**Banking Sector Strength and the Quality of Cross-Listed Securities**

**Abstract**

This paper tests the effect of banking sector strength on the volatility of American depository receipts (ADRs) listed on major U.S. exchanges. Using panel regressions based on an international dataset of 705 ADRs from 43 countries, we suggest an innovative examination of whether cross-listed securities from more solid banking systems are associated with a lower degree of volatility. Our results confirm that there is such a relationship, with the deposits/GDP ratio, in particular, playing a central role in alleviating ADRs’ volatility. This calming effect holds for different measures of volatility (historical, idiosyncratic, range, and GARCH[1,1]), and under different regression specifications and control variables. The empirical evidence documented here should prove of interest to policymakers, banking supervisors, central banks, and all those seeking ways to ensure the stability of both the banking systems and financial markets.

*Keywords*: Banking, stability, ADR, American depository receipts, volatility, idiosyncratic volatility, range volatility, cross-listed securities.

*JEL classifications*: G01, G12, G15.

1. **Introduction**

One of the main pillars of a prosperous and sustainable economy is a well-functioning array of financial intermediaries including, inter alia, commercial and investments banks. Due to the central role that banks play in financial and economic systems, and in light of past financial crises that highlighted the destructive impact of banking system failure, many studies have focused on investigating and assessing banking system stability mechanisms.[[1]](#footnote-1) Anecdotal evidence indicates that during financial crises, when banking systems are fragile, financial capital markets also experience higher volatility.

In this paper, we empirically examine whether firms operating in countries with more stable and stronger banking systems indeed enjoy less volatile equity prices. To the best of our knowledge, despite the ostensibly intuitive relationship between banking soundness and capital market stability, the literature seems to have disregarded this nexus, which has yet to be examined or analyzed through an empirical, cross-country approach. Our paper seeks to fill this gap and enrich the existing literature by presenting a novel empirical test for the link between banking and capital market stability.

Banks, in general, play a significant role in economic activity by effectively facilitating the flow of funds from savers with cash surpluses to other operating entities, such as businesses and firms, which utilize these cash surpluses for their daily operations, investment, and the development of future growth prospects. In this way, banks also help create credit, capital, and liquidity in the market, which are necessary elements for enhancing economic activity. Banks also assist firms and businesses by offering an additional channel for raising funds and by overseeing the creation of credit. This leads to an increase in production, employment, and consumer spending, thereby boosting the economy.

Along with the clear advantages and benefits of banks, they are nonetheless susceptible to a number of risks and have weaknesses that can affect various entities operating in the economy. Threats to the banking sector have been shown to be of great concern for individuals, investors, firms, policy makers, governments, and the capital market as a whole, as risk spillovers can easily be transmitted between countries and industries (e.g., Kaufman 1994; Elyasiani and Mansur, 2003; Elyasiani, Mansur, & Pagano, 2007; Elyasiani et al. 2015). Consequently, it is reasonable to assume that when bank strength is harmed, uncertainty increases regarding the future availability of bank credit for firms; future projects become uncertain, as does the value of firms.

Indeed, the subprime crisis in 2008 was a landmark demonstration of the risk of contagion, and the critical role that banks play. Compared to other crises, that of 2008 was notable for ushering in one of capital markets’ most volatile periods. Experience has shown that volatility mirrored the negative shocks that occurred in the banking system during the subprime crisis, which then spread across U.S. sectors, as well as between countries. As a result, it revived the discussion on bank strength and market stability. In the United States in particular, the crisis and its aftershocks spurred a debate on the measures required for maintaining a sound banking system that can support the economy, help banks, firms, and businesses recover from the consequences of the crisis, and reduce the damage from future systemic shocks.[[2]](#footnote-2) Given this background, the intuitive question we pose is whether a more fragile (solid) banking sector indeed has an amplifying (alleviating) impact on the volatility of equity prices.

There are essentially three strands in the literature from which this this research evolved. First and foremost, previous studies showing provide ample reason to explore the channels through which volatility is affected. Second, studies such as those of Levine (2005) and Levine et al. (2000) indicate that financial development enhances economic growth. In fact, Levine, Loayza & Beck (2000) find a causal link between better functioning financial intermediaries and economic growth. They also find evidence that legal and accounting reforms that strengthen creditor rights, contract enforcement, and accounting practices can improve financial intermediary development and thereby accelerate economic growth. Third, several other studies have also shown that banking systems on their own play a role in shaping economic fundamentals. Larrain (2006), for example, finds that bank credit reduces the volatility of industrial output, where the main reduction in volatility is idiosyncratic, concluding that stability breeds growth. Moreover, he shows that industrial output is lower in countries with more access to bank credit. Fernández et al. (2016) used data from 110 countries to examine the impact of banking stability on the volatility of industrial value added, finding empirical evidence that banking stability promotes lower levels of economic volatility. Taken together, the empirical evidence in these three strands in the literature show that, as financial intermediaries, banks can shape economic fundamentals. Given that lower financial market volatility is associated with a more prosperous economy, exploring the link between banking strength and volatility may reveal a possible channel through which banking strength at the country level can affect economic activity. To the extent that banking strength drives the volatility of equity prices, our work supports the contention that bolstering financial intermediaries such as banks enhances financial development.

In this study, we examine whether the strength of the domestic banking sector has any impact on the stability of securities. More specifically, we seek to shed light on the question of whether a more developed and sound banking system has any advantages in terms of the stability of ADR prices. Drawing on the studies of Chung 2006; Eleswarapu & Venkataraman, 2006; Blau, Brough & Thomas, 2014; Blau, 2017, we examine American Depository Receipts (ADRs), which are shares of foreign firms traded on U.S. exchanges. The context of ADRs represents a unique setting which offers important remedies for possible drawbacks in our empirical framework. It is possible that the volatility of an equity is determined by the local market structure, and a faulty treatment of this possible channel might lead to inaccurate conclusions. By using ADRs, we are able to isolate the net effect of banking sector strength on the stability of ADRs while controlling for market structure. In addition, the use of ADRs offers a control for different currencies, non-synchronous trading bias, and other country-specific effects.

This paper is structured as follows. In the second section, we describe the data, our methodology and the key variables used. In the third section, we discuss the empirical findings, and in the last section, we summarize, present conclusions, and suggest future avenues for research.

