**On the Role of Education in Capital Markets Liquidity: International Evidence**

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**Abstract**

In this paper, we examine the extent to which education plays a part in explaining liquidity in international capital markets. We examine whether liquidity is correlated with primary and secondary education, as measured by the World Bank estimates. Using a database containing information about education and liquidity variables from 266 countries around the world, we show that education plays an important role in supporting liquidity, one of the cornerstones of capital market microstructure variables. Then, we delve deeper to examine whether the contribution of education holds on the level of individual securities, using a dataset consisting of 780 ADRs from 39 countries. Our findings consistently show that education improves ADR spreads and other liquidity measures. To further strengthen our *causal* inference from education to liquidity we use a difference-in-differences approach and examine several events that can be considered exogenous shocks to education. The results remain similar and clearly signal improved liquidity. We conclude that given that liquidity itself has benefits such as fostering economic growth, investment, and savings, then any reforms or policies that increase the level of education will benefit individuals, firms, and other financial agents, eventually supporting the country as a whole.

*Keywords*: ADR, American depository receipts, Liquidity, Spread, Bid-Ask, Literacy.

*JEL classifications*: G01, G12, G15, G18.

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1. **Introduction**

*“Give a man a fish and you feed him for a day; teach a man to fish and you feed him for a lifetime.”*

*Maimonides*

Throughout economic history, new ideas, technologies, innovation, and progress have been the foundation for sustainable welfare and economic growth from both the personal and public perspectives. These mechanisms allow both individuals and nations to develop and advance their relative advantage to compete with their peers, and education is a well-recognized engine that allows such mechanisms to prosper. Education plays a crucial role in a country’s development and imparts various skills, values, growth, performance, prosperity, and competitiveness to national and global economies. The academic literature offers several theoretical models as channels through which education can encourage economic growth: by raising the capacity of the local economy for innovation, leading to new technologies and inventions (Romer, 1990; Aghion et al., 1998), by spreading the knowledge required to realize and apply new technologies (e.g., Benhabib & Spiegel, 2005; Barro and Lee, 2010), or by improving the efficiency, skills, expertise, and productivity of the labor force, which translates into a higher GDP (Mankiw, Romer, & Weil, 1992). Based on these models, there is a clear motivation for policymakers at the country level to promote education.

Given that education shapes the knowledge and ideas of individuals, and individuals compose the entire human capital in a certain country, it is plausible to expect that the quality and merits of education will also be evident through in terms of the domestic economy, either through the firms operating in it or the individuals supporting the functioning and sustainability of firms. A handful of studies supporting this view include, for example, the works of Hanushek et al. (2008), estimating the economic value of attainment in primary education across fifty countries. They show that an additional year of schooling has both an *individual* and an *aggregate* impact. More specifically, they report that an additional year of schooling can increase a person’s earnings by 10% and the average GDP by 0.37% annually. Similarly, for the US states examination, Hanushek, Ruhose & Woessmann (2017) show that educational reforms can in aggregate yield an estimated present value of long-run gains equivalent to 8% of discounted future GDP.

In this vein, a recent study[[1]](#footnote-1) by the OECD reports that private net financial returns, defined as the difference between the costs and benefits associated with attaining an additional level of education, are positive in the long run for both men and women. On average across the OECD, the net present value (NPV) of private financial returns from attaining tertiary education is USD 287,200 for a man and USD 226,800 for a woman. Higher levels of educational attainment also lead to higher net benefits for the public sector in terms of income tax and social contributions. The NPV of public net financial returns from attaining tertiary education is about USD 127,000 for a man and USD 60,600 for a woman, while the internal rate of return (IRR) to governments from tertiary education is 8% for a man and 6% for a woman.

While it is apparent that education has a positive economic effect from the perspectives of both individuals and nations, in this study, we aimed to test the possible contribution of education from a different, yet no less important, angle. Specifically, we pose the question of whether education also has a positive effect on one of the key microstructure variables, market trading liquidity. Capital markets may boost economic growth through the provision of liquidity, increasing both savings and investments. If capital markets are more liquid, they bridge between the desire of investors to sell or rebalance their holdings at any given point in time. For firms, liquidity expands access to capital, and more importantly, facilitates the long term, to which individuals are reluctant from when liquidity is weak. Therefore, liquidity contributes to higher savings and investments, and also contributes to various other aspects such as market efficiency and the price discovery process. Evidently, education contributes significantly to economic growth and welfare through various channels, but if education is a driver of more liquid markets, it is plausible that it will also accelerate economic growth, along with other positive aspects generally attributed to liquidity, such as greater market efficiency, lower uncertainty, and a better price discovery process. Hence, we are motivated to explore education as a possible driver for market liquidity.

Why should education enhance market liquidity? There are possibly two channels through which more educated countries may be associated with more liquid capital markets. First, financial markets are a reflection of the economic environment, and the value of listed firms is derived from economic activity. Given that education has been shown theoretically and empirically to be a catalyst for real economic growth and greater economic activity, we believe that the more educated countries are, the more they enjoy the benefits of greater attention through the lens of better liquidity in their domestic capital market. Second, the capital market is one of the main infrastructures through which investments and foreign direct investments are made. Noorbakhsh, Paloni & Youssef (2001), for example, suggest education as an essential ingredient for attracting foreign direct investment. More educated countries may yield new investment opportunities, leading to increased capital flows into these markets. These increased flows may directly (and/or indirectly) lead to higher interest in the securities traded in these countries. Thus, the merits of education should also be valid in capital markets activity.

Several empirical works are closely related to our paper, and are the baseline for our main hypothesis that more educated countries are associated with more liquid markets. One of very few studies linking education to microstructure variables is Xing (2004). According to this paper, school life expectancy in a country, as a proxy for the level of education of investors, is the most important factor in explaining cross-country market volatility differences. He argues that education is a significant explanatory variable for volatility, due to the possibility that the collective characteristics of investors in a market play a significant role in shaping market volatility. Since investors typically show a strong “home bias,” investors’ collective behavior could be decisive in shaping stock market movements in a country. As such, this calming effect on volatility may also determine the liquidity characteristics of the local market.

In an interesting study, Cole, Paulson & Shastry, (2014) report a positive relationship between years of schooling and the ownership of bonds, government securities, stocks, or mutual funds persists. They find that one more year of schooling increases the likelihood that an individual owns bonds or government securities by about 6.5 percentage points, and stocks or mutual funds by 4 percentage points. They state that the effect of education on any investment income is equivalent to about 19 percentage points, and the effect of education on having bonds or government securities and stocks or mutual funds is equivalent to about 11 percentage points. Similarly to Xing, they state that education effect as an explanatory variable is much more evident in its magnitude than other variables such as trust, peer effects, and former experience with stock market returns. They conclude that more education *causes* households to be more likely to invest in high-return assets, such as equities.

