0.75) | 0.193  (0.26) | -2.433  (0.13) | 0.489 | 0.478 | 0.491 | 0.479 | 0.484 | 0.468 | 0.482 | 0.463/  [0.75] |
| UNt+1 | **-0.018**  **(0.06)** | **0.228**  **(0.03)** | **0.137**  **(0.10)** | **-0.579**  **(0.00)** | 0.366  (0.12) | **0.514**  **(0.02)** | -0.150  (0.18) | **1.189**  **(0.00)** | **-0.445**  **(0.00)** | **-0.741**  **(0.08)** | **-0.342**  **(0.01)** | **-0.230**  **(0.00)** | 0.128  (0.39) | **-3.900**  **(0.00)** | 0.401 | 0.401 | 0.410 | 0.448 | 0.401 | 0.448 | 0.421 | 0.461/  [0.50] |
| CONSt+1 | 0.006  (0.15) | **-0.314**  **(0.01)** | -0.120  (0.55) | 0.223  (0.62) | -0.340  (0.34) | -0.374  (0.33) | -0.021  (0.84) | -0.780  (0.24) | 0.260  (0.13) | 0.183  (0.82) | 0.170  (0.49) | 0.154  (0.36) | -0.266  (0.38) | 2.336  (0.47) | 0.210 | 0.194 | 0.204 | 0.198 | 0.198 | 0.181 | 0.189 | 0.160/  [0.72] |
| INVt+1 | -0.001  (0.92) | 0.115  (0.26) | -0.107  (0.69) | 0.030  (0.95) | -0.223  (0.60) | -0.248  (0.59) | -0.010  (0.91) | -0.587  (0.43) | 0.094  (0.68) | -0.027  (0.98) | -0.112  (0.66) | 0.187  (0.12) | -0.021  (0.95) | -0.021  (0.84) | 0.251 | 0.273 | 0.275 | 0.238 | 0.247 | 0.261 | 0.286 | 0.270/  [0.93] |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DEP | CON | DEP | (D) RF | SMB | HML | MOM | (D) TERM | SD | XS | (D) DIV | NROS | NROL | (D) GROS | GROL | R2Adj FIN | R2Adj FIN +SN | R2Adj FIN +LN | R2Adj FIN +SG | R2Adj FIN +LG | R2Adj FIN +SN +SG | R2Adj FIN +LN  +LG | R2Adj ALL/  [PL-B] |
| GDPt+1 | **0.002**  **(0.04)** | **-0.097**  **(0.00)** | -0.144  (0.32) | **-0.212**  **(0.06)** | **-0.238**  **(0.00)** | **-0.096**  **(0.06)** | -0.016  (0.81) | **-0.555**  **(0.00)** | **0.158**  **(0.00)** | **-0.541**  **(0.00)** | -0.089  (0.22) | **0.140**  **(0.10)** | **-0.478**  **(0.03)** | -0.318  (0.16) | 0.489 | 0.482 | 0.486 | 0.495 | 0.479 | 0.489 | 0.476 | 0.502/  [0.88] |
| UNt+1 | 0.002  (0.28) | **0.314**  **(0.02)**  -0.159  (0.24)  0.098  (0.30)  -0.051  (0.39)  0.042  (0.68) | -0.125  (0.18) | -0.095  (0.26) | -0.093  (0.31) | 0.032  (0.75) | -0.119  (0.43) | **0.344**  **(0.03)** | **-0.305**  **(0.00)** | **0.224**  **(0.07)** | 0.049  (0.27) | -0.066  (0.58) | -0.178  (0.49) | -0.078  (0.70) | 0.401 | 0.391 | 0.395 | 0.399 | 0.394 | 0.388 | 0.389 | 0.324/  [0.14] |
| CONSt+1 | **0.003**  **(0.00)** | **-0.298**  **(0.00)** | 0.020  (0.88) | -0.068  (0.54) | -0.102  (0.30) | **-0.093**  **(0.00)** | -0.095  (0.11) | **-0.319**  **(0.00)** | 0.166  (0.17) | **-0.400**  **(0.00)** | **-0.068**  **(0.06)** | 0.043  (0.64) | -0.115  (0.71) | -0.004  (0.98) | 0.210 | 0.198 | 0.195 | 0.198 | 0.197 | 0.186 | 0.181 | 0.152/  [0.72] |
| INVt+1 | -**0.003**  **(0.04)** | 0.161  (0.29) | -0.076  (0.23) | -0.066  (0.64) | **-0.149**  **(0.09)** | **-0.158**  **(0.00)** | -0.041  (0.75) | **-0.432**  **(0.00)** | 0.056  (0.59) | **-0.220**  **(0.04)** | -0.066  (0.51) | -0.109  (0.49) | -0.108  (0.67) | -0.038  (0.89) | 0.251 | 0.240 | 0.254 | 0.239 | 0.236 | 0.229 | 0.239 | 0.213/  [0.60] |

