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Asset liquidity and stock returns

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ABSTRACT

We document the significant predictive power of firms' asset liquidity in the cross section of subsequent stock returns. The annual return spread between portfolios featuring the highest and lowest levels of asset liquidity is significantly positive. Our proposed measure of asset liquidity outperforms those measures developed by Gopalan et al. (2012) in predicting returns. The asset liquidity anomaly also provides significantly positive alphas when controlling for the asset pricing factors in the Fama and French (1993) three-factor model and the Carhart (1997) four-factor model. Asset liquidity exhibits strong return forecasting power even after controlling for acknowledged cross-sectional determinants of return. The positive relation between asset liquidity and future returns tends to be stronger for firms with greater asset productivity, higher quality cash flow and lower capital investment.

1. Introduction

This paper examines the effects of asset liquidity on the future stock returns of corporations. Asset illiquidity might increase the cost of capital that has been previously documented by Ortiz-Molina and Phillips (2014). Asset liquidity might also affect a firm's stock liquidity (Charoenwong, Chong, & Yang, 2014; Gopalan, Kadan, & Pevzner, 2012).

We argue that asset liquidity enhances firm value and is thus an important driver for higher equity return. Our study is motivated by prior studies from Morellec (2001) and Sibilkov (2009). Morellec (2001) examines how the asset liquidity affects the corporate structure. The study documents that asset liquidity increases optimal leverage and decreases the corporate spread when liquidity is measured by the asset liquidation value. Asset liquidity enhances the flexibility of companies to sell asset for the best interest of firms and hence increases the firm value. Sibilkov (2009) provides further evidence that leverage is positively associated with asset liquidity. Therefore, we conjecture that the asset liquidity should exhibit information content of future equity return. We test the effect of asset liquidity on future firm value and provide further support of the positive relationship between asset liquidity and future firm value.

However, prior research on the effects of the information content of asset liquidity on stock returns is limited. There are recent studies exploring the relation between excess cash holdings and future stock return. Simutin (2010) documents a positive association between excess cash and future equity return. The paper shows that firms with more excess cash holdings also have higher market betas. Hence, excess cash holdings might act as a proxy for more risky growth options and lead to higher expected return. Palazzo (2012) also develops empirical tests on the correlation between cash flows and aggregate risk. The study documents a significant excess return of high cash-to-asset portfolio over low cash-to-assets portfolio. Palazzo (2012) argues that firms with higher correlation between cash flows and the aggregate shock tends to use more costly external financing and have higher optimal savings to finance their growth option exercises. It is this precautionary saving that implies a positive association between cash holdings and expected equity returns. Hence, both studies consider the return predictability of excess cash from the aspect of aggregate risk and growth options.

We are motivated to examine the return predictability from the perspective of asset liquidity. Moreover, both Simutin (2010) and Palazzo (2012) focus only a portion of total asset. Our paper differs from Simutin (2010) and Palazzo (2012) in that we extend the study of liquidity impact from cash holdings to the full spectrum of asset. Assuming that the capital markets can provide efficient pricing of an asset, we posit that the price of a firm's asset liquidity risk may also be conveyed to and incorporated in the firm's stock price in the market.

2. Literature review

Previous studies of asset liquidity focus primarily on its effect on capital structure. Whereas Williamson (1988) and Shleifer and Vishny (1992) identify a positive relation between asset liquidity and optimal leverage, Morellec (2001) demonstrates that the relation is negative or curvilinear. Sibilkov (2009) finds that both leverage and secured

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debt are positively associated with asset liquidity but that the relation between asset liquidity and unsecured debt is curvilinear. Recently, the discussion of asset liquidity has been extended to corporate investment and hedge fund trading. Flor and Hirth (2013) analyze the relation between asset quality and corporate investment. They state that highly liquid firms have positive investment sensitivities to liquid funds. Hong (2014) finds that the asset liquidity is also related to the dynamics of hedge fund share restriction. The study states that funds with high asset liquidity and low liquidity risk tend to decrease share restriction.

Benson, Clarkson, Smith, and Tutticci (2015), Benson, Faff, and Smith (2014) review the renowned accounting and financial research journals in the Asia Pacific Region over the past fifty years. They examine the most cited papers and research areas of the Asia Pacific journals. It is shown that there are a few studies related to liquidity. Etter, Lippincott, and Reck (2006) compare financial accounting ratio of companies in Latin American countries with those of US companies and indicate that the liquidity ratios of Latin American companies are lower than those of the US companies. Chen, Chen, and Su (2001) examine whether the variations of value-relevance of accounting information in China changes can be explained by the liquidity of stock. Charitou, Vafeas, and Zachariades (2005) also investigate if split-induced return can be explained by liquidity. Aitken and Comerton-Forde (2005) find that the reduction in tick size of stocks in Australian Stock exchange increases stock liquidity but does not lead to any change in order exposure of stocks. Similarly, Alampieski and Lepone (2009) examine the impact of reducing tick size on liquidity in Sydney Futures Exchange. Their study shows that a tick size reduction significantly improves liquidity in future market. Aitken, Comerton-Forde, and Frino (2005) also examine how the closing call auction is related to liquidity. The results indicate that the introduction of closing call auction leads to a reduction of trading volume at the close of trade but has no significant impact on liquidity. Chai, Faff, and Gharghori (2013) examine the liquidity effect in asset pricing and document that liquidity factor exhibit explanatory power to variation in stock returns. However, all these studies mainly explore the market liquidity. Our study differs from theirs in that we focus on the information content of asset liquidity.

The theoretical base for the return predictability of asset liquidity stems from findings of prior related studies. Morellec (2001) states that asset liquidity increases the strategy space available to the borrower by allowing the sales of assets to meet with debt payments. Hence, whenever the firm asset is liquid, asset sales could increase firm value by assigning assets to better uses. In addition, the high liquidity of asset also makes asset sales feasible to finance the continued operation of business without requiring capital injections by shareholders, thereby improving equity value. And the increase of equity value leads to higher expected stock return.

To test our conjecture, we conduct cross-sectional regression of equity value against firm's corresponding asset liquidity. The result shows that there is a significant positive relation between equity value and asset liquidity. Moreover, we also conduct regression between future stock return against the firm's equity value. The finding gives empirical evidence that the expected stock return of a firm is significantly and positively associated with its equity value. Hence, the return predictability of asset liquidity is attributed to the increase of equity value.

Moreover, Sibilkov (2009) examines the impact of asset liquidity on capital structure and find that the level of leverage is positively related to the asset liquidity. The results are consistent with those from Williamson (1988) and Shleifer and Vishny (1992) that more liquid assets enhance the amount of capital companies that can be borrowed and the optimal leverage. Shleifer and Vishny (1992) state that higher asset liquidity of firms helps in reducing the expected cost of financial distress, and hence allowing companies to take on more debt. We perform regression to examine the relation between debt value and expected return. It is shown that debt level is positively related to the future stock return. Hence, the results provide evidence that firms with high asset liquidity increase their equity value and leverage which in turn generate higher expected return.

Moreover, we argue that asset productivity improves asset liquidity. Morellec (2001) indicates that the asset productivity has positive impact on firm value. As the asset productivity increases, it is beneficial for the firm to hold on its assets. Hence, the probability of default decreases. This improves the capability of raising more capital through debt and equity financing, and therefore enhances the asset liquidity. Firms with higher asset productivity also enable management to utilize the firm's assets more efficiently in terms of generating revenue and reducing cost. Improved asset turnover and profitability would thus lead to better performance and higher future stock returns.

Using a sample of UK stocks over the 1995–2014 periods, our study documents a significantly positive relation between a firm's asset liquidity and its future returns. Using our proposed measure of asset liquidity, a trading strategy that buys the highest and sells the lowest asset liquidity ranked portfolios generates an average annual return of 23.1%. This asset liquidity trading strategy is consistently profitable over the sample period and yields positive annual returns in 95% of the years in our sample.

In examining return predictability using a cross-sectional regression of annual returns with asset liquidity as an independent variable and controlling for the major determinants of a cross section of returns, we find that the relation between asset liquidity and future returns remains significantly positive even after controlling for company size, market-to-book ratio, lagged returns and volatility. The alphas of the Carhart (1997) four-factor model with a momentum factor are significantly positive for the long-short asset liquidity ranked quintile portfolio.

To examine the possible drivers of asset liquidity, we conduct a composition study of firm characteristics in the highest and lowest asset liquidity quintiles. Our findings indicate that the types of firm in the highest asset liquidity portfolio (quintile) feature high operating cash flows, high asset productivity, high leverage and high operating profitability. Firms in this highest asset liquidity quintile also feature lower levels of financing cash, lower market-to-book ratios and lower fixed-asset growth.

On one hand, more cash implies higher asset liquidity. However, the return predictability of asset liquidity is affected by the nature of the cash that the company is holding. Our study sheds light on how the return predictability of asset liquidity depends on the quality of cash flow. We posit that a higher proportion of operating cash flow in cash holdings enhances the company's operating flexibility and leads to higher future stock returns. However, a higher proportion of cash generated from financing activities increases the uncertainty of company debt and/or the ability to pay dividends, which hampers the performance of the stock price.

Further tests show that asset liquidity continues to provide strong return forecasting power after additionally controlling for asset productivity, cash flow quality, leverage and fixed asset investment. The positive relation between asset liquidity and subsequent returns is shown to be stronger for firms that have greater asset productivity, higher quality cash flow (i.e., a higher (lower) proportion of operating (financing) cash flow) and lower capital investment.

We end with a robustness check on the predictive power of asset liquidity on stock returns through two-way sorts with cross-sectional determinants. Our results again indicate that the relation of asset liquidity on future returns remains significantly positive after controlling for size, market-to-book ratio, volatility and the momentum effect.

3. Data and methodology

We include all stocks listed and traded on the London Stock Exchange in our sample. Following Gopalan et al. (2012), we obtain monthly stock prices, annual firm accounting data (including total assets, current assets, cash flows and fixed assets) from Datastream to

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construct alternative measures of asset liquidity. We also obtain other financial statement data (including shareholder equity, total debt, capital expenditures, plant value, property value, equipment value and operating income) to calculate leverage, fixed asset growth and operating profitability. We complement these data with monthly stock prices and the market value of equity from Datastream. Our final sample includes 124,750 monthly observations and covers the period from July 1995 to June 2014. We exclude closed-end funds, trusts and REITs from our sample.

Following Gopalan et al. (2012), we develop four balance sheet–level asset liquidity (AL) measures. The first four asset liquidity measures (AL1, AL2, AL3, AL4) are expressed as follows:

$$AL1_{i,t} = \frac{CSH\&EQV_{i,t}}{TA_{i,t-1}} + 0\left[\frac{OA_{i,t}}{TA_{i,t-1}}\right] \quad (1)$$

$$AL2_{i,t} = \frac{CSH\&EQV_{i,t}}{TA_{i,t-1}} + 0.50\left[\frac{NCCA_{i,t}}{TA_{i,t-1}}\right] + 0\left[\frac{OA_{i,t}}{TA_{i,t-1}}\right] \quad (2)$$

$$AL3_{i,t} = \frac{CSH\&EQV_{i,t}}{TA_{i,t-1}} + 0.75\left[\frac{NCCA_{i,t}}{TA_{i,t-1}}\right] + 0.5\left[\frac{TFA_{i,t}}{TA_{i,t-1}}\right] + 0\left[\frac{OA_{i,t}}{TA_{i,t-1}}\right] \quad (3)$$

$$AL4_{i,t} = \frac{CSH\&EQV_{i,t}}{MA_{i,t-1}} + 0.75\left[\frac{NCCA_{i,t}}{MA_{i,t-1}}\right] + 0.5\left[\frac{TFA_{i,t}}{MA_{i,t-1}}\right] + 0\left[\frac{OA_{i,t}}{MA_{i,t-1}}\right] \quad (4)$$

where:

AL is asset liquidity for four measures of asset liquidity (AL1, AL2, AL3, or AL4),
CSH&EQV is cash and cash-equivalents,
TA is total assets,
CSH&EQV is perfectly liquid and is assigned a score of 1,
NCCA represents other noncash current asset accounts,
Noncurrent assets are further divided into:
TFA representing more liquid tangible fixed asset, and
OA representing other assets, which includes goodwill and other intangibles, and
MA is defined as the sum of assets and the market value of equity less the book value of equity.