In a more recent study, Black et al. (2018) seek to test the *causal* impact of education on investment behavior. Specifically, they test the impact of an educational reform in Sweden, which increased the duration of compulsory schooling from 7 to 9 years, on market participation and the likelihood of holding risky financial assets. They offer several interesting channels through which education may increase market participation and the tendency to invest in risky assets. More education might overcome entry barriers and reduce investors’ risk aversion; more education leads to greater financial wealth, allowing investors to put their capital in risky financial assets; finally, more educated individuals may have lower costs of gathering and processing information about investment risks. Using the Swedish education reform, they find a positive *causal* effect from education on stock market participation, but these outcomes are limited to men only. More specifically, they report that an additional year of schooling increases stock market participation by two percentage points and risky market participation by one percentage point. They also report that the additional year of schooling also increases the proportion of men’s financial assets invested in stocks by 10%, conditional on participation. In a nutshell, both the work of Cole, Paulson & Shastry, (2014) and that of Black et al. (2018) show a causal relationship from education to market participation. Therefore, based on their findings, we assert that more educated countries (having higher market participation), will also have better liquidity at both the country and firm levels

Our paper has several motivations and contributes to the existing literature from several aspects. First, we contribute to the former studies (e.g., Campbell, 2006; Calvet, Campbell, and Sodini, 2007, 2009; Barnea, Cronqvist, and Siegel, 2010; Van Rooij, Lusardi & Alessie, 2011; Cole, Paulson & Shastry, 2014 and Black et al., 2018) which were mainly focused on the impact of education and financial literacy on market participation and the tendency to hold risky assets. While these studies demonstrate a clear relationship between education, market participation, and investment choice, we extend their examination to test whether market participation is translated *de facto* into better liquidity in financial markets. From this perspective, we may also contribute to the long debate in the literature attempting to explain the phenomenon of stock market participation, beginning in the early studies of Mankiw & Zeldes (1991) and Haliassos & Bertaut (1995).‏

Second, Black et al. (2018) state that “*despite the presence of a robust positive correlation between education and investment in risky financial assets, there is only limited work identifying the causal effect of education on equity holding*”. In fact, Black et al. (2018) is one of the very few studies to address the issue of endogeneity: that increased market participation may rise from some unobserved variables related to both education and liquidity. We are motivated to complete this need by suggesting a *causal* relationship from education to liquidity, employing a difference-in-differences approach to support the view of Black et al. (2018).

Third, most of the previous studies dealing with the effect of education on market participation focus on the US, Sweden, or a very limited number of other countries. Our study encompasses over 39 countries, in an attempt to observe the education-liquidity nexus in different capital markets. In addition, we take a further step and examine the possible impact of education, not only on the aggregate liquidity in each country but also in the single security level, using a unique sample of ADRs: shares of foreign firms traded under the U.S. stock exchanges laws. Several previous works have adopted the use of ADRs to mitigate endogeneity flaws (e.g., Chung 2006; Eleswarapu & Venkataraman, 2006; Blau, Brough & Thomas, 2014; Blau, 2017). The use of an ADRs design allows us to isolate the effect of education in the home country on the liquidity of a security, while keeping the market structure constant. It also has the benefit of being a unique design that controls for different market structures, currencies, and other country effects. Finally, it offers a possible remedy for the non-synchronous trading bias: a typical concern in country-level examinations across time.

Forth, we are inspired by the works showing that education improves investors’ financial decisions and the novel work of the inelastic market hypothesis (Gabaix & Koijen, 2021). Cole et al. (2014) show that education improves financial decision-making, and Campbell (2006) also shows that less educated households tend to invest poorly (e.g., under-diversification) and are more likely not to participate in risky markets at all. In a subsequent study, Campbell, Giglio, and Pathak (2011) suggest that consumers’ financial mistakes might also spill over and affect the stability of the financial system, and that this behavior is correlated with low levels of education. On the other hand, according to Gabaix & Koijen (2021), institutions—as opposed to households—have “*moderate scope for variation in response to changing market conditions. As a result, the price elasticity of demand of the aggregate stock market is small and flows in and out of the stock market have large impacts on prices*”. In a nutshell, they suggest that the flow of capital from households is probably responsible for the direction and magnitude of market crashes. Given that education has been shown to lead to better financial decision-making, there is a clear motivation for why our research question is also important from the disaster risk perspective. To the extent that education indeed improves investors’ choices and decisions, increased liquidity in the market may soften the inelastic property of capital markets. In addition, given that liquidity inflows eventually determine the direction of the market, it is preferred that such liquidity is based on more rational financial factors.

Finally, higher liquidity has its own merits which could aid in several aspects related to trading in the securities of firms. It is well known that better liquidity improves overall market efficiency and the ability to respond quickly to new information, improves the price discovery process, expands the pool of potential investors, and reduces uncertainty in trading. Hence, more liquid markets are associated with more prosperous economic activity (Levine, 1991; King & Levine, 1993; Levine & Zervos, 1998; Rousseau & Wachtel, 2000; Durusu-Ciftci et al., 2017). Thus, if indeed education improves liquidity, countries as well as firms and individual investors will benefit from the advantages associated with liquidity, and importantly, from economic growth stemming from both education and liquidity.

As in every study, the investigated (education-liquidity) relationship is a real challenge since it may suffer from possible endogeneity problems and reverse causality. Observing a correlation between education and liquidity is not equivalent to showing a *causal* relationship from education to liquidity. Even if it is not rational to believe that somehow liquidity tends to affect education, we strengthen our causal inference from education to liquidity by having a clear design. We examine several education reforms as exogenous events which clearly altered the level of education, and test liquidity around these events.

Our main results can be summarized as follows. Education expenditure and the duration of primary education in years are both negatively associated with the spread of ADRs in both univariate and multivariate models while controlling for all ADRs and country-level characteristics. The same is true for the Amihud (2002) illiquidity measure. In addition, both primary and secondary school enrolment are consistently associated with narrower spreads and lower illiquidity measures. Interestingly, the contribution of education seems to be evident and economically significant for both men and women, and for primary and secondary enrolment. For example, a one percent increase in female primary enrolment decreases the illiquidity by 4.93%, while a one percent increase in male primary enrolment decreases illiquidity by 4.59%. These findings suggest that countries, as well as firms, may enjoy better liquidity measures, and consequently the benefits associated with greater liquidity, by encouraging higher levels of education.

The remainder of the paper unfolds as follows. In section 2, we describe the sample and data used, the methodological approach, and define our main key variables. In section 3, we discuss the empirical findings, and in section 4 we present our conclusion.