1. **Data and Methodology**
2. **Empirical Results**

Cross listed securities have been well researched. In this section we aim to analyze whether bank characteristics of the home country affect the stock price volatility of the cross listed security. Using bank and country level annual data we use OLS regressions to study how the following ratios and variables affect ADR volatility: Bank Capital/Total Assets, Bank Deposits/GDP, Bank Z Score, and Central Bank Assets/GDP.

Our main model follows in equation (1).

The dependent variable, is Volatility measured as the standard deviation for each ADR’s returns for the year. The dependent variable will change throughout our analysis to test different measurements of ADR return volatility. Our volatility measures are explained for each table throughout the paper.

Our panel of ADR-year observations include four banking variables which should inform us on cross-listed security volatility. These four *BANKINGc,t* variables represent our independent variables of interest. The first of these is the natural log of total country bank capital to total country bank assets (*CAPITAL/ASSETS*). The second is the natural log of total country bank deposits to GDP (*DEPOSITS/GDP*). The third variable of interest is the natural log of the average bank z-score (*ZSCORE*). The last variable of interest is the natural log of the country’s central bank assets relative to GDP (CB*ASSETS/GDP*). We follow Blau, Griffith, and Whitby (2021) in using control variables including *SPREAD*, *TURNOVER*, *ILLIQUIDITY*, natural log of Price(*LNPRICE*), natural log of Market Cap (*LNSIZE*), a *NASDAQ* dummy, natural log of GDP (*LNGDP*), the natural log of Unemployment (*LNUNEMPLOYMENT*), and *POPULATION*. We include year fixed effects and robust standard errors clustered at the ADR security level to control for potential time trends.

**Table 4** details the results of our first multivariate regressions. In columns 1 and 5 we find no statistical significance in the effect of bank capital to total assets of the bank. The most significant finding is from the ratio of bank deposits to GDP. The coefficient in columns 2 and 5 are both statistically significant at the 1% level. We find a negative correlation between the *DEPOSIT/GDP* variable and the ADR return volatility. Specifically, as the deposits to GDP ratio increases, the ADR return volatility decreases. This confirms our priori that a banking system with a higher deposit ratio should provide some stability in the returns of the ADR’s from that particular country. We get a similar negative relationship between the central bank assets to GDP ratio and the volatility in a given country. However, when all independent variables are nested in column 5, we lose statistical significance.

Not surprisingly, the coefficient for the log of the average bank z-score is positively related to the ADR return volatility for the country. As individual banks are showing more signs of default risk through the z-score calculation, the overall return volatility is increasing throughout the world. Additionally, our control variables are generally showing the signs and statistical significance we would expect. For example, an increase in GDP lowers the volatility of the cross-listed security. Another control variable, *LNPRICE* has a negative relationship with volatility. As the price of the ADR decreases the volatility increase. These control variable findings are consistent with what we expect.

In **Table 5** we continue our investigation by estimating equation (1) using *Idiosyncratic Volatility* as the new dependent variable. Idiosyncratic volatility represents the standard deviation for each ADR’s residual annual returns from the Fama-French three-factor model (Fama (1993)). The only statistically significant *BANKING* variable is our bank deposits to GDP ratio. In columns 2 and 5 we find a negative and statistically significant coefficient for *DEPOSITS/GDP*. In column 2, using this variable as the only banking variable, a 1% increase in *DEPOSITS/GDP* leads to a 0.065% decrease in volatility for the ADR’s residual returns. This result is similar to column 5 with all BANKING variables. We still find a 1% increase in *DEPOSITS/GDP* leads to a decrease of 0.10% in ADR return volatility.

We again use our base model (1), however we shift our dependent variable to *RANGE VOLATILITY*. Range volatility is the natural log of the intra-day high price minus the natural log of the intra-day low price for each ADR averaged over the year. This measure is consistent with Alizadeh et. al (2002). Their research demonstrates that range volatility captures the stochastic volatility of securities. Using this approach, we are able to study ADR return volatility from a different angle. Our findings in **Table 6** are similar to findings in previous tables in direction but more economically significant. Column 1 shows a positive and significant coefficient at the 1% level of 0.232. This finding suggests a 1% increase in *CAPITAL/ASSETS* leads to a 0.23% increase in *RANGE VOLATILITY* for annual ADR returns. This significance goes away when we add the additional banking variables in column 5.

Similar to our findings in Tables 4 and 5, in Table 6 we continue to find a statistically significant coefficients for our *DEPOSITS/GDP* banking variable. In column 2 the results show a negative coefficient of -0.216. In column 5, our full specification model we find a negative coefficient of -0.249. Both are significant at the 1% level. The economic significance of the coefficients is 2x to 3x higher than previous tables. Most of our banking variables continue to be insignificant with the exception of total bank deposits to GDP.

In our last multivariate model in Table 7, we again utilize equation (1) but this time we use *GARCH VOLATILITY* as our dependent variable. We follow Blau (2018) to compute the Garch volatility measure. Garch volatility comes as we run a GARCH (1,1) model for each ADR to forecast the daily conditional variance. We then take the square root of this variance to compute the daily conditional volatility. Next, we take this daily conditional volatility average for each ADR-year. This process gives us our GARCH VOLATILITY measure which we use as the dependent variable in this last model specification.

Results from Table 7 provide similar findings to our earlier tables which supports our findings that some banking variables are significant indicators of ADR return volatility using our Garch volatility measure. In columns 2 and 4 we find negative and significant coefficients for our *DEPOSITS/GDP* and *CBASSETS/GDP* banking variables. These models are not full models as they do not contain all banking variables. In our full model specification in column 5 we see negative and significant coefficients for *CAPITAL/ASSETS* and *DEPOSITS/GDP*. These results suggest an increase in these ratios lowers the ADR returns across our sample.

In our other models we have not seen our *ZSCORE* variable have statistical significance. In column 5 of **Table 7** we have a positive and significant coefficient. This result is surprising in that we have not had statistical significance since our primary regressions in **Table 4**. However, the result confirms our priori that an increase in z-score is expected to increase the volatility of an equity. Similar to Table 4, we find this expectation to be statistically significant.