We also derive a new asset liquidity measure (AL5). Whereas the noncash current asset (NCCA) is semiliquid, it might be further broken down by the level of liquidity. We introduce AL5 by removing the more liquid receivables (RCV) from the noncash current asset and reassigning the scores for RCV and NCCA. AL5 is derived using the following equation:

$$AL5_{i,t} = \frac{CSH\&EQV_{i,t}}{TA_{i,t-1}} + 0.85\left[\frac{RCV_{i,t}}{TA_{i,t-1}}\right] + 0.65\left[\frac{NCCA_{i,t}}{TA_{i,t-1}}\right] + 0.5\left[\frac{TFA_{i,t}}{TA_{i,t-1}}\right] + 0\left[\frac{OA_{i,t}}{TA_{i,t-1}}\right] \quad (5)$$

where: RCV represents the value of firm i's receivables.

We also utilize control variables to examine the cross-sectional return predictability of AL. These variables include SIZE, which is defined as the logarithm of the market value of firm equity, the market-to-book value (MB) and the stock return volatility (VOLA) of the previous year. We also control for the momentum effect (MOM), which is defined as the cumulative return from month t-12 to t-2, as suggested by Jegadeesh and Titman (1993), in addition to the value of equity (EQTY), which is the logarithm value of shareholder equity. We also use proxy variables to describe firm and market characteristics. We use return on equity (ROE) to describe the return on shareholder investment and operating return on assets (OROA) to proxy for the operating profitability of the firm. We use CAPEX, which is capital expenditures scaled by lagged total assets, to proxy for growth opportunities. SHDINV is the annual change of shareholder equity scaled by lagged total assets.

We also examine how the quality of the cash flow, asset productivity, fixed asset growth and leverage affect the relation between AL and future returns. We examine the quality of various components of cash flows in its capacity in firm valuation and coping with financial distress. There are prior studies in examining the value relevance of cash flows because of its usefulness in firm valuation (Banker, Huang, Natara, & Ramachardran, 2009; Kumar & Gopal, 2008). Cotter (1996) compares the value relevance of components of accrual earnings and those of total cash flows. The study indicates that cash flow from operations (CFO) can recognize value relevant events in a timely manner while cash flows from investing (CFI) and financing activities (CFF) are less value relevant. This suggests the variations of quality of cash flow in firm valuation. Moreover, Sayari, Mugan, and Simga (2013) investigate the effect of cash flow components on bankruptcy and financial health of companies. The results indicate that CFO is negatively related with the financial score of companies. On the other hand, CFF is positively associated with the financial distress score. This again shows the differential effects of cash flows in financial distress risk.

We employ three factors to describe the quality of the cash flow:

1. COPEP is defined as operating cash flow scaled by lagged total cash holdings,
2. CFINP are financing cash flow divided by the total cash balance of previous year, respectively and,
3. CINVP are investing cash flow divided by the total cash balance of previous year.

We also introduce two variables to proxy for asset productivity. As the first measure of asset productivity (APROD1), we use asset turnover, which indicates the firm's overall efficiency in utilizing assets to generate revenue. We also use pretax income divided by lagged total assets as the second proxy for asset productivity (APROD2). Following Winn (1997), pretax net income is a more inclusive measure of a company's efficiency in utilizing assets to generate earnings, because it ignores the mitigating effects of equity against debt configuration and tax effects. We use PPEGTH, which is the annual difference of the value of property, plant and equipment divided by the total assets of the previous year, as a proxy for fixed asset growth. Moreover, the debt-to-equity ratio (DE) is used to measure a company's leverage.

Table 1 reports the summary statistics of five AL and key firm characteristics in our sample. Panel A presents the summary statistics for the characteristics of the firms in the sample, incorporating data from June 1995 to July 2014. The firm characteristics include the logarithm of company size (SIZE), firm's book-to-market value (B/M), the debt-equity ratio (DE), return volatility (VOLA), momentum (MOM), fixed asset growth (PPEGTH), capital expenditure per total assets (CAPEX), asset productivity (APROD1, APROD2) and the future return. Panel B reports the cross-sectional correlation values among the variables.

The mean values of five AL measures in the UK market are 0.210 (AL1), 0.404 (AL2), 0.748 (AL3), 0.536 (AL4) and 0.755 (AL5). The first four AL values are consistent with those found in the US market by Gopalan et al. (2012) (AL1:0.142, AL2:0.322, AL3:0.664, AL4:0.507). The average CAPEX value of 0.058 in our study is also comparable to that found in Gopalan et al. (2012) (CAPEX: 0.072). The average SIZE of firms in our sample has a logarithm of market value of 4.38. Panel B reports the pairwise correlations between the key variables in the analysis. As expected, the five AL measures are positively correlated. All these AL measures are negatively related with SIZE, suggesting that the assets of large corporations are relatively less liquid. AL measures and CAPEX are also positively correlated, indicating that firms with higher asset liquidity are normally associated

Table 1
Summary statistics and correlation analysis.

Panel A: descriptive statistics																	
	AL1	AL2	AL3	AL4	AL5	SIZE	MB	DE	VOLA	MOM	PPEGTH	CAPEX	APROD1	APROD2	SHDINV	R_{t+1}	R_{t+12}
Mean	0.210	0.404	0.748	0.536	0.755	4.388	24.748	1.405	0.128	−0.049	0.054	0.058	1.272	−0.019	0.157	−0.004	−0.031
Median	0.105	0.320	0.661	0.453	0.665	4.154	1.750	0.909	0.106	0.020	0.016	0.032	1.042	0.059	0.003	0.000	0.036
STD	1.012	1.132	1.411	1.626	1.402	2.421	1127.4	58.581	0.084	0.587	0.6	0.121	1.828	1.579	3.131	0.154	0.576
90^{th}	0.455	0.668	0.970	0.906	0.982	7.638	6.180	3.182	0.231	0.538	0.155	0.128	2.420	0.214	0.288	0.142	0.550
75^{th}	0.236	0.478	0.797	0.651	0.804	6.015	3.240	1.696	0.160	0.275	0.063	0.070	1.617	0.130	0.040	0.060	0.289
25^{th}	0.043	0.192	0.540	0.292	0.544	2.571	0.940	0.396	0.072	−0.306	−0.001	0.013	0.537	−0.024	−0.003	−0.064	−0.286
10^{th}	0.014	0.102	0.399	0.171	0.405	1.437	0.450	0.118	0.053	−0.749	−0.042	0.004	0.206	−0.260	−0.034	−0.154	−0.717
Panel B: correlation of variables																	
AL1	1.000																
AL2	0.936	1.000															
AL3	0.796	0.913	1.000														
AL4	0.054	0.064	0.097	1.000													
AL5	0.801	0.911	0.999	0.097	1.000												
SIZE	−0.046	−0.052	−0.018	−0.037	−0.022	1.000											
MB	−0.001	−0.002	−0.002	−0.004	−0.002	0.008	1.000										
DE	−0.002	0.000	−0.001	0.000	−0.001	0.001	0.016	1.000									
VOLA	0.078	0.060	0.036	−0.002	0.037	−0.337	−0.0009	0.009	1.000								
MOM	0.032	0.043	0.062	0.072	0.062	0.258	0.005	−0.006	−0.258	1.000							
PPEGTH	0.102	0.121	0.342	0.072	0.347	0.013	0.001	−0.0006	−0.013	0.0400	1.000						
CAPEX	0.543	0.498	0.496	0.038	0.501	0.076	0.002	−0.001	−0.001	0.084	0.273	1.000					
APROD1	0.032	0.090	0.115	0.003	0.120	−0.046	0.004	0.007	−0.039	0.062	0.067	0.022	1.000				
APROD2	−0.201	−0.340	−0.396	0.005	−0.418	0.069	0.002	−0.0001	−0.082	0.055	−0.031	−0.117	0.002	1.000			
SHDINV	0.620	0.688	0.691	0.034	0.711	−0.026	−0.0009	−0.0010	0.061	0.010	0.142	0.370	0.032	−0.762	1.000		
R_{t+1}	0.019	0.022	0.024	0.018	0.024	0.016	−0.0003	−0.003	−0.023	0.044	0.0043	0.016	0.020	0.020	0.007	1.000	
R_{t+12}	0.023	0.027	0.025	0.030	0.026	0.035	0.002	−0.002	−0.070	0.045	−0.015	0.008	0.052	0.051	0.0029	0.303	1.000

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with higher growth opportunities. These results are all consistent with Gopalan et al. (2012). In addition, all AL measures are also positively correlated with APROD and MOM, suggesting that high asset liquidity firms generally are past return winners and exhibit higher asset productivity.

4. Empirical results and analysis

4.1. Firm characteristics

At the end of each month, stocks are ranked into quintiles based on asset liquidity. Table 2 presents the firm and market characteristics for quintile portfolios (Q1, Q2, Q3, Q4, and Q5) sorted by five types of AL measures (AL1, AL2, AL3, AL4, and AL5) of stocks from 1995 to 2014. Stocks in the quintile 1 (Q1) and 5 (Q5) portfolios have the highest and lowest asset liquidity, respectively. The characteristic premium (Q1–Q5) is recorded along with t-statistics. The characteristics include the logarithm of company size (SIZE), operating profitability (OROA), return on equity (ROE), debt-equity ratio (DE), momentum (MOM), return volatility (VOLA), fixed asset growth (PPEGTH), capital expenditure per total asset (CAPEX), asset productivity (APROD1, APROD2) and shareholder investment (SHDINV).

Under the AL1 measure, the results indicate that portfolio Q1 is dominated by smaller firms whereas portfolios Q3 and Q4 contain comparably larger firms, which is consistent with the results in Gopalan et al. (2012). Moreover, firms in AL1 Q1 are also more profitable and have higher OROA and ROE. Firms in this highest AL portfolio also exhibit lower leverage, which increases monotonically from a mean value of 0.965 for the AL1 Q1 portfolio to 3.348 for the AL1 Q5 quintile portfolio. Similarly, the MOM also varies monotonically across quintiles. Firms in the highest AL quintile are generally last year's return winners. The MOM decreases monotonically from an average value of 4.4% for the AL1 Q1 portfolio to −8.2% for the AL1 Q5 portfolio. The market return volatility of firms, however, does not vary monotonically across quintiles. The VOLA exhibits a U-shaped pattern, suggesting that both extremely high and low AL firms experience high stock price fluctuation. Moreover, the extremely high AL quintile portfolio also exhibits higher PPEGTH, CAPEX and SHDINV. The PPEGTH is 51.7% for the AL1 Q1 portfolio whereas it is only 4.1% for AL1 Q5 portfolio. In addition, firms in the highest AL portfolio also have higher asset productivity. The average APROD1 value for AL1 Q1 and Q5 quintiles are 0.232 and −0.012, respectively, suggesting that high AL firms are relatively more efficient at utilizing resources. Similar patterns are also found for portfolios sorted by the other four AL measures. Thus, we conclude that firms with the highest AL tend to be smaller in size, less leveraged and with high profitability. They are also past momentum winners with higher asset productivity and higher fixed asset growth.

4.2. Returns and alpha values on portfolios sorted by asset liquidity

At the end of each month, returns are calculated for each AL portfolio using the following regression models:

$$R_{t+1} = \alpha + bAL_{i,t} + cCONTROLS_t + dFACTORS_t + eAL_{i,t}*H_{FACTORt} + fAL_{i,t}*L_{FACTORt} + \epsilon \quad (6)$$

$$R_{t+12} = \alpha + bAL_{i,t} + cCONTROLS_t + dFACTORS_t + eAL_{i,t}*H_{FACTORt} + fAL_{i,t}*L_{FACTORt} + \epsilon \quad (7)$$

where:

R_{t+1} represents future returns 1 month ahead;
R_{t+12} represents future returns 12 months (one-year) ahead;
AL represents one of the five AL measures (AL1, AL2, AL3, AL4, or AL5);
CONTROLS include SIZE, MB, VOLA, EQTY, and MOM defined previously,
FACTOR is one of the factors to be examined (COPEP, CFINP, CINVP, APROD1, APROD2, PPEGTH, and DE) defined previously;
H_FACTOR is a dummy variable that identifies firms with a high level for FACTOR with a value of either one for firms with factor values above 75th percentile, otherwise zero and,
L_FACTOR is a dummy variable that identifies firms with a low level for FACTOR with a value of either one for firms with factor values below 25th percentile, otherwise zero.

Table 3 reports the average portfolio returns, 3-factor and 4-factor alpha values for firms sorted by five AL measures (AL1, AL2, AL3, AL4, and AL5). Stocks are sorted monthly based on the five AL measures into quintile portfolios with Q1 containing firms with the highest AL and Q5 containing firms with the lowest AL. Q1–Q5 represents the results for going long (Q1) and short (Q5). 3-factor and 4-factor alphas are estimated by regressing excess returns on three Fama-French factors (MKT, SMB, HML) and four Fama-French factors (MKT, SMB, HML, UMD).