**Panel F: UK**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DEP | CON | DEP | (D) RF | SMB | HML | MOM | (D) TERM | SD | XS | (D) DIV | (D) NAMS | NAML | (D) GAMS | GAML | R2Adj FIN | R2Adj FIN +SN | R2Adj FIN +LN | R2Adj FIN +SG | R2Adj FIN +LG | R2Adj FIN +SN +SG | R2Adj FIN +LN  +LG | R2Adj ALL/  [PL-B] |
| GDPt+1 | **0.002**  **(0.06)** | **0.636**  **(0.00)** | -0.067  (0.19) | -0.081  (0.15) | -0.011  (0.86) | **0.055**  **(0.02)** | 0.099  (0.15) | **-0.185**  **(0.09)** | 0.046  (0.57) | **-0.213**  **(0.06)** | -0.019  (0.77) | 0.057  (0.24) | -0.041  (0.53) | 0.055  (0.15) | 0.515 | 0.507 | 0.509 | 0.508 | 0.510 | 0.500 | 0.505 | 0.490/  [0.12] |
| UNt+1 | -0.003  (0.44) | **0.725**  **(0.00)** | 0.037  (0.52) | 0.056  (0.11) | 0.079  (0.19) | -0.033  (0.30) | -0.019  (0.78) | 0.124  (0.20) | 0.006  (0.88) | 0.181  (0.15) | 0.015  (0.80) | **-0.074**  **(0.01)** | -0.067  (0.15) | 0.017  (0.52) | 0.583 | 0.576 | 0.581 | 0.581 | 0.577 | 0.574 | 0.575 | 0.565/  [0.68] |
| CONSt+1 | **0.002**  **(0.02)** | **0.321**  **(0.01)**  **0.344**  **(0.00)** | **0.053**  **(0.00)** | 0.035  (0.56) | -0.042  (0.66) | **-0.032**  **(0.03)** | 0.003  (0.98) | **-0.170**  **(0.08)** | **-0.146**  **(0.06)** | -0.149  (0.27) | **0.202**  **(0.00)** | 0.099  (0.11) | -0.113  (0.12) | 0.043  (0.21) | 0.233 | 0.288 | 0.221 | 0.227 | 0.220 | 0.284 | 0.208 | 0.333/  [0.92] |
| INVt+1 | **0.008**  **(0.00)** | **-0.396 (0.00)** | **0.110**  **(0.08)** | 0.072  (0.15) | 0.130  (0.40) | 0.032  (0.40) | **-0.179**  **(0.01)** | **-0.319**  **(0.00)** | **0.150**  **(0.00)** | **-0.176**  **(0.07)** | 0.091  (0.20) | -0.025  (0.50) | 0.069  (0.15) | **0.105**  **(0.01)** | 0.162 | 0.158 | 0.149 | 0.153 | 0.161 | 0.149 | 0.147 | 0.133/  [0.28] |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DEP | CON | DEP | (D) RF | SMB | HML | MOM | (D) TERM | SD | XS | (D) DIV | NROS | NROL | (D) GROS | GROL | R2Adj FIN | R2Adj FIN +SN | R2Adj FIN +LN | R2Adj FIN +SG | R2Adj FIN +LG | R2Adj FIN +SN +SG | R2Adj FIN +LN  +LG | R2Adj ALL/  [PL-B] |
| GDPt+1 | **0.002**  **(0.03)** | **0.585**  **(0.00)** | -0.057  (0.32) | -0.072  (0.27) | -0.013  (0.80) | **0.058**  **(0.00)** | 0.079  (0.21) | **-0.206**  **(0.03)** | 0.056  (0.49) | **-0.223**  **(0.08)** | **-0.096**  **(0.05)** | -0.038  (0.68) | 0.055  (0.56) | -0.092  (0.25) | 0.515 | 0.517 | 0.508 | 0.510 | 0.516 | 0.513 | 0.510 | 0.507/  [0.12] |
| UNt+1 | -0.004  (0.31) | **0.675**  **(0.00)** | 0.026  (0.67) | 0.051  (0.29) | 0.075  (0.22) | -0.033  (0.45) | -0.002  (0.97) | **0.148**  **(0.06)** | -0.005  (0.92) | 0.191  (0.15) | 0.093  (0.14) | 0.109  (0.20) | 0.074  (0.26) | 0.085  (0.10) | 0.583 | 0.586 | 0.590 | 0.581 | 0.584 | 0.585 | 0.591 | 0.593/  [0.50] |
| CONSt+1 | **0.004**  **(0.00)** | **0.387**  **(0.03)** | 0.049  (0.41) | 0.028  (0.64) | -0.000  (0.99) | -0.032  (0.56) | -0.070  (0.49) | **-0.289**  **(0.00)** | -0.126  (0.32) | -0.135  (0.25) | **-0.231**  **(0.02)** | -0.199  (0.13) | **-0.100**  **(0.02)** | -0.003  (0.95) | 0.233 | 0.287 | 0.271 | 0.231 | 0.220 | 0.289 | 0.259 | 0.301/  [0.22] |
| INVt+1 | **0.008**  **(0.00)** | **-0.406**  **(0.00)** | **0.112**  **(0.06)** | **0.073**  **(0.02)** | 0.128  (0.38) | **0.031**  **(0.06)** | **-0.180**  **(0.00)** | **-0.323**  **(0.00)** | **0.151**  **(0.01)** | **-0.176**  **(0.05)** | **-0.132**  **(0.00)** | **-0.117**  **(0.05)** | 0.064  (0.16) | 0.018  (0.70) | 0.162 | 0.167 | 0.163 | 0.153 | 0.148 | 0.158 | 0.149 | 0.145/  [0.13] |

**Panel G: Summary of Table**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **FIN VARIABLES ONLY** | **FIN +SMALL NAT** | **FIN +LARGE NAT** | **FIN+SMALL GLOB** | **FIN+LARGE GLOB** | **FIN+SMALL NAT+SMALL GLOB** | **FIN+LARGE NAT +LARGE GLOB** | **ALL** |
| AM→GDP | 0.427 | 0.422 | 0.421 | 0.427 | 0.430 | 0.422 | 0.423 | 0.417 |
| RO→GDP | 0.428 | 0.436 | 0.426 | 0.431 | 0.428 | 0.440 | 0.426 | 0.448 |
| AM→INV | 0.426 | 0.425 | 0.422 | 0.437 | 0.444 | 0.437 | 0.442 | 0.463 |
| RO→INV | 0.425 | 0.418 | 0.425 | 0.420 | 0.420 | 0.412 | 0.420 | 0.397 |
| AM→CONS | 0.076 | 0.076 | 0.066 | 0.116 | 0.067 | 0.117 | 0.057 | 0.107 |
| RO→CONS | 0.076 | 0.086 | 0.080 | 0.069 | 0.063 | 0.080 | 0.066 | 0.075 |
| AM→UN | 0.308 | 0.317 | 0.306 | 0.309 | 0.303 | 0.319 | 0.303 | 0.326 |
| RO→UN | 0.308 | 0.310 | 0.314 | 0.301 | 0.312 | 0.303 | 0.319 | 0.312 |
| AM→MACROS (AVERAGES) | 0.309 | 0.310 | 0.304 | 0.322 | 0.311 | 0.323 | 0.306 | 0.328 |
| RO→MACROS (AVERAGES) | 0.309 | 0.312 | 0.311 | 0.305 | 0.305 | 0.309 | 0.307 | 0.3068 |

The Table shows the multivariate OLS estimates from regressing next quarter GDP, CONS, INV and UN growth on current and lagged market illiquidity of small and large firms national and global as well as TERM, MOM, and SD. We examine 2 different proxies for market illiquidity sampled for small and large firms. The cross sectional liquidity measures are calculated as equally weighted averages across stocks. The estimated models are Yt+1=α +βt NAMSt+ξt NAMLt+ λt GAMSt + ψt GAML t+ γ’Xt+ut+1 AND Yt+1=α +βt NROSt+ξt NROLt+ λt GROSt + ψt GROL t+ γ’Xt+ut+1 where Yt+1 is GDP, CONS, INV and UN growth, NAMSt is the respective illiquidity proxy sampled for the 20% smallest firms captured by AM and NAMLt is the illiquidity of the 20% largest firms, NROSt is the respective illiquidity proxy sampled for the 20% smallest firms captured by RO and NROLt is the illiquidity of the 20% largest firms, Xt contains the additional control variables (RF, SMB, HML, MOM, TERM, SD, XS and DIV) and γ’ is the vector of the coefficients estimates for the control variables. As always ‘N’ in front of RO or AM stands for national and ‘G’ in front of RO or AM stands for global. R2Adj FIN presents R2Adj of the dependent variable (DEP) and financial variables (FIN). R2Adj FIN+SN presents R2Adj of the dependent variable (DEP)+financial variables (FIN)+ small national liquidity (SN). R2Adj FIN+LN presents R2Adj of the dependent variable (DEP)+financial variables (FIN)+ large national liquidity (LN). R2Adj FIN+SG presents R2Adj of the dependent variable (DEP)+financial variables (FIN) + small global liquidity (SG). R2Adj FIN+LG presents R2Adj of the dependent variable (DEP)+financial variables (FIN) + large global liquidity (LG).‘R2Adj. FIN + SN + SG’ reports R2 Adj. of FIN and small national firm liquidity and small global firm liquidity, ‘R2Adj. FIN +LN + LG’ reports R2 Adj. of FIN and large national and large global firm liquidity. R2Adj ALL presents R2Adj of ALL VARIABLES. Panel G, summarises the results, please note that this and other summarising tables were motivated by Brockman et al. (2009). The coefficients reported are standardised.The number in parentheses is the Newey-West corrected (with four lags) probability value. The number in brackets in the last column below the adjusted R2 value is the Ljung-Box test probability values testing for autocorrelation in the residuals. The null hypothesis is that there is no autocorrelation and a probability value above 0.05 indicates that there is no autocorrelation. Where there is correlation the regression is repeated and the final results are presented where the residuals are free from autocorrelation. Both the old and new Ljung-box Probability value are presented and the additional lagged variable is presented below the original one for as many lags as were necessary. Sample range Q4 1995-Q4 2013, 73 quarterly observations.