**2. Data and Methodology**

We obtain daily American Depositary Receipts (ADR) data from the Center for Research on Security Prices (CRSP). We then use the Bloomberg database to identify the respective home countries of the ADRs in our sample. We also obtain country-specific data on GDP per capita, unemployment rate, and annual population growth rate from the World Bank database. In our final sample, we have 780 ADRs from 39 countries and 5,279 ADR-year observations. Our data spans from 2001 to 2020. In 2002, the SEC and all U.S. exchanges reduced the tick size to $0.01, which significantly affected subsequent market liquidity.

**Table 1** presents the summary statistics for our dependent, independent, and control variables. Our dependent variables or variables of interest are *Spread* and *Illiquidity*. *Spread* is the daily closing bid-ask spread averaged over the year. *Illiquidity* is the annual average of the illiquidity measure proposed by Amihud (2002). For our study, when spread and illiquidity measures increase, market liquidity decreases.

Our main independent variables are the education expenditure by the ADR host country, the number of years of primary education in the ADR host country, and enrolments in primary and secondary education in the ADR host country. We also gathered data on enrolment in primary and secondary education by gender (male and female primary and secondary enrolment). Information about primary and secondary education has been used to measure human capital in earlier studies (e.g., Romer, 1990; Mankiw et al., 1992; Levine & Zervos, 1993).

Our ADR control variables include *Volatility*, which is the idiosyncratic volatility of each ADR, *Turnover*, which is the daily stock turnover, *Marketcap*, which is the market capitalization in billions of US dollars of the ADR firm on the last trading day of the year, *Price*, which is the price of the ADR on the last trading day of the year, and *Nasdaq*, which is the indicator variable for whether the ADR is listed on Nasdaq exchange or not. Our country-specific control variables are GDP per capita, the unemployment rate as a percentage, and the annual population growth rate.

In **Table 1**, we see that the average value of *Spread* is 0.0097 and *Illiquidity* is 1.54498. The average value of *Total Primary Enrolment* is 30.88 million, of which *Female Primary Enrolment* and *Male Primary Enrolment* is 14.48 million and 14.40 million, respectively. Furthermore, *Total Secondary Enrolment* is 28.39 million, while *Female Secondary Enrolment* is 13.47 million and *Male Secondary Enrolment* is 14.92 million. We make two interesting observations here: first, male enrolment at both primary and secondary levels is higher than female enrolment; second, enrolment in secondary education is lower than enrolment in primary education, which is a normal trend in most countries. The average value of *Primary Education (years)* in our ADR host countries is 5.8 years.

**Table 2** shows the country names and numbers of corresponding ADRs along with other main and control variables. We see that China has the highest number of ADRs in our sample. *Illiquidity* and *Spread* are at a minimum in Russia and a maximum in Poland. *Primary Education* *(Years)* ranges from 4 to 8 years in our sample countries. The numbers of primary and secondary enrolment are highest in the countries with greater populations, such as Indian and China, and the lowest in the countries with smaller populations, for example, Singapore and New Zealand. However, China spends the most on education among our sample countries. **Table 3** shows the correlations among our dependent and independent variables. We observe that *Illiquidity* and *Spread* are 66.6% positively correlated. However, the correlation coefficients between our dependent variables—such as *Illiquidity* and *Spread*—and the independent variables are very low.

**3. Empirical Findings**

In this section, we examine the association between our various measures of education— education expenditure, primary education in years, total enrolment in primary and secondary education—and our liquidity measures such as *Spread* and *Illiquidity*. If our hypothesis is correct, and there is a negative association between dependent and independent variables, then we can posit that an increase in education in the ADR host country improves market liquidity. Following Petersen (2009), we include firm-level robust standard error and year-fixed effects throughout our multivariate regression analysis to control for potential cross and serial dependence issues.

* 1. **Primary Education (in Years), Education Expenditures and Liquidity**

To test whether education expenditures and the number of years of primary education improve the liquidity of ADR stocks, we run the following OLS regression:

**(1)**

The dependent variables are *Spread* and *Illiquidity* as defined in the data section. Education expenditure and the number of years of primary education are independent variables. *Ln\_Price* and *Ln\_Marketcap* are the natural logs of end of the year closing price and end of the year closing market capitalization for each ADR. *Ln\_GDP*, and *Ln\_Unemp* are the natural logs of GDP per capita and unemployment rate, while *Population* is the annual population growth rate for countries in our sample. Other variables are defined in the data section.

**Table 4** presents the result of equation 1. Columns 1, 2, and 3 show the results when *Spread* is the dependent variable. In column 1, we observe that education expenditure is negatively associated with *Spread* when controlling for all ADR and country-level variables. We observe the same result in column 2, where the number of years of primary education in each country is also negatively associated with *Spread*. In column 3, we analyze education expenditure and number of years of primary education together in multivariate regression, finding that both variables are still negatively associated with the *Spread* of the ADRs. These statistically significant results suggest that increasing the expenditure on education and increasing the number of years of primary education decrease the *Spread* of the ADR. However, the association between education expenditure and *Spread* is stronger than the association between number of years of primary education and *Spread* in each country in our sample.

We show results for *Illiquidity* as the dependent variable in columns 4, 5, and 6. Similarly to *Spread*, we find a negative—but less statistically and more economically significant—association between education expenditure and illiquidity, however, the negative association between the number of years of primary education is not statistically significant even when controlling for the stock and country-level variables. Overall, these results support our claim that greater education expenditure and more years of primary education lead to improved market liquidity in the given country.

* 1. **Primary Education Level and Liquidity**

In this subsection, we test whether primary education improves market liquidity. We run the following OLS regression:

**(2)**

**Table 5** represents the results of this regression. We show the results for *Spread* as the dependent variable in columns 1, 2, and 3. In column 1, we find a negative and statistically significant association between *Total Primary Education* and *Spread*. We find similar results in columns 2 and 3, where an economically and statistically significant negative association is apparent with male primary enrolment and female primary enrolment. These results support our hypothesis that primary education improves market liquidity.

We show the results for *Illiquidity* as the main dependent variable in columns 4, 5, and 6. Similarly to the results in columns 1, 2, and 3, we find an economically and statistically significant negative association between *Primary Education Enrolment* and *Illiquidity*. However, some observations are quite interesting. First, we find that the association between primary education and illiquidity is economically stronger than the association between primary education and spread. Secondly, we find that the negative association between female primary enrolment and illiquidity is more economically significant than for male primary enrolment or total primary enrolment. In economic terms, a one percent increase in female primary enrolment decreases illiquidity by 4.93%, while a one percent increase in male primary enrolment decreases illiquidity by 4.59%. The results show that female primary enrolments are more important for improving market liquidity than male primary enrolments.

