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

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**Abstract**

This paper examines the extent to which education may take part in explaining the liquidity in international capital markets. We examine whether the 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 for the security-level, using a dataset consisted of 780 ADRs from 39 countries. Our findings consistently show that education improves ADRs spreads and decreases their illiquidity measures. To further strength our *causal* inference from education to liquidity we use difference-in difference approach and several events which can be considered as exogenous shocks to education. The results remained similar and clearly signal for improved liquidity. We conclude that given that liquidity itself has benefits in different aspects, such as the fostering of economic growth, investment, and savings, then any reforms or policies which increase the level of education, can be in the favor of individuals, the 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*

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

Given that education shapes the knowledge, ideas and of individuals, and individuals are the composition of entire human capital in a certain country, it is plausible to expect that the quality and the merits of education will be also evident through the wheels of the domestic economy, either by 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 *individual* and *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% in annual terms. Similarly, for the US states examination, Hanushek, Ruhose & Woessmann (2017) show that educational reforms, can in the aggregate yield an estimated present value of long-run gains of 8% of discounted future GDP.

In this vein, a recent study[[1]](#footnote-1) by the OECD reports that the private net financial returns, defined as the difference between the costs and benefits associated with attaining an additional level of education, is profitable in the long run for both men and women. On average across the OECD, the private financial returns investing, in terms of the net present value (NPV) for 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 the public net financial returns for 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) from tertiary education to governments is 8% for a man and 6% for a woman.

While it is apparent that education has positive effects on the economic perspective of both individuals and nations, in this study, we are aimed at testing the possible contribution of education on a different, yet no less important angle. Specifically, we pose the question of whether education bears also positive effects to one of the cornerstones 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 in any given point in time, whereas for firms, liquidity extends the access to capital and more importantly facilitates the long term, to which individuals are reluctant from when liquidity is weak. Therefore, liquidity contributes to both higher savings and investments, and also contributes to various other aspects such as the market efficiency and 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 economic growth will be accelerated, along other positive aspects such as market efficiency, lower uncertainty and better price discovery process which are generally attributed to liquidity. 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 we believe that 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 the listed firms are derived from the economic activity. Given that education has been shown theoretically and empirically as a catalysator for real economic growth and greater economic activity, we believe that correspondingly, the more educated countries are, the more they enjoy the benefits of greater attention through the lenses of better liquidity in their domestic capital market. Second, the capital market function as one of the main the infrastructure through which investments and foreign direct investments are made. Noorbakhsh, Paloni & Youssef (2001), for example, pose education as essential ingredient for attracting foreign direct investments. More educated countries, may possibly, yield new investments opportunities, leading to increased capital flows into the market, and these increased flows may be directly (and/or indirectly) pronounced through higher interest in the securities traded in a certain country. Thus, the merits of education should be also valid in capital markets activity.

Several empirical works are closely related to our paper and are the baseline for our main hypothesis to which 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 education level of investors is the most important factor in explaining cross-country market volatility differences. He states that the education can be a significant explanatory variable for volatility from 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” behavior, then investors’ collective behavior could be decisive in shaping stock market movements in a country. As such, this view having a calming impact on volatility may also determine the liquidity characteristics of the local market.

In an interesting study, Cole, Paulson & Shastry, (2014) report positive relationship between years of schooling and 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 any bonds or government securities by about 6.5 percentage points and any stocks or mutual funds by 4 percentage points. They state that the effect size of education on any investment income is about 19 percentage points, and the effect size of education on having bonds or government securities and stocks or mutual funds is 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.

A more recent study by Black et al. (2018) seek to test a *causal* impact of education on investment behaviour. Specifically, they test the impact of a reform in Sweden which increased compulsory schooling from 7 to 9 years, on market participation, and the likelihood for holding risky financial assets. They offer several interesting channels through which education can possibly 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 that allows investors to put their capital in risky financial assets, and 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 of 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 works of Cole, Paulson & Shastry, (2014) and 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 be also associated with 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 or financial literacy on market participation as well as on 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 puzzle beginning in the early studies of Mankiw & Zeldes (1991) and Haliassos & Bertaut (1995).‏

Second, Black et al. (2018) states 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 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, by employing a difference-in-difference approach, thereby, supporting the view of Black et al. (2018) study.

Third, most of the former studies dealing with education impact on market participation are focusing on the US, Sweden or for a very limited number of countries. Our study encompasses over 39 countries in an attempt for observing the education-liquidity nexus in different capital markets. In addition, we take a further step and examine the possible impact of education not only the aggregate liquidity in each country but also in the single security level, using a unique sample of ADRs, which are shares of foreign firms traded under the U.S. stock exchanges laws. Several previous works have adopted the use of ADRs to refrain from several endogeneity flaws (e.g., Chung 2006; Eleswarapu & Venkataraman, 2006; Blau, Brough & Thomas, 2014; Blau, 2017). The use of ADRs design allows us to isolate the influence 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 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 inelastic market hypothesis (Gabaix & Koijen 2021). Cole et al. (2014) show that education improves financial decision making, and Campbell (2006) also show that less educated households are those that tend to invest poorly (e.g., under- diversification) and more likely not to participate in risky markets at all. In subsequent study, Campbell, Giglio, and Pathak (2011) suggest that consumers who making their financial mistakes might also spillover to the stability of the financial system and that this behaviour 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 flows from households are probably the responsible for the direction and magnitude of market crashes. Given that education has been shown to make better financial decision making there is a clear motivation as to why our research question is also important from the disaster risk perspective. To the extent that education indeed improves the choice and decisions of investors, an 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 will be based on better rational financial factors.

