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# Social trust and the liquidity of cross-listed securities

Benjamin M. Blau

*Jon M. Huntsman School of Business at Utah State University, 3565 Old Main Hill, Logan, Utah 84322, United States.*

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ABSTRACT

This paper examines various measures of market liquidity in American Depositary Receipts (ADRs) while conditioning on the level of trust in the ADR's home country. Multivariate tests show that as home-country levels of trust increase, ADR liquidity is dramatically improved. To draw stronger causal inferences, we use a difference-in-difference approach to examine liquidity surrounding an (arguably) exogenous reduction in trust and find that liquidity worsens in response to the event. These results support our hypothesis that trust is an important determinant in the liquidity of financial markets.

## 1. Introduction

A large body of literature has attempted to explain the benefits associated with firms that choose to cross-list their securities. Both the theoretical and empirical literature seems to suggest that cross-listing can result in lower costs of capital, higher levels of liquidity, and an improvement in the market value of firms (Alexander, Eun, & Janakirananan, 1987; Diodge, Karolyi, & Stulz, 2004; Errunza & Losq, 1985; Foerster & Karolyi, 1993, 2000; Karolyi, 1998; Miller, 1999; Stapleton & Subrahmanyam, 1977). Focusing on liquidity benefits, Karolyi (1998) and Foerster and Karolyi (2000) show that cross-listing leads to an increase in liquidity in both the home market and the cross-listed market. Motivated by this line of research, our study examines factors that determine the level of liquidity in cross-listed stocks. However, our tests, while isolated to cross-listed stocks, can also contribute more broadly to the general literature that examines factors that influence liquidity. Much of this literature has been devoted to obtaining the appropriate regulatory setting that produces the optimal market structure.[1] Another broad literature examines how the information environment affects liquidity in financial markets. Theory in both Glosten and Milgrom (1985) and Kyle (1985) suggests that in a world with heterogeneously informed traders, those with the most information can impose adverse selection costs on those with the least information. This asymmetry in information motivates liquidity providers to widen bid-ask spreads and reduce market liquidity generally. Empirical research seems to confirm this prediction.[2]

Given these two streams of literature, we deviate away from more traditional studies that have examined factors that influence liquidity. Instead of investigating how market structures affect market liquidity, in this study, we are more interested in the interaction between social structures and market liquidity. In particular, we contend that countries with greater levels of trust will experience more liquidity in the cross-listed market. The literature suggests that the decision to cross-list securities is motivated, in part, by potential improvements in liquidity. Given this information, tests that examine how variations in trust affect liquidity are compelling.

The theoretical link between trust and financial market liquidity is developed nicely in Guiso, Sapienza, and Zingales (2004). They show that an investor's demand for stock is a positive function of the stock's expected return along with a coefficient that can represent the investor's level of risk aversion. Her risk aversion depends not only on the riskiness of the stock, but also on the probability that the counter-party will not abscond with the investment. As the probability of this type of dishonesty increases, the demand to invest in stock decreases. Therefore, trust can directly influence participation in stock markets. This relationship is found empirically in both Guiso et al. (2004) and in Guiso, Sapienza, and Zingales (2008). We note, however, that stock market participation is different than stock market liquidity. An investor's willingness to participate in the stock market is different than a market maker's willingness to continuously provide liquidity to that market. Yet, the same type of idea still applies. Market makers, who hold an inventory of stocks with volatile prices, similarly face the possibility that firms in less trustworthy societies will engage in dishonest or unethical behavior, which could have an adverse effect on stock prices. Therefore, costs associated with holding an inventory of stocks will motivate market makers to widen the bid-ask spreads of

*E-mail address:* ben.blau@usu.edu.

[1] See, for example, Harris (1994), Huang and Stoll (1996), Bessembinder and Kaufman (1997), Goldstein and Kavajecz (2000), Bessembinder (1999), Stoll (2000), Chung, Van Ness, & Van Ness (2001), Bessembinder (2003), Alexander and Peterson (2008), Diether, Lee, & Werner (2009), and Chung and Chuwonganant (2012) among others.

[2] Several papers discuss how information asymmetry affect transaction costs. See Glosten and Harris (1988), Stoll (1989), George, Kaul, & Nimalendran (1991), Lee, Mucklow, & Ready (1993), Lin, Sanger, & Booth (1995), and Krinsky and Lee (1996).

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cross-listed stocks from home countries that have lower levels of trust. A simple example may help motivate our analysis. In July of 2012, reports emerged that GlaxoSmithKline plead guilty to the largest, healthcare fraud settlement in U.S. history. A liquidity provider, who holds an inventory of shares for several pharmaceutical companies, not only has incentive to widen bid-ask spreads and reduce the level of liquidity for GlaxoSmithKline, but, due to the newly revealed information, the market maker also has incentive to widen spreads for other pharmaceutical stocks in the case that other companies may also be guilty of similar types of fraud. After identifying U.S. pharmaceutical companies based on SIC codes, we find that the bid-ask spreads of these firms increase nearly 10% during the four-month period surrounding the announcement of the fraud settlement. Furthermore, during the two months after the announcement, spreads for pharmaceutical companies were nearly 10 basis points higher than spreads for non-pharmaceutical companies.[3] This example provides the framework for how the level of trust in a particular sector may influence the level of liquidity of stocks in that sector. In this study, we continue along these lines by arguing that the effect of trust on the liquidity of stocks may also be observed at the country level.