Table 7

Granger Causality Tests (PANEL DATA) for ALL Countries – Size Portfolios-national and global

**Panel A: NAM and size**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | NAMS (2 lags) | NAMS (4 lags) | NAMS (2 lags) D-H | NAMS (4 lags) D-H | NAML (2 lags) | NAML (4 lags) | NAML (2 lags) D-H | NAML (4 lags) D-H |
| Line 1 | H0: N LIQ does not →GDP | **4.56**  **(0.01)** | **2.20**  **(0.06)** | 2.83  0.88  (0.37) | 3.32  -0.64  (0.51) | 0.18  (0.83) | 0.21  (0.92) | 1.36  -0.80  (0.41) | 2.23  -1.51  (0.13) |
| Line 2 | H0: GDP does not → N LIQ | **3.84**  **(0.02)** | **2.92**  **(0.02)** | **3.97**  **2.19**  **(0.02)** | **6.93**  **2.22**  **(0.02)** | 0.41  (0.66) | 0.46  (0.76) | 1.80  -0.29  (0.76) | 3.60  -0.42  (0.67) |
| Line 3 | H0: N LIQ does not → INV | 2.26  (0.10) | 1.23  (0.29) | 3.40  1.54  (0.12) | 4.65  0.41  (0.68) | 0.03  (0.96) | 0.05  (0.99) | 1.03  -1.18  (0.23) | 2.96  -0.93  (0.34) |
| Line 4 | H0: INV does not → N LIQ | 1.02  (0.36) | 1.20  (0.31) | 2.15  0.10  (0.91) | 4.57  0.34  (0.72) | 0.10  (0.90) | 0.04  (0.99) | 1.58  -0.95  (0.57) | 3.24  -0.71  (0.47) |
| Line 5 | H0: N LIQ does not → CONS | 0.15  (0.85) | 0.26  (0.90) | 2.44  0.43  (0.66) | 4.07  -0.05  (0.95) | 0.93  (0.39) | 0.75  (0.55) | 1.37  -0.78  (0.43) | 3.98  -0.12  (0.90) |
| Line 6 | H0: CONS does not → N LIQ | 0.12  (0.88) | 0.19  (0.94) | 1.70  -0.40  (0.68) | 3.02  -0.88  (0.37) | **19.2**  **(0.00)** | **13.5**  **(0.00)** | **12.6**  **12.2**  **(0.00)** | **18.1**  **11.1**  **(0.00)** |
| Line 7 | H0: N LIQ does not → UN | 0.62  (0.53) | 0.27  (0.89) | 2.45  0.45  (0.65) | 4.28  0.07  (0.93) | 0.71  (0.48) | 0.85  (0.48) | 1.24  -0.94  (0.34) | 4.22  0.06  (0.94 |
| Line 8 | H0: UN does not → N LIQ | 0.67  (0.50) | 0.35  (0.83) | 1.73  -0.37  (0.70) | 5.09  0.75  (0.44) | 1.17  (0.31) | 1.08  (0.36) | 1.42  -0.73  (0.46) | 3.20  -0.74  (0.45) |

**Panel B: NRO and size**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | NROS (2 lags) | NROS (4 lags) | NROS (2 lags) D-H | NROS (4 lags) D-H | NROL (2 lags) | NROL (4 lags) | NROL (2 lags) D-H | NROL (4 lags) D-H |
| Line 1 | H0: N LIQ does not →GDP | 0.16  (0.84) | 0.18  (0.94) | 2.32  0.30  (0.78) | 3.75  -0.30  (0.76) | 0.94  (0.38) | 0.99  (0.41) | 1.97  -0.09  (0.92 | 2.89  -8.99  (0.32) |
| Line 2 | H0: GDP does not → N LIQ | 1.27  (0.28) | 0.58  (0.67) | 1.48  -0.66  (0.50) | 2.69  -1.15  (0.25) | 1.33  (0.26) | 0.96  (0.42) | 1.45  -0.69  (0.48) | 2.62  -1.20  (0.22) |
| Line 3 | H0: N LIQ does not → INV | 1.28  (0.28) | 0.45  (0.76) | 1.68  -0.43  (0.66) | 2.92  -0.96  (0.33) | 1.28  (0.27) | 0.67  (0.60) | 2.10  0.05  (0.95) | 3.47  -0.52  (0.89) |
| Line 4 | H0: INV does not → N LIQ | 0.09  (0.90) | 0.28  (0.91) | 1.33  -0.93  (0.40) | 2.94  -0.95  (0.34) | 0.51  (0.60) | 1.01  (0.40) | 0.84  -1.30  (0.16) | 4.27  0.11  (0.91) |
| Line 5 | H0: N LIQ does not → CONS | 1.39  (0.20) | 0.97  (0.42) | 2.37  0.35  (0.72) | 3.54  -0.47  (0.63) | 0.22  (0.79) | 0.12  (0.97) | 2.05  -0.80  (0.99) | 3.18  -0.76  (0.49) |
| Line 6 | H0: CONS does not → N LIQ | 0.16  (0.84) | 0.81  (0.51) | 1.46  -0.68  (0.49) | **6.80**  **2.11**  **(0.03)** | 0.07  (0.93) | 0.28  (0.88) | 3.14  1.24  (0.21) | 4.90  0.60  (0.54) |
| Line 7 | H0: N LIQ does not → UN | 0.00  (0.99) | 0.38  (0.81) | 0.80  -1.44  (0.14) | 4.30  0.13  (0.89) | 1.00  (0.99) | 0.40  (0.80) | 1.16  -1.03  (0.30) | **1.64**  **-1.98**  **(0.04)** |
| Line 8 | H0: UN does not → N LIQ | 0.70  (0.49) | 1.06  (0.37) | 1.71  -0.40  (0.68) | 3.90  -0.18  (0.85) | **2.77**  **(0.06)** | 1.44  (0.21) | 1.51  -0.63  (0.52) | 3.06  -0.85  (0.39 |