David’s note: I think if we can also relate the findings to other studies in banking and stability it will be better. Even in general.

1. **Conclusion**

It is well known that banking systems perform a vital function in the process of transferring funds between savers and borrowers, and play a central role in maintaining the stability of a country’s financial infrastructure. A potential risk for the stability of firms, therefore, might be the exogenous strength of the local banking system in which they operate. In this study, we focus on the relationship between banking sector strength and the volatility of equity prices to examine whether banking sector strength indeed has any impact on the stability of ADR prices. Using unique ADR data from 43 countries, we show that ADRs from countries with a more stable banking sector have a lower level of volatility. This result is clearly evident based on the deposits/GDP ratio as a proxy for banking strength, and is consistent across four proxies for ADR volatility.

This result may supply new insights for both academics and practitioners dealing with the stability of asset prices, and may also be of interest to regulators, banking supervisors, and central banks seeking to preserve and promote the stability of both the banking and capital markets systems.

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**Table 1: Summary Statistics**

The table presents the descriptive statistics for the ADR volatility measures: *Volatility* - which is the historical standard deviation, the *Idiosyncratic Volatility* extracted from Fama-French (1993) three-factor model, the *Range Volatility* - the daily ADR volatility calculated as the difference between the natural log of intra-day high and low prices, and the conditional GARCH(1,1) volatility*. Spread* is the daily bid-ask spread computed as the difference between ask and bid prices of ADRs scaled by their mid-point. Turnover is calculated as the daily trading volume scaled by the number of shares outstanding. *Illiquidity* is the daily Amihud (2002) price impact measure computed by scaling the absolute return by the dollar volume scaled up by a million. *Size* is the daily market capitalization computed as the product of price and shares outstanding (in billions). *Price* is the daily closing ADR price. *Nasdaq* is a dummy 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 Banking strength variables. Namely, *Bank Capital/Total Assets*, *Bank deposits/GDP*, *Bank z score*, and *Central Bank Assets/GDP*. The size sample for each variable is 4,953 observations.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Mean** | **Median** | **Standard Deviation** | **25th Percentile** | **75th Percentile** |
|  | **[1]** | **[2]** | **[3]** | **[4]** | **[5]** |
| **Volatility** | 0.029 | 0.025 | 0.016 | 0.018 | 0.036 |
| **Idiosyncratic Volatility** | 0.026 | 0.022 | 0.016 | 0.016 | 0.033 |
| **Range Volatility** | 0.033 | 0.027 | 0.021 | 0.017 | 0.044 |
| **Garch Volatility** | 0.030 | 0.026 | 0.016 | 0.019 | 0.037 |
| **Spread** | 0.009 | 0.003 | 0.015 | 0.001 | 0.009 |
| **Turnover** | 0.015 | 0.008 | 0.022 | 0.004 | 0.016 |
| **Illiquidity** | 1.556 | 0.011 | 10.794 | 0.002 | 0.128 |
| **Size** | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| **Price** | 24.989 | 17.280 | 24.299 | 7.400 | 35.200 |
| **Nasdaq** | 0.279 | 0.000 | 0.449 | 0.000 | 1.000 |
| **GDP** | 24332.610 | 21743.480 | 19369.290 | 7328.615 | 39435.840 |
| **Unemployment** | 7.785 | 7.220 | 4.394 | 4.980 | 8.470 |
| **Population** | 0.773 | 0.638 | 0.562 | 0.479 | 1.099 |
| **Bank Capital/Total Assets** | 7.043 | 6.500 | 2.342 | 5.400 | 8.126 |
| **Bank deposits/GDP** | 71.780 | 54.683 | 54.324 | 44.737 | 77.937 |
| **Bank z score** | 14.766 | 15.468 | 6.234 | 9.548 | 19.171 |
| **Central Bank Assets/GDP** | 4.878 | 2.070 | 8.394 | 0.576 | 4.548 |
|  |  |  |  |  |  |