Table 3 summarizes the average returns and t-statistics for each quintile as well as the AL Q1–Q5 portfolio performance for the five AL measures. The results indicate that all five AL measures lead to qualitatively identical conclusions. The portfolio return decreases monotonically when moving from the highest to the lowest AL quintile portfolios. Moreover, buying portfolio AL Q1 and selling portfolio AL Q5 generates highly significant returns. The result is more pronounced for portfolios sorted by our proposed AL5 measure. The return difference between AL5 Q1 and AL5 Q5 portfolios is 3.2% per month (t-statistic = 14.44) and 23.1% per year (t-statistic = 23.68). However, portfolios formed by AL1 measures generate a return spread of only 1.3% per month (t-statistic = 5.39) and 9% per year (t-statistic = 7.07).

Table 3 also shows the alpha values of AL-sorted portfolios after controlling for the risk factors using the Fama and French (1993) three-factor model and the four-factor extension of Carhart (1997). The results indicate that both the three-factor and four-factor alpha values of the Q1–Q5 portfolios for all five AL measures are significantly positive and comparable with the return spread of portfolios ranked by the corresponding AL measure. For instance, the return difference of the AL5 Q1 and Q5 quintiles is 3% per month, whereas its corresponding four-factor alpha value is 2.6% per month. Overall, these results suggest that firms with higher asset liquidity are rewarded with higher future stock returns. A trading strategy (referred to herein as the AL trading strategy) of buying the highest AL quintile and selling the lowest AL quintile can offer significantly positive returns because asset liquidity appears to convey information regarding future returns that is not captured by traditional risk factors.

Fig. 1 illustrates the average annual return spread of Q1–Q5 portfolios sorted by AL measures broken down by year over the period from 1995 to 2014. Portfolios are formed monthly by assigning firms to quintiles based on their AL from the previous year. The trading strategy consists of buying the highest AL quintile portfolio and selling the lowest AL quintile portfolio. As Fig. 1 indicates, all five AL strategies persistently generate positive yearly returns during the period (19 out of 20 years for AL3 and AL5).

Table 4 reports the average monthly (R_{t+1}) and annual return spread (R_{t+12}) of the Q1–Q5 portfolios sorted by AL measures broken down by year over the period from 1995 to 2014. Portfolios are formed monthly by assigning firms to quintiles based on their previous year's AL. The trading strategy consists of buying the highest AL quintile portfolio and selling the highest AL quintile portfolio. P(+) represents the percentage of achieving positive returns over the sample period.

Table 2
Firm characteristics.

	SIZE		OROA		ROE		DE		MOM		VOLA		PPEGTH		CAPEX		APROD1		APROD2		SHDINV	
	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.
AL1Q1(H)	3.678		1.658		0.233		0.965		0.044		0.156		0.517		2.981		0.232		5.448		6.532	
Q2	4.527		0.061		0.055		1.852		−0.006		0.124		0.069		0.064		0.002		1.273		0.061	
Q3	5.116		0.072		−0.052		1.173		−0.026		0.117		0.049		0.062		0.008		1.158		0.068	
Q4	5.211		0.068		−0.389		3.580		−0.053		0.114		0.045		0.065		−0.010		1.076		0.005	
Q5(L)	4.484		0.048		−0.077		3.348		−0.082		0.117		0.041		0.056		−0.012		0.933		0.032	
Q1–Q5	−0.806	−22.61	1.610	2.59	0.310	1.54	−2.383	−12.11	0.126	11.10	0.039	24.27	0.476	7.84	2.925	4.45	0.244	0.20	4.515	6.10	6.500	9.93
AL2Q1(H)	3.662		1.611		0.227		1.265		0.094		0.151		0.471		2.866		0.212		5.692		6.441	
Q2	4.280		0.082		0.075		1.440		−0.001		0.119		0.057		0.063		0.021		1.555		0.007	
Q3	4.830		0.070		−0.015		1.892		−0.052		0.122		0.059		0.065		0.003		1.275		0.074	
Q4	5.089		0.051		−0.373		2.268		−0.097		0.123		0.047		0.071		−0.021		0.820		0.060	
Q5(L)	4.935		0.015		−0.625		4.054		−0.078		0.114		0.046		0.054		−0.030		0.352		0.026	
Q1–Q5	−1.273	−43.27	1.596	2.65	0.852	3.83	−2.790	−35.41	0.171	15.71	0.036	23.89	0.425	7.64	2.813	4.46	0.242	0.20	5.339	7.65	6.415	10.02
AL3Q1(H)	3.914		1.651		0.110		1.544		0.144		0.149		0.576		2.891		0.235		5.607		5.949	
Q2	4.602		0.106		0.077		2.230		0.054		0.114		0.068		0.067		0.047		1.420		0.070	
Q3	5.117		0.095		0.042		1.167		−0.017		0.112		0.050		0.063		0.036		1.132		0.029	
Q4	5.001		0.057		0.048		1.912		−0.071		0.113		0.028		0.051		0.001		0.807		0.019	
Q5(L)	4.167		−0.070		−0.954		3.893		−0.223		0.140		−0.037		0.033		−0.128		0.707		-0.055	
Q1–Q5	−0.252	−7.66	1.721	2.85	1.064	4.40	−2.349	−4.97	0.368	41.36	0.009	4.71	0.613	10.52	2.858	4.55	0.362	0.30	4.900	7.10	6.004	9.69
AL4Q1(H)	3.551		1.801		0.370		1.757		0.175		0.139		0.406		0.726		1.035		4.929		5.475	
Q2	4.230		0.066		0.004		1.885		0.086		0.114		0.065		0.062		−1.009		1.156		0.619	
Q3	5.098		0.059		0.031		2.908		0.019		0.109		0.184		0.055		−0.011		1.039		−0.365	
Q4	5.095		0.066		−0.038		3.438		−0.065		0.118		0.027		0.058		−0.005		1.195		0.085	
Q5(L)	4.496		−0.173		−1.057		0.805		−0.253		0.149		0.024		0.053		−0.252		1.237		0.935	
Q1–Q5	−0.945	−19.36	1.974	3.29	1.427	5.99	0.952	3.84	0.428	33.69	−0.009	−4.11	0.381	16.51	0.670	5.48	1.264	1.87	3.693	5.26	4.540	7.65
AL5Q1(H)	3.838		1.257		0.094		1.257		0.146		0.153		0.462		1.228		5.926		−0.380		6.287	
Q2	4.523		2.303		0.079		2.303		0.066		0.116		0.070		0.068		1.510		0.050		0.076	
Q3	5.036		0.695		0.036		0.695		−0.015		0.113		0.050		0.066		1.239		0.038		0.034	
Q4	4.891		0.653		0.037		0.653		−0.087		0.120		0.027		0.056		0.994		0.000		0.028	
Q5(L)	4.066		3.331		−1.078		3.331		−0.245		0.145		−0.029		0.040		0.833		−0.148		0.113	
Q1–Q5	−0.229	−5.71	−2.074	−3.73	1.172	4.22	−2.074	−3.73	0.391	40.95	0.007	3.97	0.489	20.71	1.186	6.77	5.094	6.43	−0.236	−0.12	6.174	11.03

Table 3
Average returns and alpha values on portfolios sorted by asset liquidity (1995 to 2014).

Variable	R_{t+1}		R_{t+12}		3-factor $alpha_{t+1}$		3-factor $alpha_{t+12}$		4-factor $alpha_{t+1}$		4-factor $alpha_{t+12}$	
AL1	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.
Q1	0.004	1.05	−0.002	−0.11	−0.004	−1.70	−0.013	−0.65	−0.001	−0.42	0.003	0.12
Q2	−0.002	−0.48	−0.016	−0.95	−0.009	−5.43	−0.026	−1.64	−0.007	−2.51	−0.015	−0.89
Q3	−0.003	−0.82	−0.022	−1.47	−0.011	−6.42	−0.032	−2.15	−0.007	−2.70	−0.021	−1.37
Q4	−0.005	−1.44	−0.042	−2.77	−0.013	−7.81	−0.053	−3.52	−0.009	−3.45	−0.042	−2.77
Q5	−0.009	−2.86	−0.092	−5.64	−0.017	−10.03	−0.102	−6.38	−0.014	−5.25	−0.092	−5.60
Q1–Q5	0.013	5.39	0.090	7.07	0.010	5.30	0.086	6.97	0.010	4.85	0.091	7.07
AL2	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.
Q1	0.008	2.04	0.027	1.37	0.0001	0.00	0.016	0.84	0.0001	−0.11	0.030	1.49
Q2	−0.0005	−0.15	0.0021	0.14	−0.008	−5.03	−0.008	−0.53	−0.0069	−4.06	0.0053	0.35
Q3	−0.006	−1.81	−0.055	−3.59	−0.014	−8.13	−0.066	−4.35	−0.012	−7.00	−0.052	−3.35
Q4	−0.008	−2.37	−0.081	−5.10	−0.016	−9.44	−0.092	−5.88	−0.014	−8.28	−0.079	−4.91
Q5	−0.009	−2.64	−0.081	−4.68	−0.017	−9.30	−0.091	−5.37	−0.015	−8.26	−0.079	−4.49
Q1–Q5	0.016	6.60	0.108	8.73	0.014	6.84	0.105	8.57	0.012	5.84	0.106	8.27
AL3	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.
Q1	0.010	2.68	0.033	1.65	0.002	1.05	0.022	1.12	0.002	0.72	0.034	1.64
Q2	0.004	1.24	0.034	2.22	−0.004	−2.28	0.023	1.57	−0.003	−1.70	0.035	2.30
Q3	−0.003	−0.90	−0.017	−1.14	−0.010	−6.52	−0.026	−1.80	−0.009	−5.54	−0.013	−0.85
Q4	−0.005	−1.76	−0.047	−3.07	−0.014	−8.63	−0.057	−3.82	−0.012	−7.55	−0.047	−3.01
Q5	−0.020	−5.37	−0.184	−9.84	−0.029	−14.38	−0.195	−10.65	−0.025	−13.14	−0.176	−9.42
Q1–Q5	0.030	13.81	0.217	21.31	0.028	14.40	0.214	21.11	0.024	13.33	0.206	19.71
AL4	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.
Q1	0.005	1.55	−0.004	−0.23	−0.002	−0.92	−0.016	−0.83	−0.002	−1.07	−0.006	−0.29
Q2	0.006	1.87	0.045	2.97	−0.002	−1.15	0.034	2.29	−0.002	−1.26	0.042	2.68
Q3	0.001	0.38	0.004	0.28	−0.007	−4.32	−0.006	−0.39	−0.006	−3.73	0.005	0.30
Q4	−0.006	−1.71	−0.047	−3.18	−0.014	−8.33	−0.057	−3.91	−0.012	−7.23	−0.043	−2.86
Q5	−0.019	−4.79	−0.172	−8.81	−0.028	−12.72	−0.182	−9.51	−0.024	−11.49	−0.159	−8.23
Q1–Q5	0.024	11.66	0.167	16.87	0.023	11.65	0.163	16.35	0.018	10.52	0.150	15.00
AL5	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.
Q1	0.011	2.72	0.031	1.51	0.003	1.11	0.020	0.98	0.002	0.75	0.032	1.55
Q2	0.005	1.42	0.039	2.53	−0.003	−1.72	0.029	1.89	−0.002	−1.19	0.041	2.58
Q3	−0.003	−0.98	−0.022	−1.50	−0.010	−6.60	−0.031	−2.17	−0.009	−5.74	−0.018	−1.22
Q4	−0.007	−2.11	−0.059	−3.85	−0.015	−8.67	−0.069	−4.58	−0.013	−7.49	−0.057	−3.67
Q5	−0.022	−5.76	−0.201	−10.60	−0.030	−14.69	−0.211	−11.36	−0.027	−13.45	−0.192	−10.12
Q1–Q5	0.032	14.44	0.231	23.68	0.030	14.85	0.228	23.52	0.026	13.78	0.221	22.04