**Panel C: GAM and size**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | GAMS (2 lags) | GAMS (4 lags) | GAMS (2 lags) D-H | GAMS (4 lags) D-H | GAML (2 lags) | GAML (4 lags) | GAML (2 lags) D-H | GAML (4 lags) D-H |
| Line 1 | H0: G LIQ does not →GDP | 2.21  (0.11) | **2.59**  **(0.03)** | 1.27  -0.90  (0.36) | 3.09  -0.83  (0.40) | **3.71**  **(0.02)** | **2.18**  **(0.07)** | **3.69**  **1.87**  **(0.06)** | 5.27  0.90  (0.36) |
| Line 2 | H0: GDP does not → G LIQ | 0.08  (0.92) | **8.05**  **(0.00)** | 2.50  0.51  (0.60) | **7.41**  **2.60**  **(0.00)** | 0.50  (0.60) | 1.55  (0.18) | 1.91  -0.17  (0.86) | 3.67  -0.36  (0.71) |
| Line 3 | H0: G LIQ does not → INV | 1.30  (0.32) | 1.96  (0.28) | 1.21  -0.97  (0.33) | 2.94  -0.94  (0.34) | 0.35  (0.70) | 0.31  (0.86) | 1.63  -0.49  (0.62) | 3.00  -0.90  (0.36) |
| Line 4 | H0: INV does not → G LIQ | 0.88  (0.41) | **3.39**  **(0.00)** | 0.88  -1.35  (0.17) | 5.87  1.37  (0.16) | 0.50  (0.60) | 1.35  (0.24) | 1.01  -1.20  (0.22) | 2.51  -1.29  (0.19) |
| Line 5 | H0: G LIQ does not → CONS | **6.53**  **(0.00)** | **3.71**  **(0.00)** | **16.3**  **16.4**  **(0.00)** | **20.8**  **13.6**  **(0.00)** | 0.17  (0.83) | 0.17  (0.94) | 1.91  -0.17  (0.86) | 2.69  -1.14  (0.25) |
| Line 6 | H0: CONS does not → G LIQ | 1.83  (0.16) | 1.19  (0.31) | 3.34  1.47  (0.13) | **7.33**  **2.53**  **(0.01)** | **20.6**  **(0.00)** | **1.00**  **(0.00)** | **69.4**  **77.4**  **(0.00)** | **80.3**  **60.9**  **(0.00)** |
| Line 7 | H0: G LIQ does not → UN | 1.56  (0.20) | 1.20  (0.30) | **4.50**  **2.80**  **(0.00)** | **10.4**  **4.97**  **(0.00)** | 0.81  (0.44) | 0.43  (1.78) | **5.22**  **3.63**  **(0.00)** | **6.54**  **1.91**  **(0.05)** |
| Line 8 | H0: UN does not → G LIQ | 1.58  (0.20) | **2.81**  **(0.02)** | 2.30  0.28  (0.77) | 4.88  0.59  (0.55) | 0.08  (0.92) | 0.48  (0.74) | 0.82  -1.41  (0.15) | 2.45  -1.34  (0.17) |

**Panel D: GRO and size**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | GROS (2 lags) | GROS (4 lags) | GROS (2 lags) D-H | GROS (4 lags) D-H | GROL (2 lags) | GROL (4 lags) | GROL (2 lags) D-H | GROL (4 lags) D-H |
| Line 1 | H0: G LIQ does not →GDP | 1.12  (0.32) | 0.74  (0.56) | 1.89  -0.19  (0.84) | 2.66  -1.16  (0.24) | 0.45  (0.63) | 1.19  (0.31) | 1.51  -0.63  (0.52) | 3.27  -0.68  (0.49) |
| Line 2 | H0: GDP does not → G LIQ | 0.30  (0.73) | 1.74  (0.13) | **0.35**  **-1.96**  **(0.04)** | 2.78  -1.07  (0.28) | 0.51  (0.59 | **2.27**  **(0.06)** | 2.07  0.00  (0.99) | 6.13  1.58  (0.11) |
| Line 3 | H0: G LIQ does not → INV | 1.47  (0.23) | 1.35  (0.24) | 0.81  -1.43  (0.14) | **1.78**  **-1.87**  **(0.06)** | 0.47  (0.62) | 0.78  (0.53) | 1.25  -0.92  (0.35) | 3.21  -0.73  (0.46) |
| Line 4 | H0: INV does not → G LIQ | 0.54  (0.57) | 1.75  (0.13) | 0.71  -1.54  (0.12) | 2.57  -1.24  (0.21) | 1.62  (0.19) | 1.05  (0.37) | 3.18  1.29  (0.19) | 5.14  0.79  (0.42) |
| Line 5 | H0: G LIQ does not → CONS | 0.04  (0.95) | 0.15  (0.96) | 0.86  -1.37  (0.16) | 2.19  -1.54  (0.12) | 0.14  (0.95) | 0.29  (0.88) | 1.18  -1.00  (0.31) | 2.26  -1.49  (0.13) |
| Line 6 | H0: CONS does not → G LIQ | 0.17  (0.84) | 0.35  (0.83) | 1.81  -0.29  (0.77) | 3.06  -0.85  (0.39) | 0.17  (0.83) | 0.35  (0.83) | 3.08  1.16  (0.24) | **8.39**  **3.38**  **(0.00)** |
| Line 7 | H0: G LIQ does not → UN | 0.28  (0.75) | 0.51  (0.72) | 1.59  -0.57  (0.59) | 4.34  0.16  (0.86) | 1.20  (0.30) | 0.51  (0.72) | 1.35  -0.81  (0.41) | **1.44**  **-2.14**  **(0.03)** |
| Line 8 | H0: UN does not → G LIQ | 0.28  (0.75) | 1.61  (0.17) | 1.06  -1.14  (0.25) | 2.53  -1.27  (0.20) | **2.55**  **(0.07)** | **2.30**  **(0.05)** | 2.66  0.69  (0.48) | 4.57  0.34  (0.72) |

The table shows Panel Granger causality tests between quarterly macroeconomic variables (GDP, INV, CONSand UN) and all liquidity variables. All liquidity variables are orthogonalised. The prefix ‘N’ means national and the prefix ‘G’ means global. The suffix ‘S’ stands for small while the suffix ‘L’ stands for large. Besides the standard Granger causality panel data test, we also use the Dumitrescu-Hurlin (D-H) panel data test. We first test the null hypothesis that our liquidity variable does not Granger cause the macroeconomic variable in question and then we test the null hypothesis that our macroeconomic variable does not Granger cause the liquidity variable in question. The null for the D-H test is that that our liquidity variable does not homogeneously cause the macroeconomic variable in question and then we test the null hypothesis that our macroeconomic variable does not homogeneously cause the liquidity variable in question. We do this for all macroeconomic and liquidity variables. We report the F-test and p-value (in parenthesis) for the standard panel Granger causality test and the W-stat, Z bar and probability (in parenthesis) for the D-H test. We use 2 and 4 lags for our tests. This is based on a number of different lag length determination criteria namely sequential modified LR test statistic (each test at 5% level), Final prediction error, Akaike information criterion, Schwarz information criterion and Hannan-Quinn information criterion. Sample range Q4 1995-Q4 2013, 73 quarterly observations.

**APPENDIX US DATA RESULTS**

Appendix Table 1

US Descriptive Statistics and Correlations between Liquidity Variables (1995-2013)

**Panel A: Liquidity Measure and Stock Descriptive Statistics**

|  |  |  |
| --- | --- | --- |
|  | AM | RO |
| Mean | 0.001 | 0.007 |
| Median | 0.000 | 0.006 |
| S.D | 0.002 | 0.003 |
| Min | 0.000 | 0.004 |
| Max | 0.010 | 0.018 |

**Panel B: Correlations between Liquidity Variables**

|  |  |
| --- | --- |
|  | **RO** |
| **AM** | -0.131  (0.25) |

Table 1, Panel A, shows descriptive statistics (mean, median standard deviation, minimum value and maximum value) for liquidity measures and for all stocks in the sample. Panel B shows correlations between liquidity variables. The number in brackets is the p-value. The correlations are calculated across all stocks and time i.e. the liquidity measures are calculated for each available stock once each quarter and the correlations are pairwise correlations between these liquidity measures. Sample range Q4 1995-Q4 2013, 73 quarterly observations.