**Table 2: Country Statistics**

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **COUNTRY** | **ADRs** | **Volatility** | **Idiosy** | **Range** | **GARCH** | **GDP** | **Unemp** | **Popu** | **Bank Capital/**  **Total Assets** | **Bank deposits/**  **GDP** | **Bank z**  **score** | **Central Bank**  **Assets/**  **GDP** |
|  | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] | [9] | [10] | [11] | [12] |
| **Argentina** | 18 | 0.03 | 0.03 | 0.04 | 0.03 | 9728.92 | 9.40 | 1.04 | 12.06 | 17.85 | 6.03 | 11.04 |
| **Australia** | 24 | 0.03 | 0.03 | 0.04 | 0.04 | 42992.49 | 10.65 | 1.43 | 5.60 | 82.76 | 14.92 | 2.53 |
| **Austria** | 1 | 0.02 | 0.02 | 0.01 | 0.02 | 36890.06 | 13.09 | 0.52 | 5.17 | 63.34 | 19.55 | 0.57 |
| **Belgium** | 6 | 0.03 | 0.02 | 0.02 | 0.03 | 42297.67 | 8.93 | 0.62 | 5.53 | 100.03 | 13.61 | 3.45 |
| **Brazil** | 19 | 0.03 | 0.02 | 0.03 | 0.03 | 9281.55 | 8.83 | 0.95 | 9.91 | 51.67 | 15.49 | 17.57 |
| **Cayman Islands** | 14 | 0.04 | 0.04 | 0.05 | 0.04 | 76719.37 | 7.74 | 2.08 | . | . | 13.75 | . |
| **Chile** | 25 | 0.02 | 0.02 | 0.03 | 0.02 | 10330.90 | 10.46 | 1.08 | 7.37 | 46.06 | 7.29 | 4.17 |
| **China** | 153 | 0.04 | 0.03 | 0.05 | 0.04 | 5709.70 | 8.34 | 0.52 | 6.48 | 45.86 | 19.28 | 2.85 |
| **Colombia** | 1 | 0.03 | 0.02 | 0.04 | 0.03 | 6511.20 | 7.70 | 1.04 | 14.02 | 18.82 | 5.55 | 0.31 |
| **Denmark** | 7 | 0.03 | 0.03 | 0.04 | 0.03 | 51568.02 | 10.80 | 0.45 | 6.09 | 53.80 | 17.37 | 0.55 |
| **Dominican Republ** | 1 | 0.05 | 0.05 | 0.06 | 0.05 | 2672.00 | 16.16 | 1.43 | 9.87 | 17.82 | 25.69 | 3.91 |
| **Finland** | 4 | 0.02 | 0.02 | 0.02 | 0.02 | 41334.19 | 11.16 | 0.35 | 7.61 | 54.73 | 13.85 | 0.74 |
| **France** | 41 | 0.03 | 0.03 | 0.03 | 0.03 | 36293.61 | 8.81 | 0.59 | 5.18 | 68.99 | 18.17 | 2.00 |
| **Germany** | 24 | 0.03 | 0.02 | 0.03 | 0.03 | 37526.83 | 8.42 | -0.02 | 4.49 | 67.51 | 16.05 | 0.52 |
| **Ghana** | 1 | 0.03 | 0.03 | 0.05 | 0.03 | 336.19 | 7.82 | 2.45 | 12.00 | 11.28 | 6.82 | 20.51 |
| **Greece** | 5 | 0.03 | 0.03 | 0.03 | 0.03 | 23480.61 | 10.41 | 0.23 | 6.51 | 84.03 | 4.96 | 7.32 |
| **Hong Kong** | 12 | 0.03 | 0.03 | 0.04 | 0.03 | 30384.29 | 5.13 | 0.55 | 11.23 | 270.22 | 14.77 | . |
| **Hungary** | 2 | 0.03 | 0.02 | 0.03 | 0.03 | 11665.61 | 7.52 | -0.21 | 8.09 | 42.99 | 5.83 | 2.43 |
| **India** | 18 | 0.03 | 0.03 | 0.04 | 0.03 | 1160.22 | 5.59 | 1.38 | 6.70 | 57.87 | 15.88 | 3.54 |
| **Indonesia** | 2 | 0.02 | 0.02 | 0.02 | 0.02 | 2340.66 | 6.22 | 1.33 | 10.85 | 32.84 | 4.69 | 7.30 |
| **Ireland** | 19 | 0.03 | 0.03 | 0.04 | 0.03 | 51426.34 | 7.79 | 1.57 | 6.48 | 83.34 | 5.27 | 2.96 |
| **Israel** | 18 | 0.03 | 0.03 | 0.03 | 0.03 | 29911.85 | 8.23 | 1.89 | 6.70 | 76.50 | 27.84 | 1.30 |

**Table 2: Country Statistics– *Continued***

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **COUNTRY** | **ADRs** | **Volatility** | **Idiosy** | **Range** | **GARCH** | **GDP** | **Unemp** | **Popu** | **Bank Capital/**  **Total Assets** | **Bank deposits/**  **GDP** | **Bank z**  **score** | **Central Bank**  **Assets/**  **GDP** |
|  | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] | [9] | [10] | [11] | [12] |
| **Italy** | 14 | 0.02 | 0.02 | 0.02 | 0.02 | 32487.88 | 8.86 | 0.39 | 6.33 | 64.36 | 14.90 | 6.04 |
| **Japan** | 35 | 0.02 | 0.02 | 0.02 | 0.02 | 38681.24 | 4.35 | 0.00 | 4.81 | 196.77 | 13.27 | 24.78 |
| **Luxembourg** | 3 | 0.03 | 0.03 | 0.03 | 0.03 | 84529.94 | 4.29 | 1.49 | 5.13 | 376.80 | 26.03 | 0.18 |
| **Mexico** | 30 | 0.03 | 0.02 | 0.03 | 0.03 | 9019.20 | 4.18 | 1.38 | 10.21 | 23.30 | 21.35 | . |
| **New Zealand** | 3 | 0.02 | 0.02 | 0.02 | 0.02 | 27030.01 | 5.07 | 1.30 | 6.12 | 82.30 | 18.74 | 2.73 |
| **Norway** | 4 | 0.02 | 0.02 | 0.02 | 0.02 | 72578.74 | 3.81 | 0.87 | 6.69 | 52.86 | 8.15 | 0.27 |
| **Papua New Guinea** | 1 | 0.03 | 0.03 | 0.03 | 0.03 | 683.61 | 2.48 | 2.14 | . | 17.15 | 9.54 | 0.87 |
| **Peru** | 4 | 0.03 | 0.03 | 0.04 | 0.03 | 5093.57 | 3.71 | 1.09 | 10.30 | 29.95 | 16.12 | 0.23 |
| **Philippines** | 1 | 0.02 | 0.02 | 0.02 | 0.02 | 2120.98 | 3.48 | 1.74 | 10.94 | 52.00 | 19.65 | 3.25 |
| **Portugal** | 2 | 0.01 | 0.01 | 0.01 | 0.01 | 17274.67 | 6.38 | 0.32 | 6.06 | 79.10 | 9.61 | 0.11 |
| **Russia** | 8 | 0.03 | 0.03 | 0.04 | 0.03 | 8348.50 | 6.77 | -0.13 | 12.22 | 28.67 | 8.12 | 1.45 |
| **Singapore** | 3 | 0.03 | 0.03 | 0.03 | 0.03 | 34131.34 | 4.96 | 2.12 | 9.50 | 100.93 | 22.04 | 3.01 |
| **South Africa** | 13 | 0.03 | 0.03 | 0.04 | 0.03 | 5731.41 | 26.94 | 1.40 | 7.69 | 55.52 | 16.41 | 1.40 |
| **South Korea** | 14 | 0.03 | 0.02 | 0.03 | 0.03 | 23012.10 | 3.48 | 0.50 | 7.79 | 74.52 | 8.72 | 1.06 |
| **Spain** | 13 | 0.02 | 0.02 | 0.02 | 0.02 | 27314.08 | 15.32 | 0.99 | 6.81 | 86.35 | 19.19 | 3.24 |
| **Sweden** | 12 | 0.03 | 0.03 | 0.03 | 0.03 | 41114.64 | 6.16 | 0.56 | 5.04 | 46.83 | 10.37 | 0.76 |
| **Switzerland** | 11 | 0.02 | 0.02 | 0.02 | 0.02 | 61667.39 | 4.13 | 0.86 | 5.49 | 129.53 | 11.50 | 1.13 |
| **The Netherlands** | 18 | 0.02 | 0.02 | 0.02 | 0.02 | 44977.23 | 4.75 | 0.39 | 4.23 | 88.83 | 13.69 | 0.92 |
| **Turkey** | 1 | 0.02 | 0.02 | 0.02 | 0.02 | 9447.99 | 10.02 | 1.46 | 12.12 | 39.84 | 8.70 | 2.26 |
| **United Kingdom** | 98 | 0.03 | 0.02 | 0.03 | 0.03 | 40404.63 | 5.59 | 0.65 | 6.58 | . | 10.41 | 0.42 |
| **Venezuela** | 2 | 0.03 | 0.03 | 0.03 | 0.03 | 4373.01 | 14.32 | 1.74 | 13.40 | 15.42 | 13.82 | 0.88 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