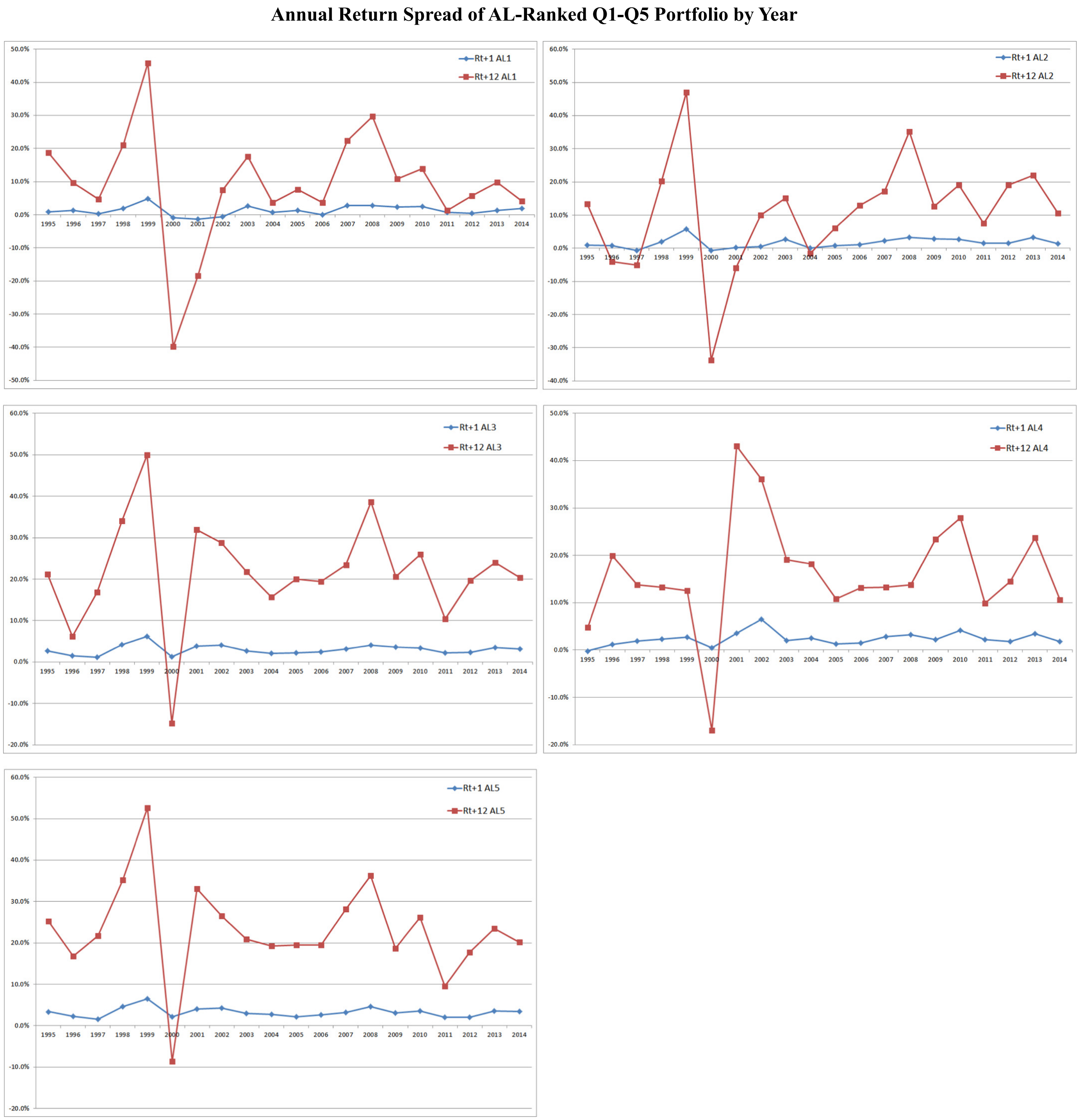

Fig. 1. Annual return spread of AL-ranked Q1–Q5 portfolio by year.

As Table 4 indicates, the five AL trading strategies are consistently profitable. The monthly profit for AL1-sorted Q1–Q5 portfolio ranges from −1.3% to 4.8% over the period whereas the Q1–Q5 portfolios sorted by AL5 achieve a higher return ranging from 1.6% to 6.5%. The probability of achieving a positive one-year return during the 20-year period ranges from 75% to 95% among the five possible AL strategies. Overall, the results imply that our AL trading strategy is consistently profitable. AL5 outperforms the other AL measures in generating higher annual profit with a high likelihood of making positive returns over the sample period.

4.3. Composition study

In this section, we conduct a comprehensive examination of the characteristics of firms comprising various AL-ranked portfolios to investigate the determinants of the return predictability of AL. The characteristics examined are quality of cash flow (COPEP, CFINP, and CINVP), asset productivity (APROD1 and APROD2), profitability (OROA), asset growth (PPEGTH), shareholder investment (SHDINV), logarithm of company size (SIZE), and market value to book value (MB). Stocks are ranked in five quintiles based on their AL such that Q1 contains stocks

Table 4
Return spread of AL trading strategy by year.

Year	R_{t+1}					R_{t+12}				
	AL1	AL2	AL3	AL4	AL5	AL1	AL2	AL3	AL4	AL5
1995	0.9%	0.9%	2.7%	−0.2%	3.4%	18.7%	13.4%	21.2%	4.8%	25.3%
1996	1.3%	0.8%	1.5%	1.2%	2.3%	9.7%	−4.0%	6.2%	19.9%	16.8%
1997	0.3%	−0.7%	1.2%	1.9%	1.6%	4.7%	−5.1%	16.8%	13.7%	21.7%
1998	1.9%	2.0%	4.2%	2.3%	4.6%	21.0%	20.2%	34.1%	13.2%	35.1%
1999	4.8%	5.7%	6.2%	2.7%	6.5%	45.7%	47.0%	49.9%	12.5%	52.6%
2000	−0.8%	−0.7%	1.3%	0.5%	2.1%	−39.7%	−33.7%	−14.8%	−16.9%	−8.6%
2001	−1.3%	0.2%	3.9%	3.5%	4.0%	−18.4%	−6.0%	32.0%	43.1%	33.1%
2002	−0.7%	0.5%	4.1%	6.5%	4.3%	7.5%	10.1%	28.8%	36.1%	26.6%
2003	2.7%	2.7%	2.7%	2.0%	3.0%	17.6%	15.1%	21.7%	19.1%	20.9%
2004	0.7%	0.1%	2.1%	2.5%	2.7%	3.6%	−1.5%	15.6%	18.2%	19.2%
2005	1.3%	0.8%	2.3%	1.3%	2.1%	7.5%	6.1%	20.0%	10.9%	19.4%
2006	0.0%	1.1%	2.5%	1.5%	2.6%	3.6%	12.9%	19.4%	13.1%	19.5%
2007	2.8%	2.3%	3.1%	2.8%	3.2%	22.3%	17.2%	23.4%	13.3%	28.2%
2008	2.8%	3.2%	4.1%	3.2%	4.6%	29.6%	35.1%	38.6%	13.8%	36.2%
2009	2.4%	2.8%	3.6%	2.2%	3.1%	10.8%	12.7%	20.5%	23.4%	18.7%
2010	2.5%	2.7%	3.4%	4.1%	3.6%	13.9%	19.0%	25.9%	27.9%	26.1%
2011	0.7%	1.5%	2.2%	2.2%	2.0%	1.3%	7.5%	10.4%	9.9%	9.5%
2012	0.5%	1.5%	2.3%	1.8%	2.0%	5.7%	19.0%	19.6%	14.5%	17.8%
2013	1.4%	3.2%	3.5%	3.4%	3.6%	9.8%	22.0%	24.0%	23.7%	23.5%
2014	1.9%	1.3%	3.2%	1.8%	3.5%	4.1%	10.6%	20.4%	10.6%	20.2%
P(+)	85%	90%	100%	95%	100%	90%	75%	95%	95%	95%

with the highest AL and Q5 with the lowest AL. Table 5 reports the percentage of the firm variables under the category of each of the four quartiles.

Table 5 reports the composition of the characteristics of firms comprising the AL Q1 and Q5 portfolios, ranked by the five AL measures. We begin with the quality of cash flow. In the AL1 Q1 portfolio, there are more firms at the highest quartile (QT4) of COPEP (QT4: 37%) and CINVP (QT4: 46%) and fewer firms with a high level of CFINP (QT4: 3%). The situation is the reverse in the AL1 Q5 quintile in which there are fewer firms with high COPEP and CINVP and more firms with high CFINP, which suggests that firms in the highest AL portfolio predominantly have higher quality cash flow (high COPEP, low CFINP). The firms' liquidity originates mainly from its core business.

Regarding asset productivity, APROD1 does not vary monotonically across quartiles in the AL1 Q1 portfolio. APROD1 exhibits a U-shaped pattern (QT1: 47%, QT4: 33%), which indicates that both extremely high asset productivity and low asset productivity firms are dominant in the AL1 Q1 portfolio. In the AL1 Q5 portfolio, however, there are generally more firms with medium level APROD1 (QT3: 27%, QT4: 31%). A comparable pattern is found in other AL measures. Similarly, for profitability, the pattern for OROA is also U-shaped in AL1 Q1 portfolio (QT4: 47%, QT1: 32%). The results suggest that for both APROD1 and OROA, there is no particular tilting to any side for the highest AL quintile portfolio.

With respect to fixed asset growth and shareholder investment, the proportion of firms with high PPEGTH and SHDINV is lower in the AL1 Q1 portfolio (PPEGTH QT4: 17%, SHDINV QT4: 14%). The results from Table 2 show that although firms in the AL Q1 portfolio have the highest value in PPEGTH and SHDINV, there are only a few firms experiencing extremely high fixed asset growth and shareholder investment. We also identify a negative relation between PPEGTH and future returns, as indicated in Panel B of Table 8. Finally, we also find that the AL1 Q1 portfolio generally has more large firms and value stocks (SIZE QT4: 32%, MB QT1: 43%) than the AL1 Q5 portfolio (SIZE QT4: 19%, MB QT1: 22%). The situation is similar for other AL measures. Overall, these results suggest that the highest AL portfolio is dominated by firms with a high level of operating cash, high asset productivity, high profitability, low fixed asset growth and low shareholder investment, as well as value stocks with a large market size.

4.4. Fama-MacBeth cross-sectional regression

We next conduct further tests on the robustness of the return predictability of AL to exclude the possibility that the AL anomaly derives from the omission of certain risk factors. By conducting the Fama and MacBeth (1973) regression, we first examine the return predictability of AL in the presence of a set of cross-sectional control variables, including SIZE, MB, VOLA, EQTY and MOM. The cross-sectional regression is conducted monthly from June 1995 through July 2014 using the following regression models:

$$\text{Model 1}: R_{t+1} = \alpha + bAL_{i,t} + \epsilon \tag{8}$$

$$\text{Model 2}: R_{t+1} = a + bAL_{i,t} + cSIZE_t + dMB_t + eEQTY_{i,t} + fVOLA_{i,t} + gMOM_{i,t} + \epsilon \tag{9}$$

$$\text{Model 3}: R_{t+12} = a + bAL_{i,t} + \epsilon \tag{10}$$

$$\text{Model 4}: R_{t+12} = a + bAL_{i,t} + cSIZE_t + dMB_t + eEQTY_{i,t} + fVOLA_{i,t} + gMOM_{i,t} + \epsilon \tag{11}$$

Table 6 presents coefficient estimates of the regressions for one-month ahead returns (R_{t+1}) and one-year-ahead returns (R_{t+12}) for the 5 AL measures (AL1, AL2, AL3, AL4, and AL5). Model 1 and Model 3 are univariate regressions without control variables, whereas Model 2 and Model 4 are multivariate regressions with control variables. The control variables are the logarithm of company size (SIZE), the firm's market-to-book value (MB), the logarithm of shareholder equity (EQTY), return volatility (VOLA) and momentum (MOM). The results confirm our findings regarding the return predictability of AL.

The coefficient values of all five AL measures are significantly positive. The results suggest that the positive relation between future returns and AL remains highly significant even when controlling for certain relevant variables.

As indicated from the composition study presented in Table 5, the stock return forecasting power of AL may derive from other factors outside of the cross-sectional control variables in our previous test. To explore this possibility, we again conduct Fama-Macbeth regressions with an expanded set of controls regarding the quality of cash flow,

Table 5
Composition study of AL portfolios.