Appendix Table 2

US Correlations for All Variables (1995-2013)

**Panel a: correlations between macroeconomic variables and liquidity (national and global)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **US** | | | | |
|  | **GDP** | **CONS** | **INV** | **UN** |
| **NAM** | 0.016  (0.88) | -0.07  (0.53) | -0.07  (0.52) | **-0.252**  **(0.03)** |
| **NRO** | **-0.455**  **(0.00)** | **-0.348**  **(0.00)** | -0.133  (0.24) | **0.570**  **(0.00)** |
| **GAM** | **-0.333**  **(0.00)** | **-0.352**  **(0.00)** | -0.102  (0.37) | **0.279**  **(0.01)** |
| **GRO** | -0.07  (0.53) | -0.122  (0.28) | -0.187  (0.10) | **-0.194**  **(0.09)** |

**Panel b: correlations between macroeconomic variables and financial variables**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **US** | | | | |
|  | **GDP** | **CONS** | **INV** | **UN** |
| **CREDIT** | **-0.656**  **(0.00)** | **-0.585**  **(0.00)** | **-0.265**  **(0.02)** | **0.715**  **(0.00)** |
| **SD** | **-0.576**  **(0.00)** | **-0.495**  **(0.00)** | -0.185  (0.10) | **0.598**  **(0.00)** |
| **TERM** | **-0.227**  **(0.05)** | **-0.375**  **(0.00)** | **-0.248**  **(0.03)** | **0.228**  **(0.05)** |
| **XS** | **0.549**  **(0.00)** | **0.432**  **(0.00)** | 0.122  (0.29) | **-0.464**  **(0.00)** |

**Panel c: correlations between financial variables and liquidity variables (national and global)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **US** | | | | |
|  | **NAM** | **NRO** | **GAM** | **GRO** |
| **CREDIT** | -0.120  (0.29) | **0.063**  **(0.00)** | **0.410**  **(0.00)** | 0.011  (0.92) |
| **SD** | -0.05  (0.65) | **0.899**  **(0.00)** | **0.380**  **(0.00)** | -0.010  (0.92) |
| **TERM** | 0.100  (0.38) | 0.032  (0.77) | **0.515**  **(0.00)** | 0.164  (0.15) |
| **XS** | 0.063  (0.58) | **-0.531**  **(0.00)** | **-0.325**  **(0.00)** | 0.094  (0.41) |

The table shows correlation coefficients between all variables used in our analysis. The associated p-values are reported in parentheses below each correlation coefficient. AM and RO are the 2 liquidity measures. TERM is our proxy for the term spread, SD is market volatility/standard deviation which is calculated as the cross sectional average volatility for all stocks in our sample CREDIT is term credit and XS is excess returns. GDP is real GDP growth, INV is growth in investments, UN is growth in unemployment and CONS is real consumption growth. The prefix ‘N’ in front of each liquidity variable refers to national while the prefix ‘G’ refers to global. Global liquidity is constructed as in Brockman et al. (2009). Correlations presented below are for raw data. Sample range Q4 1995-Q4 2013, 73 quarterly observations.

Appendix Table 3

In Sample Prediction Macro Variables for the US (1995-2013)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEP** | **CON** | **DEP** | **(D) NAM** | **(D) GAM** | **(D) TERM** | **(D) CRED** | **SD** | **XS** | **R2Adj**  **DEP+FIN** | **R2Adj DEP+FIN+NL** | **R2Adj DEP+FIN+NL+GL/**  **[PL-B]** |
| GDPt+1 | **0.004**  **(0.00)** | **0.333**  **(0.03)** | 0.086  (0.36) | 0.030  (0.58) | -0.078  (0.23) | **-0.245**  **(0.00)** | -0.109  (0.41) | -0.060  (0.40) | 0.209 | 0.205 | 0.193/  [0.18] |
| UNt+1 | 0.002  (0.64) | 0.183  (0.16) | **-0.078**  **(0.08)** | **0.101**  **(0.00)** | **0.344**  **(0.00)** | **0.229**  **(0.00)** | **0.403**  **(0.00)** | **-0.179**  **(0.00)** | 0.496 | 0.494 | 0.498/  [0.13] |
| CONSt+1 | **0.003**  **(0.06)** | **0.627**  **(0.00)** | **-0.162**  **(0.09)** | **0.177**  **(0.03)** | 0.030  (0.53) | -0.000  (0.99) | -0.043  (0.61) | 0.004  (0.96) | 0.331 | 0.348 | 0.372/  [0.14] |
| INVt+1 | 0.006  (0.22) | -0.046  (0.70) | -0.020  (0.55) | **0.161**  **(0.03)** | **-0.120**  **(0.05)** | **-0.094**  **(0.09)** | -0.107  (0.25) | 0.008  (0.90) | -0.045 | -0.061 | -0.052/  [0.88] |
|  |  |  |  |  |  |  |  |  |  |  |  |
| **DEP** | **CON** | **DEP** | **(D) NRO** | **(D) GRO** | **(D) TERM** | **(D) CRED** | **SD** | **XS** | **R2Adj**  **DEP+FIN** | **R2Adj DEP+FIN+NL** | **R2Adj DEP+FIN+NL+GL/**  **[PL-B]** |
| GDPt+1 | **0.004**  **(0.00)** | **0.364**  **(0.03)** | 0.017  (0.78) | **0.161**  **(0.00)** | -0.071  (0.25) | **-0.238**  **(0.00)** | -0.092  (0.49) | -0.069  (0.39) | 0.209 | 0.197 | 0.212/  [0.28] |
| UNt+1 | 0.002  (0.68) | 0.135  (0.24)  0.027  (0.79)  0.160  (0.29) | 0.005  (0.94) | 0.004  (0.93) | **0.309**  **(0.00)** | **0.279**  **(0.00)** | **0.327**  **(0.01)** | **-0.187**  **(0.01)** | 0.532 | 0.488 | 0.480/  [0.42] |
| CONSt+1 | 0.002  (0.24) | **0.367**  **(0.00)**  **0.399**  **(0.00**) | -0.021  (0.65) | **-0.104**  **(0.07)** | -0.023  (0.68) | -0.060  (0.24) | 0.030  (0.72) | 0.013  (0.86) | 0.331 | 0.323 | 0.392/  [0.20] |
| INVt+1 | 0.005  (0.20) | 0.115  (0.38) | **0.074**  **(0.07)** | **0.152**  **(0.09)** | -0.080  (0.28) | **-0.088**  **(0.06)** | -0.080  (0.33) | 0.003  (0.96) | -0.045 | -0.054 | -0.059/  [0.98] |

The table shows the results from predictive regression where we regress next quarter growth in different macro variables (GDPt+1, UNt+1, CONSt+1 and INVt+1,) on 2 proxies for market illiquidity. Market illiquidity (LIQ) is captured by the Amihud ratio (AM) and Roll’s effective spread (RO). The prefix ‘N’ means national and the prefix ‘G’ means global. The model estimated is Yt+1= α +β LIQt+ γ’**X**t**+** ut+1 where Yt+1 is real GDP growth GDPt+1, investment growth INVt+1,  real consumption growth CONSt+1 and growth in the unemployment rate UNt+1. We also include one lag of the dependent variable which we call DEP and TERM, CRED, SD, XS and G (LIQ) and we include more lags if there is autocorrelation in the residuals. The coefficients reported are standardised. The number in parentheses is the Newey-West corrected (with four lags) probability value. R2Adj DEP+FIN presents R2Adj of the dependent variable (DEP) and financial variables (FIN). R2Adj DEP+FIN+NL presents R2Adj of the dependent variable (DEP)+ financial variables (FIN)+ national liquidity (NL). R2Adj DEP+FIN+NL+GL presents R2Adj of the dependent variable (DEP)+ financial variables (FIN)+ national liquidity (NL)+ global liquidity (GL). The number in brackets in the last column below the adjusted R2 value is the Ljung-Box test probability values testing for autocorrelation in the residuals. The null hypothesis is that there is no autocorrelation and a probability value above 0.05 indicates that there is no autocorrelation. Where there is correlation the regression is repeated and the final results are presented where the residuals are free from autocorrelation. Both the old and new Ljung-box Probability value are presented and the additional lagged variable is presented below the original one for as many lags as were necessary. Sample range Q4 1995-Q4 2013, 73 quarterly observations.