**Table 3: Correlations**

This table provides the Pearson correlation between variables. For the definition of variables, please refer to Table 1.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **[1]** | **[2]** | **[3]** | **[4]** | **[5]** | **[6]** | **[7]** | **[8]** | **[9]** | **[10]** | **[11]** | **[12]** | **[13]** | **[14]** | **[15]** | **[16]** | **[17]** |
| **Volatility** | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Idiosyncratic Volatility** | 0.97 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Range Volatility** | 0.87 | 0.87 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **GARCH Volatility** | 0.94 | 0.93 | 0.86 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Spread** | 0.45 | 0.52 | 0.45 | 0.45 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |
| **Turnover** | 0.31 | 0.27 | 0.31 | 0.31 | -0.12 | 1 |  |  |  |  |  |  |  |  |  |  |  |
| **Illiquidity** | 0.24 | 0.27 | 0.23 | 0.25 | 0.58 | -0.05 | 1 |  |  |  |  |  |  |  |  |  |  |
| **Size** | -0.20 | -0.24 | -0.18 | -0.22 | -0.21 | -0.04 | -0.06 | 1 |  |  |  |  |  |  |  |  |  |
| **Price** | -0.37 | -0.40 | -0.41 | -0.41 | -0.26 | -0.02 | -0.11 | 0.31 | 1 |  |  |  |  |  |  |  |  |
| **Nasdaq** | 0.30 | 0.36 | 0.38 | 0.37 | 0.31 | 0.03 | 0.16 | -0.14 | -0.18 | 1 |  |  |  |  |  |  |  |
| **GDP** | -0.18 | -0.20 | -0.28 | -0.18 | -0.01 | -0.16 | 0.01 | 0.09 | 0.13 | 0.03 | 1 |  |  |  |  |  |  |
| **Unemployment** | 0.03 | 0.05 | 0.04 | 0.03 | 0.09 | 0.02 | 0.04 | -0.05 | -0.04 | 0.04 | -0.23 | 1 |  |  |  |  |  |
| **Population** | 0.03 | 0.05 | 0.09 | 0.05 | 0.09 | -0.04 | 0.07 | 0.01 | -0.07 | 0.10 | -0.08 | 0.15 | 1 |  |  |  |  |
| **Bank Capital/Total Assets** | -0.01 | 0.00 | 0.11 | -0.01 | -0.03 | -0.02 | 0.00 | 0.06 | -0.08 | -0.10 | -0.42 | 0.09 | 0.23 | 1 |  |  |  |
| **Bank deposits/GDP** | -0.19 | -0.20 | -0.30 | -0.20 | -0.07 | -0.11 | -0.02 | 0.03 | 0.10 | -0.02 | 0.59 | -0.26 | -0.29 | -0.47 | 1 |  |  |
| **Bank z score** | 0.13 | 0.14 | 0.14 | 0.17 | 0.05 | 0.12 | 0.05 | 0.00 | -0.08 | 0.19 | -0.14 | 0.05 | 0.00 | -0.13 | -0.02 | 1 |  |
| **Central Bank Assets/GDP** | -0.15 | -0.14 | -0.17 | -0.16 | -0.07 | -0.07 | -0.02 | 0.05 | 0.02 | -0.11 | 0.06 | -0.16 | -0.25 | 0.09 | 0.55 | -0.08 | 1 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Table 4: Banking Sector Strength and Volatility Regressions**

The table reports the findings from the following OLS regression equation on our main sample of ADR-Year observations:

The dependent variable is the historical standard deviation. The main independent variable is BANKING, which represents each of the four banking strength measures from World Bank Database: Bank Capital/Total) Assets, Bank deposits/GDP, Central Bank Assets/GDP Regulatory, and Bank z score. 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.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  | |  | |  | |  | |  | |
| **Model** | | **[1]** | | **[2]** | | **[3]** | | **[4]** | | **[5]** | |
|  |  | |  | |  | |  | |  | |
| **LN (Bank Capital/Total) Assets** | | -0.000 | |  | |  | |  | | -0.058 | |
|  | | (-0.002) | |  | |  | |  | | (-1.344) | |
| **LN (Bank deposits/GDP)** | |  | | -0.059\*\*\* | |  | |  | | -0.097\*\*\* | |
|  | |  | | (-3.493) | |  | |  | | (-3.846) | |
| **LN (****Central Bank Assets/GDP)** | |  | |  | | 0.026\* | |  | | 0.029\* | |
|  | |  | |  | | (1.737) | |  | | (1.809) | |
| **LN ()** | |  | |  | |  | | -0.010\*\* | | -0.008 | |
|  | |  | |  | |  | | (-1.980) | | (-1.460) | |
| **Spread** | | 8.140\*\*\* | |  | | 8.231\*\*\* | | 7.981\*\*\* | | 7.693\*\*\* | |
|  | | (10.817) | |  | | (11.130) | | (10.283) | | (9.296) | |
| **Turnover** | | 5.689\*\*\* | | 5.570\*\*\* | | 5.862\*\*\* | | 5.584\*\*\* | | 5.587\*\*\* | |
|  | | (10.426) | | (9.808) | | (10.563) | | (10.195) | | (9.167) | |
| **Illiquidity** | | -0.002\*\* | | 0.003\*\*\* | | -0.001\*\* | | -0.001\*\* | | -0.002\*\* | |
|  | | (-2.155) | | (3.288) | | (-2.216) | | (-2.118) | | (-2.304) | |
| **LN (Price)** | | -0.163\*\*\* | | -0.166\*\*\* | | -0.162\*\*\* | | -0.159\*\*\* | | -0.154\*\*\* | |
|  | | (-16.558) | | (-16.250) | | (-16.643) | | (-15.407) | | (-14.271) | |
| **LN (Size)** | | -0.006 | | -0.025\*\*\* | | -0.006 | | -0.009 | | -0.006 | |
|  | | (-0.926) | | (-4.261) | | (-1.022) | | (-1.466) | | (-0.855) | |
| **Nasdaq** | | 0.188\*\*\* | | 0.215\*\*\* | | 0.191\*\*\* | | 0.200\*\*\* | | 0.176\*\*\* | |
|  | | (9.742) | | (10.466) | | (10.212) | | (10.153) | | (8.697) | |
| **LN (GDP)** | | -0.068\*\*\* | | -0.046\*\*\* | | -0.059\*\*\* | | -0.078\*\*\* | | -0.048\*\*\* | |
|  | | (-8.630) | | (-5.260) | | (-7.902) | | (-9.593) | | (-4.953) | |
| **LN (Unemployment)** | | 0.021 | | 0.014 | | 0.024 | | 0.005 | | -0.013 | |
|  | | (1.145) | | (0.749) | | (1.343) | | (0.255) | | (-0.649) | |
| **Population** | | -0.050\*\*\* | | -0.056\*\*\* | | -0.035\*\* | | -0.055\*\*\* | | -0.040\*\* | |
|  | | (-3.147) | | (-3.623) | | (-2.376) | | (-3.562) | | (-2.406) | |
| **Constant** | | -2.649\*\*\* | | -2.156\*\*\* | | -2.813\*\*\* | | -2.452\*\*\* | | -2.341\*\*\* | |
|  | | (-16.880) | | (-15.379) | | (-18.427) | | (-16.512) | | (-11.643) | |
|  | |  | |  | |  | |  | |  | |
| **Year FE** | | Yes | | Yes | | Yes | | Yes | | Yes | |
| **Robust SE** | | Yes | | Yes | | Yes | | Yes | | Yes | |
| **Observations** | | 4,665 | | 4,345 | | 4,953 | | 4,546 | | 3,799 | |
| **R-squared** | | 0.639 | | 0.600 | | 0.632 | | 0.637 | | 0.633 | |

**Table 5: Banking Sector Strength and Volatility Regressions**

The table reports the findings from the following OLS regression equation on our main sample of ADR-Year observations:

The dependent variable is the idiosyncratic volatility. The main independent variable is BANKING, which represents each of the four banking strength measures from World Bank Database: Bank Capital/Total) Assets, Bank deposits/GDP, Central Bank Assets/GDP Regulatory, and Bank z score. 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.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Model** | | **[1]** | | **[2]** | | **[3]** | | **[4]** | | **[5]** | |
|  |  | |  | |  | |  | |  | |
| **LN (Bank Capital/Total) Assets** | | 0.010 | |  | |  | |  | | -0.056 | |
|  | | (0.340) | |  | |  | |  | | (-1.243) | |
| **LN (Bank deposits/GDP)** | |  | | -0.065\*\*\* | |  | |  | | -0.102\*\*\* | |
|  | |  | | (-3.530) | |  | |  | | (-3.535) | |
| **LN (Central Bank Assets/GDP)** | |  | |  | | 0.013 | |  | | 0.010 | |
|  | |  | |  | | (0.822) | |  | | (0.575) | |
| **LN (Bank z score)** | |  | |  | |  | | -0.008 | | -0.008 | |
|  | |  | |  | |  | | (-1.462) | | (-1.223) | |
| **Spread** | | 8.465\*\*\* | |  | | 8.570\*\*\* | | 8.296\*\*\* | | 7.914\*\*\* | |
|  | | (10.281) | |  | | (10.570) | | (9.841) | | (8.748) | |
| **Turnover** | | 5.044\*\*\* | | 5.057\*\*\* | | 5.285\*\*\* | | 4.997\*\*\* | | 5.145\*\*\* | |
|  | | (9.808) | | (9.492) | | (9.801) | | (9.554) | | (8.966) | |
| **Illiquidity** | | -0.002\*\* | | 0.003\*\*\* | | -0.002\*\* | | -0.002\*\* | | -0.002\*\* | |
|  | | (-2.493) | | (3.093) | | (-2.575) | | (-2.413) | | (-2.482) | |
| **LN (Price)** | | -0.176\*\*\* | | -0.178\*\*\* | | -0.175\*\*\* | | -0.173\*\*\* | | -0.167\*\*\* | |
|  | | (-16.534) | | (-16.478) | | (-16.755) | | (-15.618) | | (-14.563) | |
| **LN (Size)** | | -0.028\*\*\* | | -0.049\*\*\* | | -0.028\*\*\* | | -0.029\*\*\* | | -0.029\*\*\* | |
|  | | (-4.339) | | (-7.806) | | (-4.401) | | (-4.482) | | (-4.028) | |
| **Nasdaq** | | 0.231\*\*\* | | 0.256\*\*\* | | 0.234\*\*\* | | 0.245\*\*\* | | 0.223\*\*\* | |
|  | | (10.678) | | (11.520) | | (11.121) | | (11.177) | | (10.000) | |
| **LN (GDP)** | | -0.092\*\*\* | | -0.066\*\*\* | | -0.082\*\*\* | | -0.101\*\*\* | | -0.071\*\*\* | |
|  | | (-10.266) | | (-6.741) | | (-9.333) | | (-10.669) | | (-6.327) | |
| **LN (Unemployment)** | | 0.019 | | 0.011 | | 0.021 | | -0.002 | | -0.018 | |
|  | | (0.868) | | (0.512) | | (0.995) | | (-0.085) | | (-0.711) | |
| **Population** | | -0.059\*\*\* | | -0.062\*\*\* | | -0.034\*\* | | -0.059\*\*\* | | -0.047\*\*\* | |
|  | | (-3.299) | | (-3.564) | | (-2.056) | | (-3.493) | | (-2.652) | |
| **Constant** | | -2.098\*\*\* | | -1.567\*\*\* | | -2.235\*\*\* | | -1.915\*\*\* | | -1.699\*\*\* | |
|  | | (-11.999) | | (-9.425) | | (-12.799) | | (-11.217) | | (-7.468) | |
|  | |  | |  | |  | |  | |  | |
| **Year FE** | | Yes | | Yes | | Yes | | Yes | | Yes | |
| **Robust SE** | | Yes | | Yes | | Yes | | Yes | | Yes | |
| **Observations** | | 4,665 | | 4,345 | | 4,953 | | 4,546 | | 3,799 | |
| **R-squared** | | 0.656 | | 0.618 | | 0.646 | | 0.655 | | 0.649 | |