* 1. **Secondary Education Level and Liquidity**

In this subsection, we test whether secondary education improves market liquidity. We run the following OLS regression, as represented by Eq. (3) below:

**(3)**

**Table 6** presents the results of the model regression described in equation 3. We show the results for *Spread* as the dependent variable in columns 1, 2, and 3. We find similar results to the previous section when we examine the association of primary education enrolment with *Spread*. We find a negative, statistically and economically significant association between total secondary enrolments and spread. We find negative and equally significant associations between female secondary enrolment, male secondary enrolment, and spread. Female and male secondary enrolments are equally important in improving market liquidity. These results again support our hypothesis that an increase in secondary education improves market liquidity.

The results for *Illiquidity* as a dependent variable are presented in columns 4, 5, and 6 of **Table 6**. As expected, we find significant negative association between secondary enrolments and illiquidity, which implies that an increase in secondary enrolments does indeed increase market liquidity. Upon exploring the results more deeply, we again make interesting observations. For example, overall, these results are economically stronger than the results we found for the relationship between primary enrolments and illiquidity. The intuition behind the stronger association between secondary enrolments and illiquidity is that, as the population becomes more educated (increase in secondary enrolment), more educated decisions are being made when it comes to investing in stock markets. Hence, these results strongly support our hypothesis that an increase in education level improves market liquidity. Moreover, we again find that female secondary enrolment is economically more important for liquidity improvements than male secondary enrolment. In economic terms, a one percent increase in female secondary enrolment decreases illiquidity by 5.35%, while a one percent increase in male secondary enrolment decreases illiquidity by 4.98%. However, in general, an increase in overall secondary enrolment is important for improving market liquidity.

**4. Summary and Conclusions**

There is widespread evidence that education plays a key role in enhancing economic performance, yet the impact of education on market microstructure is an unchartered land. Is it possible that more educated countries are associated with more liquid financial markets? Is primary and secondary education responsible for lower trading spreads? Does illiquidity decrease in response to the level of education in a certain country? This paper deals with the role of education in the liquidity of international capital markets, as well as exploring the possible effect of education on the liquidity characteristics on the level of individual securities. To answer these questions on both the macro and micro levels, we gathered data for more than 200 countries worldwide, including aggregate liquidity measures for domestic capital markets, and an additional unique dataset consisting of 700 ADRs from 39 countries.

Individuals may be reluctant to participate in trading stocks if they lack basic education, including knowledge of arithmetic. However, we show here that more educated countries are also more liquid, suggesting that more knowledge (education) is probably a determinant of higher trading volumes, and thus may be a possible way to cope with barrier. The positive effect of education is not limited to aggregate liquidity on the country level, is but also evident for individual firms and their securities. Based on these findings, we suggest that policies that can accommodate the integration and development of education may also foster the liquidity and functioning of capital markets. More liquid capital markets lead to more stable financial infrastructure, which is a desired trait for the development of firms and the welfare of investors.

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**Table 1: Summary Statistics**

ILLIQUIDITY represents the Amihud (2002) illiquidity measure computed by scaling the absolute return by the dollar volume scaled by a factor of one million.SPREAD is the daily bid-ask spread computed as the difference between ask and bid prices of ADRs scaled by their mid-point. VOLATILITY represents ADR volatility computed as the difference between the natural log of intra-day high and low prices. TURNOVER is the trading volume scaled by the number of shares outstanding. MARKETCAP is the ADR market capitalization calculated by multiplying price by number of shares outstanding, and is presented in billions. PRICE is the closing ADR price. NASDAQ is a dichotomous variable that takes on a value of 1 for ADRs listed on NASDAQ, zero otherwise. GDP, UNEMPLOYMENT, and POPULATION are retrieved from the World Bank Database as well as our main Education variables. Namely, *Education Expenditure*, *Primary Education (Years)*, *Total Primary and Secondary Enrolment*, *Female and Male Primary and Secondary Enrolment* representing the Total number of male or female students enrolled in public and private primary or Secondary education institutions regardless of age. Our final sample is an ADR-day panel with period extending from XXX to XXX. The size sample for each variable is 5,279 observations.

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| --- | --- | --- | --- | --- | --- |
|  | **MEAN** | **MEDIAN** | **STANDARD DEVIATION** | **25TH PERCENTILE** | **75TH PERCENTILE** |
|  | **[1]** | **[2]** | **[3]** | **[4]** | **[5]** |
| **Illiquidity** | 1.544984 | 0.012091 | 9.267707 | 0.0017213 | 0.15646 |
| **Spread** | 0.009701 | 0.003712 | 0.017631 | 0.0012738 | 0.010848 |
| **Volatility** | 0.030369 | 0.025683 | 0.017298 | 0.0182607 | 0.037551 |
| **Turnover** | 0.014771 | 0.007888 | 0.024191 | 0.0041247 | 0.015695 |
| **MarketCap** | 1.377212 | 0.286044 | 3.115723 | 0.0584211 | 1.237964 |
| **Price** | 24.4069 | 16.52 | 24.25411 | 7.02 | 34.5 |
| **Nasdaq** | 0.287365 | 0 | 0.452576 | 0 | 1 |
| **GDP** | 23156.67 | 20306.93 | 17294.41 | 7678.6 | 37822.66 |
| **Unemployment** | 7.583167 | 7.22 | 4.229708 | 4.81 | 8.61 |
| **Population** | 0.717624 | 0.559121 | 0.518207 | 0.4558997 | 1.048038 |
| **Education Expenditure** | 90.44365 | 77.00804 | 69.03112 | 27.57665 | 139 |
| **Primary Education (Years)** | 5.822504 | 6 | 0.718231 | 6 | 6 |
| **Total Primary Enrolment** | 30.88806 | 4.791544 | 44.37563 | 2.860957 | 95.10712 |
| **Female Primary Enrolment** | 14.48743 | 2.347417 | 20.74745 | 1.382597 | 44.07154 |
| **Male Primary Enrolment** | 16.40063 | 2.448907 | 23.64549 | 1.47365 | 51.03558 |
| **Total Secondary Enrolment** | 28.39971 | 6.109604 | 39.06166 | 3.795981 | 81.05013 |
| **Female Secondary Enrolment** | 13.47258 | 2.988004 | 18.34603 | 1.798077 | 34.49506 |
| **Male Secondary Enrolment** | 14.92713 | 3.115469 | 20.72977 | 1.909934 | 44.16326 |
|  |  |  |  |  |  |