Appendix Table 4

US Granger Causality Tests (national and global, 1995-2013)

**PANEL A: national liquidity**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | (D) NAM | | (D) NRO | |
|  |  | 2 lags | 4 lags | 2 lags | 4 lags |
| Line 1 | **H0: N LIQ does not →dGDP** | 0.95  (0.38) | 0.49  (0.73) | 0.01  (0.98) | 0.19  (0.93) |
| Line 2 | **H0: dGDP does not → N LIQ** | 0.90  (0.41) | 0.50  (0.73) | 0.14  (0.86) | **4.02**  **(0.00)** |
| Line 3 | **H0: N LIQ does not → dINV** | 0.72  (0.48) | 0.64  (0.63) | 1.05  (0.35) | 0.50  (0.73) |
| Line 4 | **H0: dINV does not → N LIQ** | **10.4**  **(0.00)** | **7.56**  **(0.00)** | 0.75  (0.47) | 0.79  (0.53) |
| Line 5 | **H0: N LIQ does not → dCONS** | 1.99  (0.14) | 0.78  (0.53) | 0.02  (0.97) | 0.34  (0.84) |
| Line 6 | **H0: dCONS does not → N LIQ** | 0.96  (0.38) | 0.63  (0.64) | 1.49  (0.23) | 1.82  (0.13) |
| Line 7 | **H0: N LIQ does not → dUN** | 0.17  (0.83) | 0.22  (0.97) | **2.96**  **(0.05)** | 1.36  (0.25) |
| Line 8 | **H0: dUN does not → N LIQ** | 0.63  (0.53) | 0.64  (0.63) | 1.44  (0.24) | 0.76  (0.54) |

**PANEL B: global liquidity**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | (D) GAM | | (D) GRO | |
|  |  | 2 lags | 4 lags | 2 lags | 4 lags |
| Line 1 | **H0: G LIQ does not →dGDP** | 0.11  (0.89) | 0.14  (0.96) | 0.74  (0.47) | 0.48  (0.74) |
| Line 2 | **H0: dGDP does not → G LIQ** | 2.22  (0.11) | **5.06**  **(0.00)** | 0.73  (0.48) | 0.43  (0.78) |
| Line 3 | **H0: G LIQ does not → dINV** | **6.56**  **(0.00)** | **4.22**  **(0.00)** | 2.10  (0.13) | 1.09  (0.36) |
| Line 4 | **H0: dINV does not → G LIQ** | 2.23  (0.11) | **2.86**  **(0.03)** | 1.50  (0.22) | 1.93  (0.11) |
| Line 5 | **H0: G LIQ does not → dCONS** | 1.42  (0.24) | 0.81  (0.51) | 0.57  (0.56) | 0.50  (0.73) |
| Line 6 | **H0: dCONS does not → G LIQ** | 1.40  (0.25) | **3.49**  **(0.01)** | 1.45  (0.23) | 0.83  (0.51) |
| Line 7 | **H0: G LIQ does not → dUN** | **2.83**  **(0.06)** | 1.54  (0.20) | 0.41  (0.66) | 0.33  (0.85) |
| Line 8 | **H0: dUN does not → G LIQ** | **2.92**  **(0.06)** | **9.38**  **(0.01)** | 1.02  (0.36) | 0.64  (0.63) |

The table shows Granger causality tests between quarterly macroeconomic variables (GDP, INV, CONSand UN) and all liquidity variables. The prefix ‘N’ means national and the prefix ‘G’ means global. We first test the null hypothesis that our liquidity variable does not Granger cause the macroeconomic variable in question and then we test the null hypothesis that our macroeconomic variable does not Granger cause the liquidity variable in question. We do this for all macroeconomic and liquidity variables. We report the χ2 and p-value (in parenthesis) for each test. We choose the optimal lag length for each test based on sequential modified LR test statistic (each test at 5% level), Final prediction error, Akaike information criterion, Schwarz information criterion and Hannan-Quinn information criterion. Sample range Q4 1995-Q4 2013, 73 quarterly observations.

Appendix Table 5

Predicting Macro Variables with US Market Liquidity – Size Portfolios (1995-2013)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DEP | CON | DEP | **(D)** TERM | **(D)** CRED | SD | XS | **(D)** NAMS | **(D)** NAML | **(D)** GAMS | **(D)** GAML | R2Adj FIN | R2Adj FIN+SN | R2Adj FIN+LN | R2Adj FIN+SG | R2Adj FIN+LG | R2Adj FIN+SN+SG | R2Adj FIN+LN+LG | R2Adj ALL/  [PL-B] |
| GDPt+1 | **0.004**  **(0.00)** | **0.354**  **(0.00)** | -0.073  (0.35) | **-0.240**  **(0.00)** | -0.097  (0.43) | -0.066  (0.45) | -0.155  (0.36) | -0.074  (0.40) | -0.113  (0.29) | **-0.058**  **(0.03)** | 0.209 | 0.222 | 0.202 | 0.211 | 0.200 | 0.224 | 0.193 | 0.209/  [0.22] |
| INVt+1 | 0.006  (0.13) | -0.031  (0.74) | -0.116  (0.19) | -0.093  (0.02) | -0.104  (0.27) | 0.007  (0.93) | 0.005  (0.91) | -0.014  (0.58) | **0.425**  **(0.00)** | **0.062**  **(0.00)** | -0.045 | -0.061 | -0.061 | 0.133 | -0.057 | 0.119 | -0.073 | 0.095/  [0.32] |
| CONSt+1 | 0.001  (0.24) | **0.379**  **(0.00)**  **0.378**  **(0.00)** | -0.021  (0.74) | -0.056  (0.29) | 0.026  (0.76) | 0.013  (0.86) | -0.000  (0.99) | 0.032  (0.29) | 0.068  (0.43) | -0.003  (0.93) | 0.331 | 0.324 | 0.322 | 0.321 | 0.321 | 0.314 | 0.311 | 0.366/  [0.28] |
| UNt+1 | 0.001  (0.65) | 0.152  (0.18)  0.034  (0.73)  0.160  (0.29) | 0.302  (0.00) | 0.276  (0.00) | 0.312  (0.02) | -0.182  (0.01) | 0.047  (0.69) | 0.050  (0.53) | -0.064  (0.27) | -0.025  (0.22) | 0.496 | 0.490 | 0.490 | 0.490 | 0.489 | 0.485 | 0.483 | 0.469/  [0.45] |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DEP | CON | DEP | **(D)** TERM | **(D)** CRED | SD | XS | **(D)** NROS | **(D)** NROL | **(D)** GROS | GROL | R2Adj FIN | R2Adj FIN | R2Adj FIN+SN | R2Adj FIN+LN | R2Adj FIN+SG | R2Adj FIN+LG | R2Adj FIN+SN+SG | R2Adj ALL/  [PL-B] |
| GDPt+1 | **0.004**  **(0.00)** | **0.372**  **(0.02)** | -0.069  (0.31) | **-0.236**  **(0.00)** | -0.087  (0.52) | -0.072  (0.40) | -0.048  (0.33) | -0.025  (0.80) | **0.119**  **(0.03)** | 0.086  (0.22) | 0.209 | 0.199 | 0.197 | 0.211 | 0.204 | 0.201 | 0.192 | 0.184/  [0.15] |
| INVt+1 | 0.005  (0.21) | 0.126  (0.21) | -0.077  (0.23) | **-0.087**  **(0.06)** | -0.077  (0.34) | 0.002  (0.98) | **0.074**  **(0.00)** | -0.035  (0.59) | **0.167**  **(0.03)** | 0.019  (0.43) | -0.045 | -0.054 | -0.060 | -0.046 | -0.061 | -0.056 | -0.077 | -0.089/  [0.96] |
| CONSt+1 | 0.002  (0.17) | **0.369**  **(0.00)**  **0.383**  **(0.00)** | -0.023  (0.68) | -0.060  (0.25) | 0.023  (0.77) | 0.016  (0.84) | -0.006  (0.81) | -0.015  (0.89) | **-0.089**  **(0.07)** | -0.027  (0.68) | 0.331 | 0.327 | 0.325 | 0.324 | 0.321 | 0.320 | 0.315 | 0.795/  [0.20] |
| UNt+1 | 0.002  (0.59) | 0.140  (0.14) | **0.356**  **(0.00)** | **0.237**  **(0.00)** | **0.426**  **(0.00)** | **-0.185**  **(0.00)** | -0.018  (0.74) | **0.130**  **(0.00)** | -0.045  (0.55) | -0.018  (0.82) | 0.496 | 0.488 | 0.505 | 0.490 | 0.488 | 0.482 | 0.497 | 0.483/  [0.11] |