**Table 6: Banking Sector Strength and Volatility Regressions**

The table reports the findings from the following OLS regression equation on our main sample of ADR-Year observations:

The dependent variable is the range volatility measure. The main independent variable is BANKING, which represents each of the four banking strength measures from World Bank Database: Bank Capital/Total) Assets, Bank deposits/GDP, Central Bank Assets/GDP Regulatory, and Bank z score. 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.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Model** | | **[1]** | | **[2]** | | **[3]** | | **[4]** | | **[5]** | |
|  |  | |  | |  | |  | |  | |
| **LN (Bank Capital/Total) Assets** | | 0.232\*\*\* | |  | |  | |  | | 0.018 | |
|  | | (6.765) | |  | |  | |  | | (0.336) | |
| **LN (Bank deposits/GDP)** | |  | | -0.216\*\*\* | |  | |  | | -0.249\*\*\* | |
|  | |  | | (-9.797) | |  | |  | | (-7.616) | |
| **LN (Central Bank Assets/GDP)** | |  | |  | | 0.003 | |  | | 0.002 | |
|  | |  | |  | | (0.135) | |  | | (0.115) | |
| **LN (Bank z score)** | |  | |  | |  | | -0.013\* | | -0.006 | |
|  | |  | |  | |  | | (-1.793) | | (-0.869) | |
| **Spread** | | 11.784\*\*\* | |  | | 12.702\*\*\* | | 12.448\*\*\* | | 11.394\*\*\* | |
|  | | (11.765) | |  | | (12.408) | | (11.839) | | (10.212) | |
| **Turnover** | | 6.754\*\*\* | | 6.521\*\*\* | | 6.796\*\*\* | | 6.533\*\*\* | | 6.905\*\*\* | |
|  | | (11.690) | | (11.543) | | (11.431) | | (11.298) | | (11.055) | |
| **Illiquidity** | | -0.004\*\*\* | | 0.003\*\*\* | | -0.004\*\*\* | | -0.004\*\*\* | | -0.004\*\* | |
|  | | (-2.831) | | (3.124) | | (-3.080) | | (-2.912) | | (-2.448) | |
| **LN (Price)** | | -0.261\*\*\* | | -0.273\*\*\* | | -0.263\*\*\* | | -0.262\*\*\* | | -0.257\*\*\* | |
|  | | (-22.403) | | (-22.063) | | (-21.915) | | (-21.135) | | (-21.440) | |
| **LN (Size)** | | 0.046\*\*\* | | 0.019\*\*\* | | 0.047\*\*\* | | 0.045\*\*\* | | 0.048\*\*\* | |
|  | | (6.408) | | (2.692) | | (6.154) | | (5.639) | | (6.385) | |
| **Nasdaq** | | 0.352\*\*\* | | 0.397\*\*\* | | 0.342\*\*\* | | 0.357\*\*\* | | 0.351\*\*\* | |
|  | | (14.396) | | (14.930) | | (13.784) | | (13.793) | | (13.964) | |
| **LN (GDP)** | | -0.102\*\*\* | | -0.051\*\*\* | | -0.113\*\*\* | | -0.130\*\*\* | | -0.052\*\*\* | |
|  | | (-9.416) | | (-4.204) | | (-9.532) | | (-10.187) | | (-4.075) | |
| **LN (Unemployment)** | | 0.041\* | | 0.010 | | 0.031 | | 0.037 | | -0.014 | |
|  | | (1.699) | | (0.422) | | (1.317) | | (1.506) | | (-0.588) | |
| **Population** | | 0.007 | | 0.006 | | 0.058\*\*\* | | 0.016 | | 0.014 | |
|  | | (0.330) | | (0.340) | | (2.870) | | (0.756) | | (0.781) | |
| **Constant** | | -3.610\*\*\* | | -2.077\*\*\* | | -3.118\*\*\* | | -2.892\*\*\* | | -2.594\*\*\* | |
|  | | (-18.399) | | (-10.951) | | (-14.977) | | (-13.810) | | (-11.032) | |
|  | |  | |  | |  | |  | |  | |
| **Year FE** | | Yes | | Yes | | Yes | | Yes | | Yes | |
| **Robust SE** | | Yes | | Yes | | Yes | | Yes | | Yes | |
| **Observations** | | 4,665 | | 4,345 | | 4,953 | | 4,546 | | 3,799 | |
| **R-squared** | | 0.686 | | 0.655 | | 0.664 | | 0.674 | | 0.710 | |

**Table 7: Banking Sector Strength and Volatility Regressions**

The table reports the findings from the following OLS regression equation on our main sample of ADR-Year observations:

The dependent variable is the GARCH(1,1) volatility measure. The main independent variable is BANKING, which represents each of the four banking strength measures from World Bank Database: Bank Capital/Total) Assets, Bank deposits/GDP, Central Bank Assets/GDP Regulatory, and Bank z score. 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.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Model** | | **[1]** | | **[2]** | | **[3]** | | **[4]** | | **[5]** | |
|  |  | |  | |  | |  | |  | |
| **LN (Bank Capital/Total) Assets** | | 0.000 | |  | |  | |  | | -0.080\* | |
|  | | (0.001) | |  | |  | |  | | (-1.804) | |
| **LN (Bank deposits/GDP)** | |  | | -0.062\*\*\* | |  | |  | | -0.117\*\*\* | |
|  | |  | | (-3.595) | |  | |  | | (-4.590) | |
| **LN (Central Bank Assets/GDP)** | |  | |  | | 0.023 | |  | | 0.031\* | |
|  | |  | |  | | (1.455) | |  | | (1.793) | |
| **LN (Bank z score)** | |  | |  | |  | | -0.012\*\* | | -0.008 | |
|  | |  | |  | |  | | (-2.451) | | (-1.336) | |
| **Spread** | | 6.741\*\*\* | |  | | 6.825\*\*\* | | 6.597\*\*\* | | 6.176\*\*\* | |
|  | | (8.733) | |  | | (8.962) | | (8.226) | | (7.291) | |
| **Turnover** | | 5.219\*\*\* | | 5.182\*\*\* | | 5.320\*\*\* | | 5.033\*\*\* | | 5.150\*\*\* | |
|  | | (10.443) | | (9.917) | | (10.456) | | (9.970) | | (9.252) | |
| **Illiquidity** | | -0.001 | | 0.003\*\*\* | | -0.001 | | -0.001 | | -0.001 | |
|  | | (-0.849) | | (4.345) | | (-0.987) | | (-0.985) | | (-0.876) | |
| **LN (Price)** | | -0.167\*\*\* | | -0.167\*\*\* | | -0.166\*\*\* | | -0.164\*\*\* | | -0.158\*\*\* | |
|  | | (-16.312) | | (-16.128) | | (-16.225) | | (-15.135) | | (-14.501) | |
| **LN (Size)** | | -0.012\* | | -0.029\*\*\* | | -0.013\*\* | | -0.017\*\* | | -0.013\* | |
|  | | (-1.935) | | (-4.799) | | (-2.061) | | (-2.451) | | (-1.904) | |
| **Nasdaq** | | 0.224\*\*\* | | 0.238\*\*\* | | 0.227\*\*\* | | 0.236\*\*\* | | 0.207\*\*\* | |
|  | | (10.549) | | (10.703) | | (10.889) | | (10.761) | | (9.354) | |
| **LN (GDP)** | | -0.067\*\*\* | | -0.046\*\*\* | | -0.059\*\*\* | | -0.079\*\*\* | | -0.044\*\*\* | |
|  | | (-7.431) | | (-4.624) | | (-7.010) | | (-8.359) | | (-4.180) | |
| **LN (Unemployment)** | | 0.023 | | 0.019 | | 0.027 | | 0.008 | | -0.013 | |
|  | | (1.218) | | (1.015) | | (1.449) | | (0.441) | | (-0.652) | |
| **Population** | | -0.047\*\*\* | | -0.054\*\*\* | | -0.032\*\* | | -0.053\*\*\* | | -0.034\* | |
|  | | (-2.724) | | (-3.213) | | (-2.034) | | (-3.115) | | (-1.926) | |
| **Constant** | | -2.482\*\*\* | | -2.034\*\*\* | | -2.621\*\*\* | | -2.253\*\*\* | | -2.068\*\*\* | |
|  | | (-13.958) | | (-12.843) | | (-15.807) | | (-13.196) | | (-9.172) | |
|  | |  | |  | |  | |  | |  | |
| **Year FE** | | Yes | | Yes | | Yes | | Yes | | Yes | |
| **Robust SE** | | Yes | | Yes | | Yes | | Yes | | Yes | |
| **Observations** | | 4,665 | | 4,345 | | 4,953 | | 4,546 | | 3,799 | |
| **R-squared** | | 0.647 | | 0.617 | | 0.640 | | 0.646 | | 0.644 | |

**Banking Sector Strength and the Quality of Cross-Listed Securities**

*David Y. Aharon*^*, Kyle Allen*§, *Ahmed S. Baig*†

**Abstract**

This paper tests the effect of Banking sector strength on the volatility of American depository receipts (ADRs) listed on major US Exchanges. Using panel regressions based on an international dataset covering 705 ADRs from 43 countries, we suggest a pioneer examination on whether cross-listed securities from more solid banking systems are associated with lower degree of volatility. Our results confirm this relationship, while particularly Deposits/GDP ratio has a central role in alleviating ADRs volatility. The calming effect holds for different measures of volatility (Historical, Idiosyncratic, Range, and GARCH[1,1]) and under different regression specifications and control variables. The empirical evidence documented here may be of interest for policymakers, banking supervisors and central banks and all those who seek for the stability of both the banking systems and financial markets.

*Keywords*: Banking, Stability, ADR, American depository receipts, Volatility, Idiosyncratic Volatility, Range Volatility, Cross-listed Securities.

*JEL classifications*: G01, G12, G15.

First draft: 27 September 2021

This version: 28 September 2021

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**Highlights**

* We explore the impact of Banking Infrastructure strength on ADRs volatility.
* We examine the potential effects across 705 ADRs from 43 countries
* Four different measures of volatility are tested: Historical, Idiosyncratic, Range, and GARCH[1,1]
* Four different estimates for Banking strength are used: Deposits/GDP, Bank Capital/Total assets, Bank Z score, and Central Bank assets/GDP
* The results suggest that Deposits/GDP ratio has a central role in alleviating ADRs volatility

David’s note: do Deposits/GDP, Bank Capital/Total assets, Bank Z score, and Central Bank assets/GDP, all, essentially reflect strength?

How do we treat endogeneity? Financial crises periods?

**Credit Author Statement**

**David Y. Aharon:** Conceptualization; Data curation; Investigation; Methodology; Project administration; Resources; Software; Visualization; Writing – original draft; Writing – review & editing.

**Kyle Allen:** Conceptualization; Data curation; Investigation; Methodology; Project administration; Resources; Software; Visualization; Writing – original draft; Writing – review & editing.

**Ahmed Baig:** Conceptualization; Data curation; Investigation; Methodology; Project administration; Resources; Software; Visualization; Writing – original draft; Writing – review & editing.

1. See for example: Gan, 2004; Elsinger, Lehar, & Summer, 2006; Gropp et al. 2006; Uhde & Heimeshoff, 2009; De Jonghe 2010; Haldane & May, 2011; Mirzaei, Moore & Liu, 2013; Schaeck & Cihák, 2014. [↑](#footnote-ref-1)
2. These include, *inter alia*, the Dodd-Frank Wall Street Reform and Consumer Protection Act, the Emergency Economic Stabilization Act, and the Troubled Asset Relief Program (TARP). [↑](#footnote-ref-2)