**Table 2: Summary Statistics by Country**

This table presents the summary statistics for our sample by ADR home country. For the definition of variables, please refer to Table 1.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **ADRs** | **ILLIQ** | **SPREAD** | **GDP** | **UNEMP** | **POPUL** | **EDUCATION EXPEND ($)** | **PRIMARY-EDUCATION**  **(Years)** | **FEMALE**  **PRIM-ENROL (MIL)** | **MALE**  **PRIM-ENROL (MIL)** | **FEMALE**  **SECO-ENROL (MIL)** | **MALE**  **SECO-ENROL (MIL)** |
| **COUNTRY** | **[1]** | **[2]** | **[3]** | **[4]** | **[5]** | **[6]** | **[7]** | **[8]** | **[9]** | **[10]** | **[11]** | **[12]** |
| Argentina | 19 | 1.680 | 0.012 | 9567.972 | 9.886 | 1.048 | 18.522 | 6.000 | 2.390 | 2.490 | 2.143 | 2.045 |
| Australia | 11 | 2.082 | 0.013 | 54544.090 | 8.332 | 1.558 | 65.134 | 7.000 | 1.070 | 1.129 | 1.189 | 1.403 |
| Austria | 1 | 0.384 | 0.012 | 35125.410 | 13.693 | 0.498 | 14.825 | 4.000 | 0.180 | 0.191 | 0.366 | 0.403 |
| Belgium | 7 | 0.537 | 0.009 | 42242.820 | 9.158 | 0.589 | 28.473 | 6.000 | 0.378 | 0.396 | 0.620 | 0.575 |
| Brazil | 20 | 0.201 | 0.004 | 9407.919 | 8.805 | 0.930 | 103.516 | 4.482 | 8.074 | 8.877 | 12.118 | 11.700 |
| Chile | 27 | 1.837 | 0.010 | 10504.660 | 10.496 | 1.093 | 7.304 | 6.000 | 0.782 | 0.841 | 0.771 | 0.785 |
| China | 209 | 1.029 | 0.008 | 6825.511 | 8.244 | 0.490 | 166.611 | 5.987 | 46.976 | 54.262 | 43.428 | 48.459 |
| Colombia | 1 | 0.069 | 0.007 | 6511.200 | 7.696 | 1.043 | 10.376 | 5.000 | 2.455 | 2.605 | 2.552 | 2.425 |
| Denmark | 7 | 0.895 | 0.013 | 51818.040 | 10.792 | 0.461 | 21.683 | 6.386 | 0.211 | 0.223 | 0.243 | 0.249 |
| Finland | 7 | 0.162 | 0.006 | 38293.720 | 12.397 | 0.316 | 11.651 | 6.000 | 0.184 | 0.193 | 0.240 | 0.233 |
| France | 45 | 1.542 | 0.011 | 35022.440 | 8.797 | 0.590 | 113.615 | 5.000 | 1.957 | 2.069 | 2.904 | 3.023 |
| Germany | 29 | 2.739 | 0.013 | 36229.020 | 8.208 | 0.002 | 128.606 | 4.000 | 1.576 | 1.666 | 3.840 | 4.164 |
| Greece | 3 | 0.040 | 0.004 | 26755.500 | 10.823 | 0.190 | 8.932 | 6.000 | 0.312 | 0.330 | 0.332 | 0.368 |
| Hong Kong | 15 | 2.349 | 0.018 | 30286.510 | 5.135 | 0.576 | 6.720 | 6.000 | 0.204 | 0.221 | 0.234 | 0.248 |
| Hungary | 2 | 0.412 | 0.008 | 10908.010 | 7.287 | -0.202 | 5.285 | 4.000 | 0.208 | 0.222 | 0.469 | 0.492 |
| India | 18 | 0.545 | 0.007 | 1248.667 | 5.579 | 1.349 | 48.697 | 5.000 | 64.469 | 69.765 | 49.151 | 58.585 |
| Indonesia | 2 | 0.073 | 0.005 | 2498.851 | 5.808 | 1.319 | 17.348 | 6.000 | 14.387 | 15.289 | 9.564 | 9.940 |
| Ireland | 23 | 1.695 | 0.010 | 49514.610 | 7.030 | 1.593 | 9.328 | 8.000 | 0.234 | 0.247 | 0.169 | 0.166 |
| Israel | 20 | 3.879 | 0.015 | 30773.490 | 7.922 | 1.915 | 13.382 | 6.000 | 0.398 | 0.418 | 0.362 | 0.377 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

**Table 2: Summary Statistics by Country - *Continued***

This table presents the summary statistics for our sample by ADR home country. For the definition of variables, please refer to Table 1.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **ADRs** | **ILLIQ** | **SPREAD** | **GDP** | **UNEMP** | **POPUL** | **EDUCATION EXPEND ($)** | **PRIMARY-EDUCATION**  **(Years)** | **FEMALE**  **PRIM-ENROL (MIL)** | **MALE**  **PRIM-ENROL (MIL)** | **FEMALE**  **SECO-ENROL (MIL)** | **MALE**  **SECO-ENROL (MIL)** |
| **COUNTRY** | **[1]** | **[2]** | **[3]** | **[4]** | **[5]** | **[6]** | **[7]** | **[8]** | **[9]** | **[10]** | **[11]** | **[12]** |
| Italy | 14 | 0.996 | 0.011 | 31520.130 | 8.967 | 0.354 | 75.320 | 5.000 | 1.359 | 1.453 | 2.193 | 2.356 |
| Japan | 36 | 0.489 | 0.006 | 38439.810 | 4.329 | 0.012 | 150.919 | 6.000 | 3.446 | 3.620 | 3.713 | 3.884 |
| Mexico | 35 | 2.455 | 0.015 | 8924.241 | 4.015 | 1.370 | 47.463 | 6.000 | 7.185 | 7.523 | 5.855 | 5.598 |
| New Zeal | 3 | 0.419 | 0.007 | 26376.190 | 4.856 | 1.340 | 6.937 | 6.000 | 0.171 | 0.181 | 0.255 | 0.250 |
| Norway | 6 | 2.646 | 0.013 | 58798.490 | 4.145 | 0.663 | 19.166 | 7.000 | 0.211 | 0.222 | 0.198 | 0.208 |
| Peru | 4 | 1.258 | 0.013 | 3928.137 | 4.394 | 1.207 | 3.458 | 6.000 | 1.936 | 2.011 | 1.252 | 1.335 |
| Philippines | 2 | 0.090 | 0.005 | 1902.568 | 3.638 | 1.743 | 3.663 | 6.000 | 6.510 | 6.946 | 3.328 | 3.181 |
| Poland | 1 | 23.371 | 0.072 | 4991.244 | 18.370 | -0.028 | 9.492 | 6.000 | 1.562 | 1.659 | 1.918 | 2.056 |
| Portugal | 2 | 0.397 | 0.010 | 16041.320 | 5.811 | 0.409 | 8.322 | 6.000 | 0.368 | 0.402 | 0.375 | 0.365 |
| Russia | 8 | 0.015 | 0.003 | 9315.286 | 6.439 | -0.082 | 48.234 | 3.909 | 2.689 | 2.818 | 5.188 | 5.524 |
| Singapore | 2 | 0.968 | 0.025 | 66188.780 | 3.650 | 0.470 | 9.312 | 6.000 | 0.114 | 0.119 | 0.081 | 0.085 |
| South Africa | 13 | 1.537 | 0.008 | 5695.975 | 26.919 | 1.384 | 15.867 | 7.000 | 3.562 | 3.760 | 2.452 | 2.332 |
| South Korea | 14 | 3.078 | 0.009 | 23093.680 | 3.516 | 0.511 | 47.436 | 6.000 | 1.631 | 1.796 | 1.738 | 1.936 |
| Spain | 14 | 0.363 | 0.007 | 26352.460 | 14.879 | 0.947 | 47.093 | 6.000 | 1.296 | 1.378 | 1.572 | 1.598 |
| Sweden | 14 | 5.672 | 0.032 | 38023.350 | 5.783 | 0.503 | 23.673 | 6.000 | 0.378 | 0.390 | 0.465 | 0.419 |
| Switzerland | 12 | 0.216 | 0.006 | 58722.920 | 3.934 | 0.818 | 21.028 | 6.000 | 0.252 | 0.267 | 0.274 | 0.304 |
| Netherlands | 21 | 0.817 | 0.009 | 42174.720 | 4.226 | 0.436 | 31.091 | 6.000 | 0.613 | 0.655 | 0.708 | 0.753 |
| Turkey | 1 | 0.021 | 0.003 | 9098.128 | 9.979 | 1.465 | 22.910 | 4.667 | 3.000 | 3.213 | 3.855 | 4.455 |
| United King | 110 | 2.698 | 0.012 | 39040.770 | 5.458 | 0.612 | 115.724 | 6.000 | 2.229 | 2.339 | 2.783 | 2.859 |
| Venezuela | 2 | 2.195 | 0.025 | 4509.377 | 14.036 | 1.765 | 4.220 | 6.000 | 1.675 | 1.782 | 0.980 | 0.886 |