Variable	COPEP		CFINP		CINVP		APROD1		APROD2		OROA		PPEGTH		SHDINV		SIZE		MB	
AL1	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.
AL1 Q1 QT4(H)	37%	62.4	3%	20.9	46%	144.9	47%	66.7	30%	73.2	47%	64.7	17%	54.7	14%	43.6	32%	67.6	15%	49.6
QT3	48%	114.2	25%	53.4	35%	130.8	11%	38.3	22%	48.8	11%	38.8	29%	75.0	16%	49.1	33%	95.3	19%	71.7
QT2	14%	45.2	44%	113.5	15%	48.9	10%	31.2	19%	82.1	10%	32.5	22%	88.0	14%	47.1	25%	71.7	23%	66.3
QT1(L)	1%	16.1	28%	50.1	4%	31.8	33%	87.9	29%	63.6	32%	78.3	33%	79.9	56%	77.9	10%	30.0	43%	125.3
AL1 Q5 QT4(H)	18%	57.1	35%	49.6	19%	64.1	19%	52.6	23%	49.4	19%	46.8	27%	88.0	29%	95.4	19%	60.8	25%	70.0
QT3	16%	32.9	22%	29.9	20%	32.3	27%	71.2	26%	76.6	28%	98.7	23%	73.4	26%	93.0	22%	82.2	27%	97.7
QT2	31%	38.2	21%	44.4	31%	54.7	32%	90.7	27%	81.7	30%	70.1	25%	72.1	28%	78.6	26%	73.4	26%	86.9
QT1(L)	35%	29.8	22%	41.7	30%	27.9	22%	51.0	24%	67.3	24%	58.2	24%	87.4	17%	58.3	34%	81.5	22%	65.4
AL2	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.
AL2 Q1 QT4(H)	35%	79.0	4%	27.6	39%	136.8	41%	50.9	18%	54.2	40%	50.1	15%	48.1	12%	43.0	32%	61.2	14%	54.6
QT3	43%	138.4	24%	52.9	35%	133.6	9%	40.2	16%	50.6	10%	35.9	27%	86.9	15%	38.4	34%	84.9	18%	55.1
QT2	19%	63.4	39%	108.9	17%	63.8	10%	31.1	20%	77.8	11%	31.7	23%	105.6	14%	52.3	24%	51.1	24%	73.3
QT1(L)	3%	29.0	34%	68.8	8%	48.3	40%	82.7	45%	94.5	39%	90.0	35%	78.9	58%	82.8	10%	30.7	44%	118.0
AL2 Q5 QT4(H)	20%	56.3	36%	86.9	20%	52.2	25%	57.3	21%	16.4	25%	40.7	28%	68.7	30%	80.8	22%	81.8	26%	61.6
QT3	17%	53.1	21%	45.8	19%	48.2	26%	76.6	30%	39.2	24%	63.3	23%	70.8	26%	103.1	23%	80.7	27%	90.9
QT2	25%	57.1	22%	65.7	30%	62.6	28%	87.5	32%	38.9	28%	70.4	25%	72.5	26%	73.3	24%	89.6	25%	72.1
QT1(L)	38%	72.8	20%	48.6	31%	62.5	21%	49.4	17%	25.5	23%	56.9	24%	73.4	18%	79.0	32%	88.3	22%	77.8
AL3	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.
AL3 Q1 QT4(H)	37%	67.4	4%	20.6	26%	68.7	35%	26.3	18%	38.3	34%	25.8	10%	42.8	9%	28.8	27%	31.5	11%	29.4
QT3	34%	65.2	15%	36.1	29%	82.0	8%	24.2	16%	37.4	9%	24.0	16%	52.8	9%	22.2	33%	58.5	20%	43.0
QT2	21%	44.9	34%	65.1	23%	43.1	13%	27.7	18%	42.1	12%	24.1	20%	72.1	10%	23.7	26%	36.2	27%	50.6
QT1(L)	9%	28.7	48%	83.2	22%	52.1	44%	52.1	48%	63.6	45%	55.9	54%	115.6	72%	72.1	14%	25.3	41%	56.1
AL3 Q5 QT4(H)	16%	29.0	35%	43.8	20%	33.2	21%	22.1	26%	19.0	22%	22.6	28%	27.8	28%	47.7	20%	59.8	27%	38.4
QT3	21%	45.4	26%	40.9	22%	33.9	30%	47.7	27%	51.0	29%	47.4	22%	52.3	31%	75.7	23%	69.1	29%	61.1
QT2	27%	45.1	21%	47.1	28%	56.6	31%	52.1	26%	51.5	30%	45.6	27%	63.2	26%	83.4	26%	52.7	26%	63.9
QT1(L)	36%	65.8	18%	51.3	29%	56.8	19%	20.0	21%	24.5	19%	23.3	23%	29.9	15%	48.5	31%	52.1	18%	37.0
AL4	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.
AL4 Q1 QT4(H)	41%	59.5	9%	23.5	27%	85.1	41%	39.7	36%	98.7	43%	43.2	16%	24.1	18%	36.1	39%	45.3	28%	23.4
QT3	32%	60.9	19%	39.0	29%	67.7	19%	30.2	26%	39.6	16%	34.3	23%	52.1	15%	25.8	34%	42.4	24%	30.6
QT2	14%	39.0	37%	82.7	23%	58.4	15%	26.0	14%	58.9	14%	19.9	20%	34.6	12%	33.5	16%	24.9	20%	25.5
QT1(L)	12%	32.7	36%	49.1	21%	48.2	26%	61.2	24%	40.8	27%	60.6	41%	47.4	55%	58.3	10%	17.3	28%	28.6
AL4 Q5 QT4(H)	15%	33.1	31%	65.0	21%	51.7	16%	38.4	23%	31.8	16%	41.9	26%	49.4	27%	71.0	17%	42.5	17%	17.6
QT3	23%	44.9	29%	70.1	23%	49.3	27%	26.9	23%	63.0	27%	32.5	26%	46.2	29%	69.8	22%	51.2	33%	32.8
QT2	33%	58.4	20%	49.2	28%	59.2	33%	51.1	27%	56.0	32%	51.8	25%	50.1	29%	69.6	31%	79.5	32%	38.4
QT1(L)	29%	57.3	20%	41.9	28%	64.4	24%	22.2	27%	65.1	25%	25.5	22%	49.8	15%	33.6	30%	56.4	18%	14.4
AL5	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.	Ave.	t-Stat.
AL5 Q1 QT4(H)	37%	82.2	4%	32.7	27%	82.4	42%	42.9	19%	45.9	40%	41.1	11%	54.6	9%	37.1	30%	52.6	13%	40.7
QT3	35%	99.0	14%	40.0	29%	122.1	8%	31.2	16%	45.7	8%	31.8	18%	51.3	8%	27.2	34%	81.1	18%	57.7
QT2	20%	54.8	32%	73.0	23%	67.1	10%	32.8	18%	56.3	10%	31.0	22%	90.9	10%	30.5	24%	49.3	27%	69.1
QT1(L)	8%	41.6	50%	96.3	20%	67.7	40%	59.2	48%	88.4	42%	62.8	50%	106.4	73%	105.2	12%	30.0	43%	90.2
AL5 Q5 QT4(H)	19%	48.1	35%	59.0	18%	33.7	21%	46.9	17%	29.1	19%	44.1	27%	42.7	30%	74.7	22%	63.6	25%	67.8
QT3	17%	45.7	25%	62.8	23%	49.2	26%	55.3	30%	80.6	25%	50.7	24%	74.1	30%	65.6	24%	91.2	28%	74.6
QT2	28%	64.9	24%	60.1	29%	68.6	33%	90.5	31%	76.6	34%	98.7	28%	81.1	26%	87.7	24%	68.4	26%	81.8
QT1(L)	36%	72.5	16%	58.1	30%	67.7	21%	30.9	22%	40.8	22%	34.0	21%	42.8	14%	49.1	31%	80.9	21%	69.3

Table 6
Cross-sectional analysis of asset liquidity and future returns.

Model	R_{t+1}		R_{t+1}		R_{t+12}		R_{t+12}	
	1		2		3		4	
AL1	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.
Intercept	−0.0036	−1.121	−0.0575	−9.37	−0.0391	−2.466	−0.4686	−16.75
AL1	0.0029	2.509	0.0083	4.63	0.0171	2.660	0.0574	6.80
SIZE			−0.0076	−9.75			−0.0652	−19.62
MB			−0.00003	−0.38			0.0003	1.42
EQTY			0.0084	11.46			0.0713	20.13
VOLA			−0.0260	−1.71			−0.3945	−6.31
MOM			0.0152	7.48			0.0968	12.16
Adj R^2	0.0058		0.0554		0.0091		0.1022	
AL2	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.
Intercept	−0.0045	−1.394	−0.0614	−10.17	−0.0471	−2.975	−0.5064	−19.04
AL2	0.0036	3.406	0.0097	5.97	0.0240	4.072	0.0609	8.08
SIZE			−0.0078	−10.12			−0.0671	−20.28
MB			−0.00002	−0.25			0.0004	1.84
EQTY			0.0087	12.05			0.0746	21.75
VOLA			−0.0282	−1.86			−0.3972	−6.37
MOM			0.0150	7.31			0.0982	12.32
Adj R^2	0.0058		0.0554		0.0094		0.1032	
AL3	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.
Intercept	−0.0051	−1.616	−0.0603	−9.92	−0.0525	−3.332	−0.4956	−18.63
AL3	0.0027	4.003	0.0075	5.08	0.0193	6.226	0.0407	7.41
SIZE			−0.0076	−9.83			−0.0659	−19.74
MB			−0.00002	−0.23			0.0004	1.78
EQTY			0.0083	11.39			0.0721	20.67
VOLA			−0.0283	−1.83			−0.3748	−5.89
MOM			0.0148	7.35			0.0976	12.37
Adj R^2	0.0057		0.0555		0.0070		0.1010	
AL4	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.
Intercept	−0.0039	−1.219	−0.0474	−7.68	−0.0404	−2.585	−0.4307	−14.80
AL4	0.0008	2.573	0.0056	4.95	0.0036	2.376	0.0331	7.54
SIZE			−0.0058	−6.97			−0.0570	−16.76
MB			−0.00004	−0.60			0.0002	1.14
EQTY			0.0065	8.22			0.0632	16.56
VOLA			−0.0217	−1.47			−0.3405	−5.35
MOM			0.0138	6.81			0.0961	12.81
Adj R^2	0.0024		0.0527		0.0035		0.0981	
AL5	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.
Intercept	−0.0064	−1.927	−0.0602	−9.870	−0.0672	−4.302	−0.4811	−18.209
AL5	0.0035	3.966	0.0081	5.186	0.0292	7.565	0.0486	7.892
SIZE			−0.0075	−9.967			−0.0631	−18.370
MB			0.00002	0.219			0.0004	1.869
EQTY			0.0083	11.068			0.0695	19.211
VOLA			−0.0353	−2.166			−0.4158	−6.194
MOM			0.0144	7.100			0.0936	11.535
Adj R^2	0.0048		0.0547		0.0063		0.1014	

profitability, asset productivity, fixed asset growth and leverage, in addition to the control variables previously utilized using the following regression models:

$$FV_{i,t} = a + bAL_{i,t} + cTD_{i,t} + dMB_{i,t} + eEQTY_{i,t} + fDE_{i,t} + gOROA_{i,t} + \epsilon \quad (12)$$

$$\Delta FV_t = a + bAL_{i,t} + cTD_{i,t} + dMB_t + eEQTY_{i,t} + fDE_{i,t} + gOROA_{i,t} + \epsilon \quad (13)$$

$$FV_{t+1} = a + bAL_{i,t} + cTD_{i,t} + dMB_t + eEQTY_{i,t} + fDE_{i,t} + gOROA_{i,t} + \epsilon \quad (14)$$

$$\Delta FV_{t+1} = a + bAL_{i,t} + cTD_{i,t} + dMB_t + eEQTY_{i,t} + fDE_{i,t} + gOROA_{i,t} + \epsilon \quad (15)$$

$$EQTY_t = a + bAL_{i,t} + cSIZE_{i,t} + dMB_t + eVOLA_{i,t} + fMOM_{i,t} + \epsilon \quad (16)$$

$$TD_t = a + bAL_{i,t} + cSIZE_{i,t} + dMB_t + eVOLA_{i,t} + fMOM_{i,t} + \epsilon \quad (17)$$

$$STD_t = a + bAL_{i,t} + cSIZE_{i,t} + dMB_t + eVOLA_{i,t} + fMOM_{i,t} + \epsilon \quad (18)$$

$$LTD_t = a + bAL_{i,t} + cSIZE_{i,t} + dMB_t + eVOLA_{i,t} + fMOM_{i,t} + \epsilon \quad (19)$$

$$R_{t+1} = a + bAL_{i,t} + cTD_{i,t} + dMB_t + eEQTY_{i,t} + fDE_{i,t} + foroa_{i,t} + \epsilon \quad (20)$$

$$R_{t+12} = a + bAL_{i,t} + cTD_{i,t} + dMB_t + eEQTY_{i,t} + fDE_{i,t} + fOROA_{i,t} + \epsilon \quad (21)$$

$$R_{t+24} = a + bAL_{i,t} + cTD_{i,t} + dMB_t + eEQTY_{i,t} + fDE_{i,t} + fOROA_{i,t} + \epsilon \quad (22)$$

$$R_{t+36} = a + bAL_{i,t} + cTD_{i,t} + dMB_t + eEQTY_{i,t} + fDE_{i,t} + fOROA_{i,t} + \epsilon \quad (23)$$

where:

Panel A of Table 7 reports the coefficient values of the regression of firm value (FV) and firm value growth (ΔFV) against asset liquidity in the presence of control variables. FV is defined as the logarithm of total asset. Panel B presents coefficient estimates of the regressions of equity value (EQTY) and debt ratios against asset liquidity in the presence of control variables. The debt ratios are total debt-to-asset (TD), short term debt-to-asset (STD), long term debt-to-asset (LTD). The control variables are the logarithm of company size (Size), firm's market-to-book value (MB), return volatility (VOLA) and momentum (MOM). Panel C shows the regression results of future returns against EQTY and TD and AL1 in the presence of control variables. The operation

Table 7
Cross-sectional analysis of firm value, equity and leverage and future returns against asset liquidity.