Finally, better trading 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 the overall market efficiency and the ability to respond quickly to new information, improves the price discovery process, extend the pool of potential investors, and reduces the 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 liquidity associated advantages, and importantly from economic growth stemming from both source of arrows: education and liquidity.

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

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

The remainder of the paper unfolds as follows. Section 2 describes the sample and data used, the methodological approach and the definitions of our main key variables, Section 3 debates the empirical findings, while Section 4 concludes.

**2. Data and Methodology**

We obtain daily American Depositary Receipts (ADR) level data from the Center for Research on Security Prices (CRSP). We then use 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 World Bank database. In our final sample, we have 780 ADRs from 39 countries and 5,279 ADR-year observation. Our data spans from 2001 to 2020. In 2002, SEC and all U.S. exchanges reduced tick size to $0.01, which significantly affected the market liquidity moving forward.

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

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

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

In **Table 1**, we see that average value of *Spread* is 0.0097 and *Illiquidity* is 1.54498. 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* 13.47 million and *Male Secondary Enrolment* is 14.92 million. We find two interesting observations here, first, male enrolment at both, primary as well as secondary level is higher than female enrolment. Secondly, enrolment in secondary education is less than enrolment in primary education, which is normal trend in most countries. Finally, the average value of *Primary Education (years)* is our ADR countries is 5.8 years.

**Table 2** shows the country names and number 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 the minimum in Russia and maximum in Poland. *Primary Education* *(Years)* ranges from 4 to 8 years our sample countries. Number of primary and secondary enrolment is highest in the countries with more population such as Indian and China, while the lowest in the countries with less population, for example, Singapore and New Zealand. However, China spends the most on the education expenditures among our sample countries. **Table 3** shows the correlation among our dependent and independent variables. We observe that *Illiquidity* and *Spread* are 66.6% positively correlated. However, the correlation coefficient among our dependent variable such as *Illiquidity* and *Spread* and independent variables are very low.

**3. Empirical Findings**

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

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

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

**(1)**

The dependent variables are *Spread* and *Illiquidity* as defined in the data section. Education expenditure and 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, unemployment rate, while *Population* is the annual population growth rate for countries in our sample. Other variables are defined in data section.

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

We find results of *Illiquidity* as a dependent variable in column 4, 5, and 6. As for *Spread*, we find 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, our results support our claim that with increase in education expenditure and number of years of primary education, market liquidity improves in the given country.

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

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

**(2)**

**Table 5** represents the results of this regression. We find the results of *Spread* as the dependent variable in column 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 column 2 and 3, where we find economically and statistically significant negative association between male primary enrolment and female primary enrolment. These results support our hypothesis that increase in primary education improves the market liquidity.

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

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

In this subsection, we test whether secondary level 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 find the results of *Spread* as the dependent variable in column 1, 2, and 3. We find similar results as we did in previous section when we examine the association of primary education enrolment with *Spread*. We find negative, statistically, and economically significant association between total secondary enrolment and spread. We find negative and equally significant association between female secondary enrolment, male secondary enrolment, and spread. Female as well as male secondary enrolment are equally important in improving the market liquidity. These results again support our hypothesis that increase in secondary education improves the 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 enrolment level and illiquidity, which implies that increase in the secondary enrolment level does indeed increase the market liquidity. Upon exploring the results deeply, we again find interesting observations. For example, overall, these results are economically stronger as compared to the results that we find for the relationship between primary enrolment level and illiquidity. The intuition behind the stronger association between secondary enrolment level 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 market. Hence, these results strongly support our hypothesis that increase in education level improves the market liquidity. Moreover, we again find that female secondary enrolment is economically more important for liquidity improvements as compared to male secondary enrolment. In economic terms, a one percent increase in female secondary enrolment decreases the illiquidity by 5.35% as compared to a one percent increase in male secondary enrolment decreases the illiquidity by 4.98%. However, in general, increase in overall secondary enrolment is important for improving the 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? Do primary and secondary education be responsible lower trading spreads in the securities? Is illiquidity decreases 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 in exploring education possible impact on the security-level liquidity characteristics. To answer these questions, in both the macro and micro levels, we gathered data for more than 200 countries worldwide, containing their aggregate liquidity measures in their homeland capital markets, and an additional unique dataset consisted of 700 ADRs from 39 countries.

Individuals may be reluctant from participating in trading stock market in case they lack basic arithmetic knowledge and education. However, we show here that more educated countries are also more liquid, suggesting that more knowledge (education) is probably a determinant of higher volume trade, and thus may be a possible way to cope with barrier. The positive effect of education is not limited to the aggregate liquidity in the country level but also valid for the firms and their securities. Based on these findings, we highlight that any policies that can accommodate the integration and development of education may foster the liquidity and functioning of capital markets. A more liquid capital market suggests a more stable financial infrastructure, which is a desired trait for the development of firms and 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 up by a 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 shares outstanding. MARKETCAP is the ADR market capitalization calculated by multiplying price and shares outstanding, it 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.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **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)