**Table 3: Pearson Correlations**

This table presents the Pearson correlations of our sample. For variable definitions please refer to Table 1.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **[1]** | **[2]** | **[3]** | **[4]** | **[5]** | **[6]** | **[7]** | **[8]** | **[9]** | **[10]** | **[11]** | **[12]** | **[13]** | **[14]** | **[15]** | **[16]** | **[17]** | **[18]** |
| **Illiquidity** | **1** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Spread** | **0.6667** | **1** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Volatility** | **0.3563** | **0.5171** | **1** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Turnover** | **-0.0538** | **-0.103** | **0.2447** | **1** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **MarketCap** | **-0.0727** | **-0.2026** | **-0.2179** | **-0.0513** | **1** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Price** | **-0.1304** | **-0.2753** | **-0.3903** | **-0.0332** | **0.3111** | **1** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Nasdaq** | **0.1659** | **0.2773** | **0.3380** | **0.022** | **-0.1184** | **-0.1671** | **1** |  |  |  |  |  |  |  |  |  |  |  |
| **GDP** | **-0.0096** | **-0.0445** | **-0.2016** | **-0.0999** | **0.0880** | **0.1509** | **0.0348** | **1** |  |  |  |  |  |  |  |  |  |  |
| **Unemployment** | **0.0001** | **0.0041** | **0.0483** | **0.0423** | **-0.0472** | **-0.0647** | **0.0145** | **-0.2558** | **1** |  |  |  |  |  |  |  |  |  |
| **Population** | **0.0210** | **0.0481** | **-0.0128** | **-0.0467** | **0.0282** | **-0.0703** | **0.0188** | **-0.1648** | **0.0901** | **1** |  |  |  |  |  |  |  |  |
| **Education Expenditure** | **-0.0435** | **-0.1277** | **0.0761** | **0.1515** | **0.0389** | **0.0101** | **0.0625** | **-0.0393** | **-0.1128** | **-0.5051** | **1** |  |  |  |  |  |  |  |
| **Primary Education (Years)** | **0.0166** | **0.0242** | **0.0176** | **0.0076** | **-0.0426** | **-0.039** | **0.1797** | **0.1509** | **0.0491** | **0.299** | **-0.1439** | **1** |  |  |  |  |  |  |
| **Total Primary Enrolment** | **-0.0403** | **-0.0813** | **0.239** | **0.2039** | **-0.0557** | **-0.1093** | **0.1095** | **-0.618** | **0.0299** | **-0.0839** | **0.4796** | **-0.0219** | **1** |  |  |  |  |  |
| **Female Primary Enrolment** | **-0.0407** | **-0.0823** | **0.2349** | **0.2015** | **-0.0532** | **-0.108** | **0.107** | **-0.618** | **0.0281** | **-0.0798** | **0.4739** | **-0.0264** | **0.9996** | **1** |  |  |  |  |
| **Male Primary Enrolment** | **-0.0399** | **-0.0804** | **0.2425** | **0.2059** | **-0.0579** | **-0.1104** | **0.1117** | **-0.6176** | **0.0314** | **-0.0875** | **0.4843** | **-0.0179** | **0.9997** | **0.9984** | **1** |  |  |  |
| **Total Secondary Enrolment** | **-0.0439** | **-0.0916** | **0.2364** | **0.2119** | **-0.0524** | **-0.1077** | **0.1105** | **-0.6147** | **0.0248** | **-0.123** | **0.4950** | **-0.041** | **0.9909** | **0.9903** | **0.9906** | **1** |  |  |
| **Female Secondary Enrolment** | **-0.0444** | **-0.0931** | **0.2348** | **0.2128** | **-0.0509** | **-0.1072** | **0.1099** | **-0.6165** | **0.0261** | **-0.1268** | **0.4980** | **-0.0407** | **0.9877** | **0.9873** | **0.9873** | **0.9996** | **1** |  |
| **Male Secondary Enrolment** | **-0.0435** | **-0.0903** | **0.2376** | **0.2108** | **-0.0538** | **-0.1081** | **0.111** | **-0.6127** | **0.0236** | **-0.1195** | **0.4920** | **-0.0413** | **0.993** | **0.9923** | **0.9929** | **0.9997** | **0.9985** | **1** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Table 4: Education and Liquidity Regressions**

This table provides the results from the following OLS regression equation on our main sample of ADR-Year observations.