Variable	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.
	FV_t		ΔFV_t		FV_{t+1}		ΔFV_{t+1}	
Panel A: firm value and firm value growth against asset liquidity								
Intercept	0.326	20.03	−0.277	−16.94	0.402	21.54	0.085	6.97
AL1	0.129	8.96	0.035	2.85	0.138	9.08	0.025	5.42
TD	0.604	21.01	0.276	17.29	0.617	20.30	0.023	5.96
MB	0.007	13.07	−0.001	−3.17	0.010	11.99	0.002	5.87
EQTY	1.033	851.88	0.007	10.05	1.029	694.55	−0.005	−5.64
DE	−0.395	−14.88	0.218	16.36	−0.375	−14.74	0.021	5.92
OROA	−0.152	−11.00	0.108	9.05	−0.084	−5.53	0.065	8.19
Adj R^2	0.961		0.624		0.940		0.040	
Panel B: equity and leverage against asset liquidity								
Variable	EQTY		TD		STD		LTD	
Intercept	0.282	8.66	0.020	0.09	−0.168	−2.79	−0.106	−1.28
AL1	1.400	23.61	1.683	4.36	0.721	6.86	4.385	5.42
SIZE	−0.011	−5.22	−0.017	−0.99	0.004	0.87	−0.005	−0.90
MB	−0.004	−3.70	−0.016	−2.88	−0.0003	−6.82	−0.003	−5.20
VOLA	1.251	5.27	4.322	2.68	1.295	3.80	−1.746	−2.04
MOM	0.094	5.17	0.202	1.98	−0.044	−3.13	−0.305	−4.52
Adj R^2	0.612		0.155		0.223		0.203	
Panel C: future return against equity and leverage								
Variable	R_{t+1}		R_{t+12}		R_{t+24}		R_{t+36}	
Intercept	−0.025	−4.25	−0.223	−7.75	−0.395	−10.16	−0.535	−13.44
AL1	0.010	5.57	0.076	9.81	0.102	8.11	0.098	7.03
TD	0.005	3.81	0.038	6.12	0.037	4.28	0.012	1.32
MB	−0.0003	−3.57	−0.0028	−7.21	−0.0048	−7.86	−0.0069	−8.44
EQTY	0.002	3.46	0.014	7.58	0.026	10.71	0.037	15.03
DE	0.0003	2.43	0.003	6.12	0.007	7.46	0.010	9.90
OROA	0.025	7.90	0.205	12.72	0.294	15.80	0.346	13.83
Adj R^2	0.036		0.078		0.078		0.072	

return on asset (OROA) and debt-to-equity ratio (DE) are included as controls.

To explore the determinants for the return predictability of asset liquidity, we conduct cross-sectional regression of firm value, equity value and debt ratios against its corresponding asset liquidity. The results are summarized in panels A and B of Table 7. The findings in panel A and B indicate that the asset liquidity is positively related with firm value and equity value.

Moreover, panel C of Table 7 reports the result of regression between future stock return against the firm's equity value. The finding gives empirical evidence that the expected stock return of a firm is significantly and positively associated with its equity value. Hence, the return predictability of asset liquidity is attributed to the increase of equity value.

Furthermore, we perform regression to examine the relation between debt value and expected return. The results in Panel C of Table 7 indicate that debt level is positively related to the future stock return. Hence, the results from Table 7 provide evidence that firms with high asset liquidity increase their equity value and leverage which in turn generate higher expected return.

Table 8 presents coefficient estimates of the regression of one-year-ahead returns (R_{t+12}) using the following regression models:

$$\text{Model 5}: R_{t+12} = \alpha + bAL_{i,t} + cSIZE_t + dMB_t + eEQTY_{i,t} + fVOLA_{i,t} + gMOM_{i,t} + hCOPEP_{i,t} + \epsilon \quad (24)$$

$$\text{Model 6}: R_{t+12} = \alpha + bAL_{i,t} + cSIZE_t + dMB_t + eEQTY_{i,t} + fVOLA_{i,t} + gMOM_{i,t} + hCINVP_{i,t} + \epsilon \quad (25)$$

$$\text{Model 7}: R_{t+12} = \alpha + bAL_{i,t} + cSIZE_t + dMB_t + eEQTY_{i,t} + fVOLA_{i,t} + gMOM_{i,t} + hCFINP_{i,t} + \epsilon \quad (26)$$

$$\text{Model 8}: R_{t+12} = \alpha + bAL_{i,t} + cSIZE_t + dMB_t + eEQTY_{i,t} + fVOLA_{i,t} + gMOM_{i,t} + hOROA_{i,t} + \epsilon \quad (27)$$

$$\text{Model 9}: R_{t+12} = \alpha + bAL_{i,t} + cSIZE_t + dMB_t + eEQTY_{i,t} + fVOLA_{i,t} + gMOM_{i,t} + hAPROD1_{i,t} + \epsilon \quad (28)$$

$$\text{Model 10}: R_{t+12} = \alpha + bAL_{i,t} + cSIZE_t + dMB_t + eEQTY_{i,t} + fVOLA_{i,t} + gMOM_{i,t} + hAPROD2_{i,t} + \epsilon \quad (29)$$

$$\text{Model 11}: R_{t+12} = \alpha + bAL_{i,t} + cSIZE_t + dMB_t + eEQTY_{i,t} + fVOLA_{i,t} + gMOM_{i,t} + hPPEGTH_{i,t} + \epsilon \quad (30)$$

$$\text{Model 12}: R_{t+12} = \alpha + bAL_{i,t} + cSIZE_t + dMB_t + eEQTY_{i,t} + fVOLA_{i,t} + gMOM_{i,t} + hDE_{i,t} + \epsilon \quad (31)$$

The factors selected are COPEP, CFINP and CINVP, which are defined as the proportion of cash flow for operating, investing and financing activities, respectively, scaled by beginning balance of cash and equivalent, operating profitability (OROA), asset productivity (APROD1, APROD2), fixed asset growth (PPEGTH) and leverage (DE).

Panel A of Table 8 reports the results of the multiple regressions with additional control variables regarding the quality of cash flow and profitability. (For the sake of simplicity, we present only the results of the AL1 measure but the results for other AL measures are similar and could be provided on request.) The results indicate that the coefficients of all these additional variables are significant, suggesting that they exhibit return predictive power. The results also show that AL1 is not subsumed by these additional controls and remains a strong determinant of the cross section of annual returns. The AL1 measure attains significantly positive coefficient after controlling for the additional variables. Then, in panel B of Table 8, the coefficients on AL1 for Model 1 and 2 are also positively significant after controlling for APROD1 and APROD2 respectively. Model 3 and 4 in panel C, respectively report the regressions with controls on PPEGTH and DE. The coefficient on PPEGTH is significantly

Table 8
Return predictability of asset liquidity after controlling for cash flow, profitability, asset productivity, fixed asset growth and leverage.

R_{t+12}	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.
Panel A: cash flow nature and operating profitability								
Intercept	−0.4692	−16.82	−0.4661	−16.55	−0.4655	−16.53	−0.4949	−17.41
AL1	0.0577	6.82	0.0570	6.73	0.0574	6.81	0.0953	10.63
SIZE	−0.0650	−19.56	−0.0650	−19.51	−0.0649	−19.49	−0.0683	−20.33
MB	3.2E-04	1.42	3.1E-04	1.38	3.1E-04	1.37	7.8E-04	3.16
EQTY	0.0712	20.09	0.0711	19.89	0.0709	19.87	0.0717	20.26
VOLA	−0.3884	−6.14	−0.3921	−6.26	−0.3906	−6.24	−0.2698	−4.12
MOM	0.0965	12.13	0.0966	12.14	0.0964	12.11	0.0779	10.47
COPEP	0.0002	6.56						
CINVP			−4.1E-06	−0.14				
CFINP					−0.0001	−2.73		
OROA							0.2094	13.02
Adj R^2	0.0994		0.0988		0.0991		0.1223	
Panel B: asset productivity, fixed asset growth and leverage								
Intercept	−0.5347	−16.78	−0.4779	−17.29	−0.4258	−13.99	−0.4724	−16.72
AL1	0.0810	8.53	0.0804	8.95	0.0993	10.85	0.0605	7.07
SIZE	−0.0678	−18.64	−0.0654	−19.47	−0.0627	−18.45	−0.0669	−19.50
MB	−6.4E-05	−0.29	7.5E-04	2.97	0.0007	2.86	−4.2E-04	−1.78
EQTY	0.0764	19.19	0.0700	20.11	0.0677	17.71	0.0719	19.99
VOLA	−0.4412	−6.62	−0.2422	−3.70	−0.5478	−8.37	−0.3895	−6.27
MOM	0.0997	12.60	0.0760	10.33	0.1048	12.98	0.0981	12.46
APROD1	0.0254	15.55						
APROD2			0.1845	11.08				
PPEGTH					−0.0407	−4.90		
DE							0.0028	10.98
Adj R^2	0.1140		0.1194		0.1040		0.1006	

negative, as expected. Again, AL on Model 3 and 4 remain highly significant. These results imply that AL is another strong determinant of the cross section of returns and is not a manifestation of the quality of cash flow, profitability, asset productivity, fixed asset growth or leverage.

4.5. Quality of cash flow and return predictability of asset liquidity

In this section, we examine how the relation between AL and future returns is affected by the level of various factors, including the quality of cash flow, asset productivity, fixed asset growth and leverage. We run a multiple regression of one-year-ahead returns with AL and the control variables as well as one of these factors each time using the following three regression models:

$$\text{Model 13}: R_{t+12} = \alpha + bAL_{i,t} + cSIZE_t + dMB_t + eEQTY_{i,t} + fVOLA_{i,t} + gMOM_{i,t} + bAL_{i,t}\left[COPEP_{i,t}\right] + \epsilon \quad (32)$$

$$\text{Model 13}: R_{t+12} = \alpha + bAL_{i,t} + cSIZE_t + dMB_t + eEQTY_{i,t} + fVOLA_{i,t} + gMOM_{i,t} + bAL_{i,t}\left[CFINP_{i,t}\right] + \epsilon \quad (33)$$

$$\text{Model 13}: R_{t+12} = \alpha + bAL_{i,t} + cSIZE_t + dMB_t + eEQTY_{i,t} + fVOLA_{i,t} + gMOM_{i,t} + bAL_{i,t}\left[CINVP_{i,t}\right] + \epsilon \quad (34)$$

SIZE, MB, VOLA, MOM, and EQTY have been described previously. Table 9 presents coefficient estimates of regressions of one-year-ahead returns with AL, COPEP, CFINP, CINVP in the presence of control variables. Here, H_COPEP (H_CFINP, H_CINVP)) equals one if firm has COPEP (CFINP, CINVP) at or above the 80th percentile of firms at time t, and zero otherwise; and L_COPEP (L_CFINP, L_CINVP)) equals one if firm has COPEP (CFINP, CINVP) at or below the 20th percentile of firms at time t, and zero otherwise.

Firms with high COPEP are likely to have higher quality cash flow because the improved liquidity is derived from cash generated from core business. The results indicate that coefficients on AL1[H_COPEP] and AL1[L_COPEP] are 0.905 (t-statistic 14.86) and −0.109 (t-statistic −7.58), respectively, which suggests that the return predictability of AL is stronger (weaker) for high (low) COPEP stocks.

We repeat the same set of cross-sectional regressions using CFINP as the factor but obtain results that are the opposite from our earlier findings using COPEP as the additional control. By contrast, the average coefficient value on AL1[H_CFINP] (AL1[L_CFINP]) is significantly negative (positive), suggesting that improving liquidity through financing activities only deteriorates the positive association between AL and future returns. We repeat our tests with other AL measures and attain similar results as those found for AL1. Overall, the results suggest that the positive relation between AL and one-year-ahead returns is stronger for stocks with high-quality cash flow.