The Table shows the multivariate OLS estimates from regressing next quarter GDP, CONS, INV and UN growth on current market illiquidity of small and large firms national and global as well as TERM, CRED, SD, and XS. We examine 2 different proxies for market illiquidity sampled for small and large firms. The estimated models are Yt+1=α +βt NAMSt +ξt NAMLt + λt GAMSt + ψt GAML t+ γ’Xt+ut+1 AND Yt+1=α +βt NROSt +ξt NROLt + λt GROSt + ψt GROL t+ γ’Xt+ut+1 where Yt+1 is GDP, CONS, INV and UN growth, NAMSt is the respective illiquidity proxy sampled for the 20% smallest firms captured by AM and NAMLt is the illiquidity of the 20% largest firms, NROSt is the respective illiquidity proxy sampled for the 20% smallest firms captured by RO and NROLt is the illiquidity of the 20% largest firms, Xt contains the additional control variables (TERM, CRED, SD and XS) and γ’ is the vector of the coefficients estimates for the control variables. As always ‘N’ in front of RO or AM stands for national and ‘G’ in front of RO or AM stands for global. ‘R2 Adj. FIN’ reports R2 Adj with financial variables only (FIN), ‘R2Adj. FIN+SN’ reports R2 Adj. of FIN and small national liquidity variables, ‘R2Adj. FIN+LN’ reports R2 Adj. of FIN and large national liquidity variables, ‘R2Adj. FIN+SG’ reports R2 Adj. of FIN and small global liquidity variables, ‘R2Adj. FIN+LG’ reports R2 Adj. of FIN and large global liquidity variables, ‘R2Adj. FIN+SN+SG’ reports R2 Adj. of FIN small national firm liquidity and small global firm liquidity, ‘R2Adj. FIN+LN+LG’ reports R2 Adj. of FIN and large national and large global firm liquidity and ‘all’ reports R2 Adj. of all variables. ). The coefficients reported are standardised.The number in parentheses is the Newey-West corrected (with four lags) probability value. The number in brackets in the last column below the adjusted R2 value is the Ljung-Box test probability values testing for autocorrelation in the residuals. The null hypothesis is that there is no autocorrelation and a probability value above 0.05 indicates that there is no autocorrelation. Where there is correlation the regression is repeated and the final results are presented where the residuals are free from autocorrelation. Both the old and new Ljung-box Probability value are presented and the additional lagged variable is presented below the original one for as many lags as were necessary. Sample range Q4 1995-Q4 2013, 73 quarterly observations.

Appendix Table 6

US Granger Causality Tests – Size Portfolios (1995-2013)

**PANEL A: national large**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | (D) AML | | (D) ROL | |
|  |  | 2 lags | 4 lags | 2 lags | 4 lags |
| Line 1 | **H0: N LIQ does not →dGDP** | 1.58  (0.21) | 1.20  (0.31) | 0.08  (0.92) | 0.95  (0.44) |
| Line 2 | **H0: dGDP does not → N LIQ** | 0.09  (0.90) | 1.34  (0.26) | 0.83  (0.44) | 0.58  (0.67) |
| Line 3 | **H0: N LIQ does not → dINV** | 0.47  (0.62) | 0.50  (0.73) | 0.04  (0.95) | 0.26  (0.90) |
| Line 4 | **H0: dINV does not → N LIQ** | 0.13  (0.87) | 0.20  (0.93) | 0.10  (0.89) | 0.31  (0.86) |
| Line 5 | **H0: N LIQ does not → dCONS** | **4.23**  **(0.01)** | **2.77**  **(0.03)** | 0.32  (0.72) | 0.14  (0.96) |
| Line 6 | **H0: dCONS does not → N LIQ** | 1.22  (0.29) | **2.76**  **(0.03)** | 1.48  (0.23) | 0.73  (0.57) |
| Line 7 | **H0: N LIQ does not → dUN** | 0.90  (0.41) | **3.62**  **(0.01)** | 0.92  (0.40) | **2.48**  **(0.05)** |
| Line 8 | **H0: dUN does not → N LIQ** | 1.13  (0.32) | 0.68  (0.60) | 0.21  (0.80) | 0.56  (0.69) |

**PANEL B: national small**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | (D) AMS | | (D) ROS | |
|  |  | 2 lags | 4 lags | 2 lags | 4 lags |
| Line 1 | **H0: N LIQ does not →dGDP** | 0.92  (0.40) | 0.45  (0.76) | 0.29  (0.74) | 0.62  (0.64) |
| Line 2 | **H0: dGDP does not → N LIQ** | 0.45  (0.63) | 0.61  (0.65) | 0.23  (0.78) | **5.79**  **(0.05)** |
| Line 3 | **H0: N LIQ does not → dINV** | 0.05  (0.94) | 0.11  (0.97) | 0.78  (0.45) | 0.48  (0.74) |
| Line 4 | **H0: dINV does not → N LIQ** | 0.09  (0.90) | 0.16  (0.95) | 0.89  (0.41) | 0.91  (0.46) |
| Line 5 | **H0: N LIQ does not → dCONS** | 0.13  (0.87) | 0.07  (0.99) | 0.00  (0.90) | 0.06  (0.99) |
| Line 6 | **H0: dCONS does not → N LIQ** | 0.62  (0.53) | 0.75  (0.56) | 2.19  (0.11) | **3.51**  **(0.01)** |
| Line 7 | **H0: N LIQ does not → dUN** | 0.37  (0.69) | 0.26  (0.90) | 2.20  (0.11) | **2.12**  **(0.08)** |
| Line 8 | **H0: dUN does not → N LIQ** | 1.48  (0.23) | **2.48**  **(0.05)** | 0.88  (0.41) | 1.61  (0.18) |