*i*

The dependent variable is LIQ, which is either the daily bid-ask spread computed as the difference between ask and bid prices of ADRs scaled by their mid-point the, or the daily Amihud (2002) price impact measure computed by scaling the absolute return by the dollar volume scaled up by a million. The main independent variable is Education, which represents the following measures from World Bank Database: EDUCATION EXPENDITURE and PRIMARY EDUCATION (YEARS). For definitions of the remaining variables, please refer to Table 1. Robust t-stats corresponding to standard errors clustered at the firm level are reported in parenthesis. \*\*\*, \*\*, and \* reflect statistical significance at 0.01, 0.05, and 0.10 levels, respectively.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **SPREAD** | **SPREAD** | **SPREAD** | **ILLIQUIDITY** | **ILLIQUIDITY** | **ILLIQUIDITY** |
|  | **[1]** | **[2]** | **[3]** | **[4]** | **[5]** | **[6]** |
|  |  |  |  |  |  |  |
| **EDUCATION EXPENDITURE** | -0.0000\*\*\* |  | -0.0000\*\*\* | -0.0051\* |  | -0.0053\*\* |
|  | (-3.619) |  | (-3.705) | (-1.923) |  | (-1.982) |
| **PRIMARY EDUCATION (YEARS)** |  | -0.0007\* | -0.0008\* |  | -0.2267 | -0.2496 |
|  |  | (-1.782) | (-1.947) |  | (-1.117) | (-1.221) |
| **TURNOVER** | -0.1337\*\*\* | -0.1352\*\*\* | -0.1327\*\*\* | -51.6805\*\*\* | -52.1075\*\*\* | -51.3756\*\*\* |
|  | (-6.682) | (-6.719) | (-6.662) | (-4.740) | (-4.754) | (-4.715) |
| **VOLATILITY** | 0.4262\*\*\* | 0.4211\*\*\* | 0.4257\*\*\* | 211.6474\*\*\* | 210.1094\*\*\* | 211.4811\*\*\* |
|  | (8.019) | (7.960) | (8.024) | (5.068) | (5.050) | (5.064) |
| **LN\_PRICE** | 0.0007\* | 0.0007\* | 0.0007\* | 0.6263\*\*\* | 0.6166\*\*\* | 0.6228\*\*\* |
|  | (1.842) | (1.765) | (1.823) | (2.661) | (2.631) | (2.650) |
| **LN\_MARKETCAP** | -0.0031\*\*\* | -0.0031\*\*\* | -0.0031\*\*\* | -0.7651\*\*\* | -0.7622\*\*\* | -0.7663\*\*\* |
|  | (-14.365) | (-14.465) | (-14.495) | (-7.234) | (-7.258) | (-7.277) |
| **NASDAQ** | 0.0015\* | 0.0017\*\* | 0.0017\*\* | 0.0582 | 0.0965 | 0.1214 |
|  | (1.868) | (1.996) | (2.095) | (0.146) | (0.236) | (0.298) |
| **LN\_GDP** | 0.0008\*\*\* | 0.0010\*\*\* | 0.0009\*\*\* | 0.5304\*\*\* | 0.5777\*\*\* | 0.5671\*\*\* |
|  | (3.282) | (3.717) | (3.573) | (3.201) | (3.376) | (3.339) |
| **LN\_UNEMPLOYMENT** | -0.0013\* | -0.0012 | -0.0013\* | -0.5183 | -0.5040 | -0.5381 |
|  | (-1.658) | (-1.568) | (-1.734) | (-1.263) | (-1.215) | (-1.298) |
| **POPULATION** | 0.0007 | 0.0021\*\*\* | 0.0010\* | 0.3150 | 0.7398\*\*\* | 0.4272 |
|  | (1.049) | (3.730) | (1.659) | (1.053) | (2.665) | (1.429) |
| **CONSTANT** | 0.0518\*\*\* | 0.0520\*\*\* | 0.0553\*\*\* | 5.0997\* | 5.1849\* | 6.1915\*\* |
|  | (9.512) | (9.695) | (9.854) | (1.769) | (1.681) | (2.029) |
|  |  |  |  |  |  |  |
| **YEAR FE** | Yes | Yes | Yes | Yes | Yes | Yes |
| **ROBUST SE** | Yes | Yes | Yes | Yes | Yes | Yes |
| **OBSERVATIONS** | 5,279 | 5,279 | 5,279 | 5,279 | 5,279 | 5,279 |
| **R-SQUARED** | 0.540 | 0.539 | 0.541 | 0.196 | 0.195 | 0.196 |

Robust t-statistics in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 5: Primary Education, Gender and Liquidity Regressions**

This table provides the results from the following OLS regression equation on our main sample of ADR-Year observations.

*i*. The main independent variable is Education, which represents the following measures from World Bank Database: TOTAL PRIMARY ENROLMENT, and FEMALE PRIMARY ENROLMENT and MALE PRIMARY ENROLMENT. For definitions of the remaining variables, please refer to Table 1. Robust t-stats corresponding to standard errors clustered at the firm level are reported in parenthesis. \*\*\*, \*\*, and \* reflect statistical significance at 0.01, 0.05, and 0.10 levels, respectively.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **SPREAD [1]** | **SPREAD** | **SPREAD** | **ILLIQUIDITY** | **ILLIQUIDITY** | **ILLIQUIDITY** |
|  | **[1]** | **[2]** | **[3]** | **[4]** | **[5]** | **[6]** |
|  |  |  |  |  |  |  |
| **TOTAL PRIMARY ENROLMENT** | -0.0001\*\*\* |  |  | -0.0238\*\*\* |  |  |
|  | (-4.973) |  |  | (-3.597) |  |  |
| **FEMALE PRIMARY ENROLMENT** |  | -0.0001\*\*\* |  |  | -0.0493\*\*\* |  |
|  |  | (-4.854) |  |  | (-3.512) |  |
| **MALE PRIMARY ENROLMENT** |  |  | -0.0001\*\*\* |  |  | -0.0459\*\*\* |
|  |  |  | (-5.062) |  |  | (-3.661) |
| **TURNOVER** | -0.1287\*\*\* | -0.1290\*\*\* | -0.1284\*\*\* | -49.6648\*\*\* | -49.8110\*\*\* | -49.5467\*\*\* |
|  | (-6.725) | (-6.725) | (-6.724) | (-4.692) | (-4.693) | (-4.691) |
| **VOLATILITY** | 0.4285\*\*\* | 0.4278\*\*\* | 0.4292\*\*\* | 212.8067\*\*\* | 212.5201\*\*\* | 213.0567\*\*\* |
|  | (8.077) | (8.066) | (8.086) | (5.102) | (5.098) | (5.105) |
| **LN\_PRICE** | 0.0007\* | 0.0007\* | 0.0007\* | 0.6143\*\*\* | 0.6140\*\*\* | 0.6145\*\*\* |
|  | (1.766) | (1.763) | (1.768) | (2.619) | (2.618) | (2.620) |
| **LN\_MARKETCAP** | -0.0031\*\*\* | -0.0031\*\*\* | -0.0031\*\*\* | -0.7683\*\*\* | -0.7673\*\*\* | -0.7692\*\*\* |
|  | (-14.558) | (-14.547) | (-14.568) | (-7.286) | (-7.279) | (-7.292) |
| **NASDAQ** | 0.0022\*\*\* | 0.0021\*\*\* | 0.0022\*\*\* | 0.2936 | 0.2831 | 0.3016 |
|  | (2.625) | (2.595) | (2.647) | (0.760) | (0.732) | (0.782) |
| **LN\_GDP** | -0.0013\*\* | -0.0012\*\* | -0.0013\*\* | -0.2476 | -0.2248 | -0.2635 |
|  | (-2.471) | (-2.377) | (-2.538) | (-0.966) | (-0.875) | (-1.032) |
| **LN\_UNEMPLOYMENT** | -0.0017\*\* | -0.0017\*\* | -0.0017\*\* | -0.6954\* | -0.6969\* | -0.6926\* |
|  | (-2.326) | (-2.337) | (-2.312) | (-1.707) | (-1.710) | (-1.701) |
| **POPULATION** | 0.0004 | 0.0005 | 0.0004 | 0.1569 | 0.1789 | 0.1395 |
|  | (0.745) | (0.840) | (0.671) | (0.536) | (0.613) | (0.476) |
| **CONSTANT** | 0.0735\*\*\* | 0.0729\*\*\* | 0.0739\*\*\* | 13.3015\*\*\* | 13.0416\*\*\* | 13.4826\*\*\* |
|  | (10.322) | (10.237) | (10.390) | (3.694) | (3.606) | (3.763) |
|  |  |  |  |  |  |  |
| **YEAR FE** | Yes | Yes | Yes | Yes | Yes | Yes |
| **ROBUST SE** | Yes | Yes | Yes | Yes | Yes | Yes |
| **OBSERVATIONS** | 5,279 | 5,279 | 5,279 | 5,279 | 5,279 | 5,279 |
| **R-SQUARED** | 0.546 | 0.545 | 0.546 | 0.199 | 0.198 | 0.199 |