4.6. Asset productivity and return predictability of asset liquidity

Table 10 presents the coefficient estimates of regression of one-year-ahead returns with AL, asset productivity (APROD1, APROD2) using the following regression models:

$$\text{Model 14}: R_{t+12} = \alpha + bAL_{i,t} + cSIZE_t + dMB_t + eEQTY_{i,t} + fVOLA_{i,t} + gMOM_{i,t} + bAL_{i,t}\left[APROD1_{i,t}\right] + \epsilon \quad (35)$$

$$\text{Model 15}: R_{t+12} = \alpha + bAL_{i,t} + cSIZE_t + dMB_t + eEQTY_{i,t} + fVOLA_{i,t} + gMOM_{i,t} + bAL_{i,t}\left[APROD2_{i,t}\right] + \epsilon \quad (36)$$

Here, H_APROD1 (H_ APROD2) equals one if a firm has APROD1 (APROD2) at or above the 80th percentile of firms at time t, and zero otherwise; and L_ APROD1 (L_ APROD2) equals one if firm has APROD1 (APROD2) at or below the 20th percentile of firms at time t, and zero otherwise.

We find that the coefficients on AL1[H_APROD1] (AL1[L_APROD1]) are positive (negative) and significant, suggesting that the relation between future returns and AL will be stronger for firms with high asset productivity. When APROD2 is used as a proxy for asset productivity, the results further confirm our previous findings. Moreover, we conclude that asset productivity can further strengthen the

Table 9
Effect of quality of cash flow on return predictability of asset liquidity.

R_{t+12}	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.
Panel A: operating cash flows (COPEP)										
Intercept	−0.511	−18.00	−0.524	−18.85	−0.503	−18.51	−0.408	−14.24	−0.491	−17.98
AL1	0.142	10.51								
AL2			0.105	12.50						
AL3					0.085	11.88				
AL4							0.071	12.94		
AL5									0.101	11.84
SIZE	−0.070	−20.55	−0.068	−20.72	−0.066	−20.22	−0.054	−16.38	−0.064	−19.03
MB	4.2E-04	1.78	4.8E-04	2.01	5.0E-04	2.15	1.3E-04	0.71	4.9E-04	2.18
EQTY	0.075	20.81	0.074	21.36	0.069	20.01	0.058	15.86	0.066	18.70
VOLA	−0.349	−5.61	−0.321	−5.13	−0.278	−4.39	−0.261	−4.14	−0.276	−4.03
MOM	0.091	11.57	0.090	11.36	0.087	11.24	0.088	12.10	0.080	10.15
COPEP	1.6E-04	7.01	1.2E-04	5.67	8.9E-05	4.47	1.1E-04	5.23	1.6E-04	3.08
AL1xH_COPEP	0.905	14.86								
AL1xL_COPEP	−0.109	−7.58								
AL2xH_COPEP			0.184	9.50						
AL2xL_COPEP			−0.087	−9.27						
AL3xH_COPEP					0.058	9.09				
AL3xL_COPEP					−0.081	−14.12				
AL4xH_COPEP							0.011	1.89		
AL4xL_COPEP							−0.110	−15.29		
AL5xH_COPEP									0.061	10.01
AL5xL_COPEP									−0.096	−14.75
Adj R^2	0.113		0.113		0.111		0.106		0.113	
Panel B: financing cash flows (CFINP)										
Intercept	−0.515	−17.69	−0.557	−19.30	−0.536	−18.78	−0.394	−13.56	−0.520	−18.01
AL1	0.133	12.85								
AL2			0.147	14.94						
AL3					0.129	14.64				
AL4							0.060	10.54		
AL5									0.145	14.61
SIZE	−0.069	−20.29	−0.070	−20.75	−0.066	−19.90	−0.051	−15.87	−0.063	−18.30
MB	4.0E-04	1.78	4.9E-04	2.15	4.7E-04	2.05	8.8E-05	0.47	4.5E-04	2.07

EQTY	0.075	20.63	0.077	21.46	0.070	19.79	0.056	15.02	0.066	18.10
VOLA	−0.381	−6.14	−0.352	−5.63	−0.319	−5.01	−0.309	−4.87	−0.342	−5.04
MOM	0.095	11.83	0.091	11.38	0.088	11.08	0.089	12.31	0.082	10.05
CFINP	−5.8E-05	−2.43	−1.9E-05	−0.89	6.3E-06	0.29	−2.2E-05	−0.96	−8.4E-05	−2.05
AL1xH_CFINP	−0.096	−6.76								
AL1xL_CFINP	0.529	14.15								
AL2xH_CFINP			−0.111	−11.51						
AL2xL_CFINP			0.191	11.59						
AL3xH_CFINP					−0.096	−14.59				
AL3xL_CFINP					0.062	9.00				
AL4xH_CFINP							−0.057	−9.38		
AL4xL_CFINP							0.027	4.05		
AL5xH_CFINP									−0.103	−15.83
AL5xL_CFINP									0.071	10.21
Adj R^2	0.112		0.115		0.115		0.102		0.116	
Panel C: investing cash flows (CINVP)										
Intercept	−0.465	−16.45	−0.493	−17.79	−0.484	−17.15	−0.420	−13.55	−0.467	−16.41
AL1	0.107	8.62								
AL2			0.107	11.55						
AL3					0.072	10.40				
AL4							0.061	10.35		
AL5									0.081	11.16
SIZE	−0.065	−19.25	−0.066	−19.80	−0.065	−18.99	−0.056	−15.51	−0.062	−17.55
MB	3.4E-04	1.53	4.0E-04	1.77	3.7E-04	1.63	1.9E-04	0.98	3.6E-04	1.71
EQTY	0.071	19.56	0.073	20.62	0.070	19.13	0.062	15.11	0.067	17.54
VOLA	−0.425	−6.78	−0.428	−6.70	−0.397	−6.19	−0.344	−5.32	−0.438	−6.44
MOM	0.093	11.56	0.091	11.21	0.092	11.39	0.092	12.06	0.087	10.49
CINVP	5.5E-06	0.19	2.2E-05	0.79	4.2E-05	1.31	3.5E-05	1.17	−1.1E-04	−3.83
AL1xH_CINVP	−0.156	−4.23								
AL1xL_CINVP	−0.063	−6.85								
AL2xH_CINVP			−0.106	−10.33						
AL2xL_CINVP			−0.056	−9.12						
AL3xH_CINVP					−0.064	−16.43				
AL3xL_CINVP					−0.028	−7.16				
AL4xH_CINVP							−0.084	−16.25		
AL4xL_CINVP							−0.014	−2.88		
AL5xH_CINVP									−0.070	−18.13
AL5xL_CINVP									−0.029	−7.58
Adj R^2	0.108		0.109		0.107		0.101		0.108	

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Table 10
Effect of asset productivity on return predictability of asset liquidity.

R_{t+12}	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.
Panel A: asset productivity (APROD1)										
Intercept	−0.551	−17.18	−0.546	−17.30	−0.557	−18.21	−0.481	−13.54	−0.559	−18.45
AL1	0.127	12.15								
AL2			0.100	10.54						
AL3					0.044	7.06				
AL4							0.047	8.14		
AL5									0.055	8.37
SIZE	−0.069	−18.90	−0.067	−18.37	−0.068	−18.42	−0.055	−12.72	−0.066	−17.25
MB	6.2E-06	0.03	4.4E-05	0.20	7.4E-05	0.34	-1.0E-04	−0.50	2.4E-04	1.13
EQTY	0.078	19.62	0.077	19.55	0.077	18.84	0.065	13.18	0.075	17.95
VOLA	−0.426	−6.64	−0.415	−6.49	−0.370	−5.65	−0.353	−5.30	−0.364	−5.42
MOM	0.095	12.01	0.097	12.45	0.100	12.93	0.091	12.43	0.095	11.84
APROD1	0.015	9.04	0.004	1.81	0.020	9.05	0.016	8.36	0.023	9.88
AL1xH_APROD1	0.156	7.45								
AL1xL_APROD1	−0.113	−8.70								
AL2xH_APROD1			0.072	6.18						
AL2xL_APROD1			−0.094	−7.91						
AL3xH_APROD1					0.024	4.45				
AL3xL_APROD1					−0.038	−4.58				
AL4xH_APROD1							0.068	9.63		
AL4xL_APROD1							−0.031	−4.83		
AL5xH_APROD1									0.018	3.45
AL5xL_APROD1									−0.055	−6.39
Adj R^2	0.125		0.124		0.121		0.116		0.121	
Panel B: asset productivity (APROD2)										
Intercept	−0.507	−17.63	−0.557	−20.87	−0.545	−20.05	−0.444	−16.42	−0.532	−19.62
AL1	0.128	11.03								
AL2			0.127	14.02						
AL3					0.088	12.18				
AL4							0.048	8.35		
AL5									0.098	12.58
SIZE	−0.067	−18.86	−0.069	−19.85	−0.068	−19.31	−0.055	−16.98	−0.065	−18.27
MB	0.001	2.93	0.001	3.48	0.001	3.49	0.001	2.38	0.001	3.64
EQTY	0.072	19.41	0.076	21.75	0.072	20.29	0.060	17.45	0.069	18.98
VOLA	−0.240	−3.68	−0.223	−3.45	−0.178	−2.81	−0.161	−2.56	−0.179	−2.61
MOM	0.071	9.87	0.071	9.57	0.068	9.36	0.065	9.48	0.061	8.23
APROD2	0.182	10.70	0.136	8.52	0.119	7.85	0.095	6.62	0.110	7.16
AL1xH_APROD2	0.098	5.80								
AL1xL_APROD2	−0.038	−2.48								
AL2xH_APROD2			0.079	7.02						
AL2xL_APROD2			−0.076	−5.75						
AL3xH_APROD2					0.058	9.38				
AL3xL_APROD2					−0.064	−9.03				
AL4xH_APROD2							0.126	17.57		
AL4xL_APROD2							−0.074	−9.25		
AL5xH_APROD2									0.067	10.66
AL5xL_APROD2									−0.072	−9.73
Adj R^2	0.132		0.135		0.132		0.127		0.135	

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Table 11
Effects of fixed asset growth, leverage on return predictability of asset liquidity.

R_{t+12}	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.	Coeff.	t-Stat.
Panel A: fixed asset growth (PPEGTH)										
Intercept	−0.447	−15.28	−0.524	−18.65	−0.493	−17.29	−0.385	−12.55	−0.491	−16.49
AL1	0.155	11.72								
AL2			0.156	16.80						
AL3					0.110	14.63				
AL4							0.037	6.45		
AL5									0.113	15.07
SIZE	−0.064	−19.36	−0.068	−20.55	−0.064	−19.29	−0.055	−16.47	−0.061	−17.48
MB	7.6E-04	3.05	9.6E-04	3.88	9.3E-04	3.84	5.7E-04	2.45	9.4E-04	3.92
EQTY	0.070	19.07	0.076	21.22	0.070	19.17	0.060	15.18	0.068	17.58
VOLA	−0.567	−8.62	−0.573	−8.79	−0.543	−8.34	−0.449	−6.80	−0.540	−8.25
MOM	0.104	12.65	0.102	12.50	0.101	12.46	0.106	13.59	0.096	11.52
PPEGTH	−0.027	−3.04	−0.035	−3.83	−0.085	−7.32	−0.040	−4.02	−0.077	−6.18
AL1xH_PPEGTH	−0.069	−4.95								
AL1xL_PPEGTH	−0.011	−0.65								
AL2xH_PPEGTH			−0.055	−6.04						
AL2xL_PPEGTH			−0.008	−0.84						
AL3xH_PPEGTH					−0.032	−5.69				
AL3xL_PPEGTH					−0.024	−3.89				
AL4xH_PPEGTH							0.000	0.04		
AL4xL_PPEGTH							−0.012	−2.19		
AL5xH_PPEGTH									−0.034	−6.11
AL5xL_PPEGTH									−0.017	−2.65
Adj R^2	0.112		0.113		0.111		0.101		0.109	
Panel B: leverage (DE)										
Intercept	−0.545	−18.75	−0.599	−20.44	−0.550	−19.41	−0.437	−14.53	−0.556	−18.74
AL1	0.258	15.94								
AL2			0.162	16.33						
AL3					0.078	11.36				
AL4							0.072	11.66		
AL5									0.085	12.03
SIZE	−0.073	−20.36	−0.075	−20.35	−0.072	−19.97	−0.056	−14.94	−0.071	−18.83
MB	−3.5E-04	−1.54	−9.3E-05	−0.39	1.7E-06	0.01	−1.2E-04	−0.58	−1.9E-04	−0.71
EQTY	0.079	21.13	0.083	21.90	0.077	20.79	0.061	15.03	0.077	19.32
VOLA	−0.400	−6.36	−0.373	−5.95	−0.333	−5.26	−0.316	−5.04	−0.360	−5.43
MOM	0.095	11.92	0.097	12.32	0.097	12.52	0.093	12.46	0.095	11.91
DE	0.003	11.10	0.002	9.39	0.002	6.46	0.001	3.97	0.003	4.94
AL1xH_DE	0.060	3.31								
AL1xL_DE	−0.225	−15.55								
AL2xH_DE			0.059	5.52						
AL2xL_DE			−0.128	−14.56						
AL3xH_DE					0.033	6.82				
AL3xL_DE					−0.057	−9.92				
AL4xH_DE							0.018	2.92		
AL4xL_DE							−0.052	−10.72		
AL5xH_DE									0.035	6.56
AL5xL_DE									−0.056	−9.46
Adj R^2	0.115		0.115		0.110		0.103		0.112	

Table 12
Return predictability of asset liquidity after controlling for size, MB and realized volatility (two-way sorting).