**PANEL C: global small**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | (D) GAMS | | (D) GROS | |
|  |  | 2 lags | 4 lags | 2 lags | 4 lags |
| Line 1 | **H0: G LIQ does not →dGDP** | 0.43  (0.65) | 0.31  (0.86) | 0.65  (0.52) | 0.61  (0.65) |
| Line 2 | **H0: dGDP does not → G LIQ** | 0.30  (0.73) | 2.02  (0.10) | 0.80  (0.44) | 0.48  (0.75) |
| Line 3 | **H0: G LIQ does not → dINV** | **13.3**  **(0.00)** | **10.4**  **(0.00)** | 1.25  (0.29) | 1.01  (0.40) |
| Line 4 | **H0: dINV does not → G LIQ** | 0.32  (0.72) | **2.85**  **(0.03)** | 0.06  (0.94) | 0.20  (0.93) |
| Line 5 | **H0: G LIQ does not → dCONS** | 0.92  (0.40) | 0.43  (0.78) | 0.47  (0.62) | 0.51  (0.72) |
| Line 6 | **H0: dCONS does not → G LIQ** | 1.17  (0.31) | **2.39**  **(0.06)** | 0.73  (0.48) | 0.44  (0.77) |
| Line 7 | **H0: G LIQ does not → dUN** | 0.86  (0.42) | 0.51  (0.72) | 0.66  (0.51) | 0.34  (0.84) |
| Line 8 | **H0: dUN does not → G LIQ** | 0.27  (0.75) | 1.03  (0.39) | 1.33  (0.27) | 0.90  (0.46) |

**PANEL D: global large**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | (D) GAML | | (D) GROL | |
|  |  | 2 lags | 4 lags | 2 lags | 4 lags |
| Line 1 | **H0: G LIQ does not →dGDP** | 0.51  (0.59) | 0.27  (0.89) | 0.24  (0.78) | 1.04  (0.38) |
| Line 2 | **H0: dGDP does not → G LIQ** | 1.74  (0.18) | 0.87  (0.48) | 0.15  (0.85) | 0.58  (0.67) |
| Line 3 | **H0: G LIQ does not → dINV** | 1.16  (0.31) | 0.81  (0.51) | 0.97  (0.38) | 0.62  (0.64) |
| Line 4 | **H0: dINV does not → G LIQ** | **192**  **(0.00)** | **95.4**  **(0.00)** | 0.72  (0.49) | **6.43**  **(0.00)** |
| Line 5 | **H0: G LIQ does not → dCONS** | 0.00  (0.99) | 0.31  (0.86) | 0.14  (0.86) | 0.07  (0.99) |
| Line 6 | **H0: dCONS does not → G LIQ** | 0.44  (0.64) | 0.28  (0.88) | 0.55  (0.57) | 1.28  (0.28) |
| Line 7 | **H0: G LIQ does not → dUN** | 0.43  (0.64) | 0.60  (0.65) | 0.57  (0.56) | 0.24  (0.90) |
| Line 8 | **H0: dUN does not → G LIQ** | 0.31  (0.72) | 0.54  (0.70) | 0.30  (0.73) | 0.96  (0.43) |

Table 6 shows the results of Granger causality tests between macroeconomic variables and the illiquidity of small and large firms (national and global) for our illiquidity proxies. The prefix ‘N’ in front of each liquidity variable (AM or RO) stands for national and the prefix ‘G’ stands for global. The suffix ‘S’ stands for small while the suffix ‘L’ stands for large. The first column denotes the liquidity variable while the first row denotes the direction of the causality. The null hypotheses are: I) the macro variable does not Granger cause the LIQ variable and II) the LIQ variable does not Granger causes the macro variable. Within cells you can see the χ2 value and the relevant p-value. We choose the optimal lag length for each test based on sequential modified LR test statistic (each test at 5% level), Final prediction error, Akaike information criterion, Schwarz information criterion and Hannan-Quinn information criterion. Sample range Q4 1995-Q4 2013, 73 quarterly observations.

1. Both capture illiquidity and are clearly explained in the next section. Note for now that we also split each of the two measures to ‘national’ relating only to the liquidity of the nation’s firms and ‘global’ where liquidity is made up of international firms only, also explained analytically in the relevant section. The global factor is value weighted. [↑](#footnote-ref-1)
2. In **Canada** NRO and NAM increase before recessions consistent with NSO and with the existence of a relationship of market liquidity and the business cycle. In **France** NAM behaves as in NSO but NRO however offers less clear evidence. In **Germany**, NAM decreases (increases) before a recession and increases (decreases) during the recession of Q4 2002-Q2 2003 (Q2 08-Q1 09). NRO also behave inconsistently by increasing and decreasing respectively before the two aforementioned recessions. In the most recent recession Q4 12-Q1 13 NRO declines while NAM remains stable. In **Italy**, sometimes NRO behaves the same as NSO and sometimes it is inconsistent, while NAM is not behaving consistently. In the most recent recession Q3 11-Q4 13 both measures increase and decrease quite erratically. In **Japan** both measures exhibit consistent behaviour and decrease (increase) just before (during) recessions. Up to Q2 12, market liquidity variables have a contemporaneous relationship with the real economy rather than a leading one as NSO suggest. In the most recent recession though Q2 12-Q4 12, both variables increase. In the **UK**, NRO behaviour is inconsistent with NSO, whilst NAM increases before the recession, to reduce on the onset, and then repeats the same behavior sequence. [↑](#footnote-ref-2)
3. The links here are well known and not discussed in the interest of brevity. For example the liquidity and returns relationship as well as the role of volatility and the link to the uncertainty of future asset prices (pertinent to recessions) is made in Watanabe and Watanabe (2008). Petkova (2006) who employed most of these variables in another context explains the rationale for doing so. [↑](#footnote-ref-3)
4. The fact that the results for Canada in our paper are consistent with the US NSO results, render any criticisms that our findings for other countries differ from theirs based only on sample differences rather weak. In addition, when we talk about direction, we are talking about which variable predicts the other (i.e. whether liquidity predicts the macroeconomy or the opposite). [↑](#footnote-ref-4)
5. An additional reason for using this measure is that Goyenko et al. (2009) compare different measures and find that the Amihud ratio is very good in capturing price impact. [↑](#footnote-ref-5)
6. Penny shares are the ones below one unit of currency of value in local currency. [↑](#footnote-ref-6)
7. As is the case for other countries, macro data go further back in time than liquidity data. This imposes an immediate constraint to our sample period length, and we use the longest commonly available period for comparable results. [↑](#footnote-ref-7)
8. We thank various colleagues for suggesting this addition as well as for proposing additional measures/variables such as momentum, SMB, HML, RF etc. that we ignored in earlier versions of the paper. [↑](#footnote-ref-8)
9. Results are not tabulated, for the economy of the paper. [↑](#footnote-ref-9)
10. We use “RO” and “AM” because we are referring to both national and global measures of liquidity. In all other cases where we mention the word “national” or “global” before “RO” or “AM” or use “N” or “G” as the first letter of either ratio we are referring to one of the two versions of the “RO” and “AM” measures. [↑](#footnote-ref-10)
11. We wish to thank the referee for this helpful suggestion. [↑](#footnote-ref-11)
12. We use exactly the same variables as in NSO. Some of the signs appear to be contrary to expectations. We run several controls and when we excluded the most recent financial crises the signs appear to be correct. Therefore we attribute these signs to the most recent turmoil and its side effects. [↑](#footnote-ref-12)
13. We do this for all liquidity variables that survived the inclusion of financial variables in the previous section and all macroeconomic variables, therefore we do not need to use the modified Diebold and Mariano (1995) statistic to choose between competing liquidity variables as in NSO. This of course produces greater output and tables. [↑](#footnote-ref-13)
14. At this point it is worth reminding the reader that causality between macroeconomic indicators and liquidity is very unstable in the US. [↑](#footnote-ref-14)