Robust t-statistics in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 6: Secondary Education, Gender and Liquidity Regressions**

This table provides the results from the following OLS regression equation on our main sample of ADR-Year observations.

*i*. The main independent variable is Education, which represents the following measures from World Bank Database: TOTAL PRIMARY ENROLMENT, and FEMALE SECONDARY ENROLMENT and MALE SECONDARY ENROLMENT. For definitions of the remaining variables, please refer to Table 1. Robust t-stats corresponding to standard errors clustered at the firm level are reported in parenthesis. \*\*\*, \*\*, and \* reflect statistical significance at 0.01, 0.05, and 0.10 levels, respectively.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **SPREAD** | **SPREAD** | **SPREAD** | **ILLIQUIDITY** | **ILLIQUIDITY** | **ILLIQUIDITY** |
|  | **[1]** | **[2]** | **[3]** | **[4]** | **[5]** | **[6]** |
|  |  |  |  |  |  |  |
| **TOTAL SECONDARY ENROLMENT** | -0.0001\*\*\* |  |  | -0.0258\*\*\* |  |  |
|  | (-4.737) |  |  | (-3.526) |  |  |
| **FEMALE SECONDARY ENROLMENT** |  | -0.0001\*\*\* |  |  | -0.0535\*\*\* |  |
|  |  | (-4.612) |  |  | (-3.452) |  |
| **MALE SECONDARY ENROLMENT** |  |  | -0.0001\*\*\* |  |  | -0.0498\*\*\* |
|  |  |  | (-4.836) |  |  | (-3.586) |
| **TURNOVER** | -0.1284\*\*\* | -0.1286\*\*\* | -0.1283\*\*\* | -49.5158\*\*\* | -49.5577\*\*\* | -49.4923\*\*\* |
|  | (-6.706) | (-6.703) | (-6.709) | (-4.681) | (-4.679) | (-4.683) |
| **VOLATILITY** | 0.4282\*\*\* | 0.4278\*\*\* | 0.4285\*\*\* | 212.7367\*\*\* | 212.6013\*\*\* | 212.8495\*\*\* |
|  | (8.059) | (8.050) | (8.066) | (5.098) | (5.095) | (5.100) |
| **LN\_PRICE** | 0.0006\* | 0.0006\* | 0.0006\* | 0.6057\*\*\* | 0.6052\*\*\* | 0.6063\*\*\* |
|  | (1.710) | (1.706) | (1.714) | (2.586) | (2.584) | (2.589) |
| **LN\_MARKETCAP** | -0.0031\*\*\* | -0.0031\*\*\* | -0.0031\*\*\* | -0.7642\*\*\* | -0.7637\*\*\* | -0.7646\*\*\* |
|  | (-14.524) | (-14.516) | (-14.530) | (-7.259) | (-7.257) | (-7.262) |
| **NASDAQ** | 0.0021\*\*\* | 0.0021\*\* | 0.0022\*\*\* | 0.2919 | 0.2847 | 0.2973 |
|  | (2.592) | (2.558) | (2.619) | (0.754) | (0.733) | (0.770) |
| **LN\_GDP** | -0.0011\*\* | -0.0010\*\* | -0.0011\*\* | -0.1925 | -0.1681 | -0.2112 |
|  | (-2.147) | (-2.007) | (-2.257) | (-0.768) | (-0.674) | (-0.840) |
| **LN\_UNEMPLOYMENT** | -0.0016\*\* | -0.0016\*\* | -0.0017\*\* | -0.6642 | -0.6537 | -0.6729\* |
|  | (-2.192) | (-2.150) | (-2.226) | (-1.634) | (-1.610) | (-1.654) |
| **POPULATION** | 0.0003 | 0.0003 | 0.0003 | 0.1078 | 0.1165 | 0.1026 |
|  | (0.557) | (0.612) | (0.521) | (0.360) | (0.388) | (0.343) |
| **CONSTANT** | 0.0713\*\*\* | 0.0704\*\*\* | 0.0720\*\*\* | 12.6861\*\*\* | 12.4101\*\*\* | 12.8967\*\*\* |
|  | (10.219) | (10.131) | (10.287) | (3.574) | (3.504) | (3.629) |
|  |  |  |  |  |  |  |
| **YEAR FE** | Yes | Yes | Yes | Yes | Yes | Yes |
| **ROBUST SE** | Yes | Yes | Yes | Yes | Yes | Yes |
| **OBSERVATIONS** | 5,279 | 5,279 | 5,279 | 5,279 | 5,279 | 5,279 |
| **R-SQUARED** | 0.545 | 0.544 | 0.545 | 0.198 | 0.198 | 0.198 |

Robust t-statistics in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

1. https://www.oecd.org/education/education-at-a-glance/ [↑](#footnote-ref-1)