Control variable																			
SIZE					MB					VOLA					MOM				
Variable	R_{t+1}		R_{t+12}			R_{t+1}		R_{t+12}			R_{t+1}		R_{t+12}			R_{t+1}		R_{t+12}	
	Coeff.	t-Stat.	Coeff.	t-Stat.	Variable	Coeff.	t-Stat.	Coeff.	t-Stat.	Variable	Coeff.	t-Stat.	Coeff.	t-Stat.	Variable	Coeff.	t-Stat.	Coeff.	t-Stat.
SIZE1(H)					*MB1(H)*					*VOLA1(H)*					*MOM 1(H)*				
Q1(H)	0.007	1.93	0.044	2.66	Q1(H)	−0	−0.64	−0.08	−3.21	Q1(H)	0.009	1.45	−0.01	−0.3	Q1(H)	0.018	3.78	0.044	1.85
Q3	0.003	0.79	0.024	1.8	Q3	−0.01	−3.06	−0.11	−6.25	Q3	−0.02	−3.08	−0.12	−5.22	Q3	0.005	1.48	0.009	0.54
Q5(L)	−0.003	−0.67	−0.018	−1.07	Q5(L)	−0.04	−7.77	−0.41	−14.6	Q5(L)	−0.04	−6.65	−0.36	−14.2	Q5(L)	−0.01	−1.33	−0.11	−5.39
Q1–Q5	0.01	3.91	0.062	5.83	Q1–Q5	0.036	9.65	0.327	20.48	Q1–Q5	0.047	11.43	0.355	26	Q1–Q5	0.023	7.95	0.155	12.54
SIZE2					*MB2*					*VOLA2*					*MOM2*				
Q1(H)	0.011	2.76	0.051	2.68	Q1(H)	0.01	2.28	0.019	0.89	Q1(H)	0.01	2.39	0.064	3.03	Q1(H)	0.011	3.48	0.099	6.16
Q3	−0.002	−0.48	−0.011	−0.61	Q3	−0	−1.13	−0.05	−2.96	Q3	−0.01	−1.43	−0.04	−2.07	Q3	0.001	0.21	0.024	1.78
Q5(L)	−0.011	−2.53	−0.106	−5.21	Q5(L)	−0.02	−4.97	−0.17	−8.69	Q5(L)	−0.03	−6.33	−0.25	−12	Q5(L)	−0.01	−2.02	−0.05	−3.52
Q1–Q5	0.022	8.46	0.158	14.97	Q1–Q5	0.029	9.35	0.186	15.72	Q1–Q5	0.038	12.83	0.31	26.49	Q1–Q5	0.017	7.77	0.147	14.87
SIZE3					*MB3*					*VOLA3*					*MOM 3*				
Q1(H)	0.007	1.64	0.001	0.05	Q1(H)	0.013	3.46	0.098	5.46	Q1(H)	0.012	3.6	0.101	6.21	Q1(H)	0.009	2.73	0.074	4.43
Q3	−0.006	−1.84	−0.059	−3.51	Q3	−0	−0.8	−0.04	−2.34	Q3	−0	−0.25	−0.01	−0.85	Q3	−0	−0.66	0.001	0.06
Q5(L)	−0.019	−4.46	−0.188	−9.28	Q5(L)	−0.02	−4.42	−0.12	−6.34	Q5(L)	−0.01	−3.53	−0.13	−6.97	Q5(L)	−0.01	−3.57	−0.09	−5.36
Q1–Q5	0.026	7.84	0.189	11.56	Q1–Q5	0.03	11.49	0.213	20.79	Q1–Q5	0.025	10.56	0.229	21.88	Q1–Q5	0.02	9.25	0.159	14.97
SIZE4					*MB4*					*VOLA4*					*MOM 4*				
Q1(H)	0.009	2.22	0.028	1.29	Q1(H)	0.016	4.6	0.12	6.22	Q1(H)	0.012	3.55	0.104	6.58	Q1(H)	0.002	0.6	0.067	3.47
Q3	−0.008	−2.44	−0.066	−3.96	Q3	−0	−0.37	−0.01	−0.6	Q3	−0	−0.54	−0	−0.2	Q3	−0.01	−2.36	−0.05	−2.78
Q5(L)	−0.03	−7.44	−0.297	−14.79	Q5(L)	−0.01	−2.2	−0.1	−6.35	Q5(L)	−0.01	−2.64	−0.09	−4.97	Q5(L)	−0.02	−4.87	−0.2	−10
Q1–Q5	0.039	12.69	0.325	27.31	Q1–Q5	0.025	9.04	0.221	21.91	Q1–Q5	0.021	8.61	0.194	19.81	Q1–Q5	0.021	7.86	0.265	17.75
SIZE5(L)					*MB5(L)*					*VOLA5(L)*					*MOM 5(L)*				
Q1(H)	0.009	2.06	0.075	3.48	Q1(H)	0.017	4.69	0.146	8.13	Q1(H)	0.01	4.36	0.111	8.44	Q1(H)	0.007	1.23	0.029	1.23
Q3	−0.011	−3	−0.067	−3.91	Q3	0.002	0.46	0.035	2.09	Q3	0.003	1.52	0.03	2.56	Q3	−0.01	−2.86	−0.13	−6.03
Q5(L)	−0.024	−5.33	−0.276	−13.35	Q5(L)	−0.01	−3.4	−0.18	−9.5	Q5(L)	−0	−1.25	−0.03	−2.25	Q5(L)	−0.04	−7.2	−0.36	−14.5
Q1–Q5	0.033	8.73	0.352	26.49	Q1–Q5	0.031	9.49	0.326	27.23	Q1–Q5	0.012	7.47	0.139	16.1	Q1–Q5	0.047	11.17	0.385	31.69

return predictability of AL. We also get similar results using other AL measures.

4.7. Fixed asset growth, leverage and return predictability of asset liquidity

Table 11 presents coefficient estimates of regression of one-year-ahead return with AL, PPEGTH (DE) using the following regression models:

$$\text{Model 16}: R_{t+12} = \alpha + bAL_{i,t} + cSIZE_t + dMB_t + eEQTY_{i,t} + fVOLA_{i,t} + gMOM_{i,t} + bAL_{i,t}[PPRGTH_{i,t}] + \epsilon \quad (37)$$

$$\text{Model 17}: R_{t+12} = \alpha + bAL_{i,t} + cSIZE_t + dMB_t + eEQTY_{i,t} + fVOLA_{i,t} + gMOM_{i,t} + bAL_{i,t}[DE_{i,t}] + \epsilon \quad (38)$$

Here, H_ PPEGTH (H_DE) equals one if the firm has PPEGTH (DE) at or above the 80th percentile of firms at time t, and zero otherwise; L_ PPEGTH (L_DE) equals one if the firm has PPEGTH (DE) at or below the 20th percentile of firms at time t, and zero otherwise.

PPEGTH is selected to proxy for the fixed asset growth of firms. The results of Panel A show that the coefficient on AL1[H_PPEGTH] is significantly negative, indicating that the return predictability of AL will be reduced if the firm has a high level of fixed asset growth. Finally, in Panel B of Table 11, the coefficient on AL1[H_DE] is positive and significant across all AL measures. To conclude, the positive relation between AL and one-year-ahead returns is significant for all Al measures. In addition, the relation is stronger for high-quality cash flow, high asset productivity, low fixed asset growth and high leverage stocks.

4.8. Return predictability after controlling for cross-sectional variables

As a robustness check, we conduct two-way sorts on AL controlling for one of four variables (SIZE, MB, VOLA and MOM) for each sorting to examine whether AL is separately priced from these variables using the following regression models.

$$R_{t+1} = a + bAL3_{i,t} + CONTROL_{i,t} + \epsilon \quad (39)$$

$$R_{t+12} = a + bAL3_{i,t} + CONTROL_{i,t} + \epsilon \quad (40)$$

where:

R_{t+1} represents future returns 1 months ahead;
R_{t+12} represents future returns 12 months (one-year) ahead;
CONTROL = SIZE, MB, VOLA, or MOM

When AL3 is controlled, the stocks are first categorized in each month into five portfolios based on the control variable SIZE (MB, VOLA, MOM) for each control quintile (Q1, Q3, Q5, and Q1-Q5), respectively. Within each SIZE category (MB, VOLA, MOM) quintile, the stocks are further sorted by AL3. The first AL3 quintile within each control quintile is combined to form a single average quintile 1.

Table 12 reports the results of the quintile portfolio return and the return difference of the AL3 Q1 and Q5 portfolios after controlling for one of the variables. We obtain similar results for the other four AL measures (AL1, AL2, AL4, and AL5), which are available upon request.

We examine first the interaction of asset liquidity and the size effect. At the outset, we rank stocks into quintile portfolios based on their SIZE values. Then, within each size quintile, we sort into five portfolios based on AL3. First, the results indicate that the AL3 Q1 quintile portfolio has the highest future returns compared with the other AL3 quintiles in each size quintile. The result is more pronounced for the smallest size quintile (SIZE5). Moreover, after controlling for size, the monthly return difference between the AL3 Q1 and Q5 quintiles remains 1% (t-statistic = 3.91) for SIZE1 quintile and 3.3% (t-statistic = 8.73) for SIZE5 quintile, respectively. Hence, the results provide evidence that the size effect cannot explain the AL anomaly.

We conduct the same two-way sorts for the other control variables. For the interaction of MB and the AL effect, we find that after controlling for MB ratios, the return spread between the AL3 Q1 and Q5 portfolios is 3.6% per month (t-statistic = 9.65) for the MB1 and 3.1% per month (t-statistic = 9.49) for MB5 portfolios, respectively. The findings of these two-way sorts provide evidence that AL and MB are separately priced in the cross-section of stock returns.

We also examine whether return volatility can explain the asset liquidity effect. The results of Table 12 indicate that controlling for volatility does not eliminate the return predictability of AL. The return spread of the AL3 Q1 and Q5 quintile are shown to be significantly positive for all VOLA quintiles portfolios.

Finally, we examine AL and MOM in the two-way sorts. Again, controlling for MOM does not eliminate the return forecasting power of AL. The monthly return spread of the AL3 Q1–Q5 portfolio remains positive and significant for all MOM quintiles. In summary, the findings offer evidence that AL exhibits distinct return predictability that cannot be explained by SIZE, MB, VOLA and MOM.

5. Conclusion

Our results show that asset liquidity has significant predictive power with respect to future stock returns. We propose a new measure of asset liquidity and adopt four measures of asset liquidity derived from Gopalan et al. (2012) in our return predictability tests. We demonstrate that there is a significantly positive relationship between asset liquidity and cross-sectional expected returns. Our proposed asset liquidity model also outperforms the other four asset liquidity measures in return prediction with a return difference of 23.1% per year between the highest and lowest asset liquidity–sorted portfolios. This asset liquidity trading strategy is also consistently profitable over the sample period, yielding positive annual returns in 95% of the years in the sample. We find that the return predictability of asset liquidity remains significant after controlling for company size, market-to-book ratio, momentum and volatility. The alphas of the Carhart (1997) four-factor model are significantly positive for a long-short asset liquidity–ranked quintile portfolio.

We conduct a composition study of the characteristics of firms in the highest and lowest asset liquidity quintiles. Our results show that firms in the highest asset liquidity portfolio are dominantly featured with high operating cash flow, asset productivity, leverage and operating profitability. Firms in this highest asset liquidity quintile are also characterized by less financing cash, lower market-to-book ratios and lower fixed asset growth.

Our study also shed lights on how return predictability of AL depends on quality of cash flow. The results provide evidence that a higher proportion of operating cash flow in cash holdings enhances the asset liquidity and operating flexibility of a company to generate higher future stock returns. However, if the asset liquidity is due to a higher proportion of financing cash in the cash balance, stock price performance worsens. Further tests show that the asset liquidity effect is stronger for firms with greater asset productivity and lower capital investment.

The asset liquidity trading strategy is robust, as demonstrated by the two-way sorts with cross-sectional determinants of size, MB, momentum and volatility. The results suggest that the asset liquidity effect is priced distinctly from these cross-sectional variables and exhibits predictive power in the cross-section returns that cannot be explained by these determinants.

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