As additional motivation, theory in Kyle (1985) and Glosten and Milgrom (1985) show that liquidity provision becomes more costly when market makers trade with others with private information. To the extent that these types of information asymmetries cause markets to become less liquid, countries with lower levels of trust might be more subject to these potential asymmetries – or, in other words, liquidity providers might perceive a higher likelihood of asymmetric information. This could occur for a number of reasons. For instance, firms in countries with less trust might have more questionable financial disclosure policies or less restrictive insider trading laws. In either case, those on the other side of the market maker's trade may have a higher likelihood of possessing private information. The costs associated with these types of information asymmetries are expected to be higher for stocks of firms located in societies with lower levels of trust.

We recognize the possibility that trust in a particular country might affect how financial markets are structured in that country. Thus, the level of trust might endogenously influence the structure of markets and any impact on liquidity in those markets might be due to these different structure types. To overcome the possibility of this type of endogeneity, we investigate our hypothesis by using a sample of American Depositary Receipts (ADRs), which are certificates issued by U.S. banks that are traded on U.S. exchanges but represent shares of a foreign stock.[4,5] This unique setting allows all securities in our sample to be traded in a similar setting, subsequently isolating the effect of trust in the home country on liquidity.[6]

The second difficulty we face in testing our hypothesis is identifying trust. We choose two indices that seem to properly reflect trust. First, we use the Corruption Perception Index provided by Transparency International. This index captures the perceived level of corruption in the public sector and is available for each country in each year. While we recognize that the lack of trust extends beyond the public sector and this index might not capture this extension perfectly, this index seems to reasonably capture attitudes related to trust that we are interested in (La Porta, Lopex-de-Silanes, Shlieifer, & Vishny, 1997). Recognizing that this index is not a perfect (inverse) approximation of trust, we also use the ASEP/JDS Trust Index, which consists of responses to the World Values Survey (WVS) about the interpersonal trust of individuals in a particular country. Johnson and Mislin (2012) contrast the measurement of trust in the WVS to the level of trust obtained from experimental tests performed in different countries and find a strong, positive relationship between the two measures suggesting that the WVS seem to properly capture the level of trust in a society.

Results from our tests show that, after controlling for a number of ADR-specific and country-specific characteristics, corruption in the ADR home country is negatively associated with our measures of liquidity. In particular, we find that bid-ask spreads, both in percentage terms and dollar terms, are markedly higher for ADRs with the most corrupt home countries. We also document that these ADRs also have significantly higher price impact. Interestingly, we show that ADRs with the most corrupt home countries trade less frequently providing some evidence that the lack of trust influences the willingness of investors to trade. Results from our multivariate tests are not only statistically significant, but they are also economically meaningful. For instance, a 1% increase in corruption is associated with an increase in bid-ask spreads of 0.124%. Similarly, a 1% increase in the corruption index is associated with a 0.194% and a 0.22% reduction in share turnover and trading volume and a 0.223% increase in price impact (Amihud's (2002) measure of illiquidity). These findings support our hypothesis and suggest that, to the extent that the corruption properly captures trust levels, countries with higher levels of trust experience greater ADR liquidity.

In our second set of tests, we find that, again after controlling for a variety of ADR-specific and country-specific characteristics, countries with higher levels of interpersonal trust (according to the AESP/JDS Trust Index) have ADRs with lower bid-ask spreads and less price impact. Once again, these findings are both statistically and economically significant. A 1% increase in trust is associated with a decrease in bid-ask spreads of nearly 0.28%. We note that the results are stronger when we focus on Amihud's (2002) measure of price impact. According to our estimates, a 1% increase in trust results in a 0.40% decrease in price impact. Combined, these findings provide support for our hypothesis and suggest that trust is an important determinant in the liquidity of cross-listed stocks. In additional tests, we find that these results hold after controlling for a variety of institutional quality measures described in Eleswarapu and Venkataraman (2006).

While it is difficult to argue that causality might flow from ADR liquidity to macro-levels of trust, the possibility still exists. To account for this possibility, we conduct a third set of tests where we examine how liquidity changes surrounding an (arguably) exogenous shock to a country's level of trust using a difference-in-difference approach. Specifically, we examine the liquidity of Chinese ADRs (relative to non-Chinese ADRs) during the four-month period surrounding the 2008 Chinese Melamine scandal, where it was discovered that certain foods, such as milk and infant formula, were adulterated with high levels of Melamine. This event affected > 50,000 infants and > 300,000 total individuals. According to news reports, the Melamine scandal first broke on July 16th, 2008 after several infants were hospitalized in the Gansu Province. The use of this event seems to meet the criteria for being a valid natural experiment. First, the scandal seems to be exogenous to financial market liquidity issues. Second, the scandal is likely to provide a meaningful, negative shock to the level of trust in China. Results from both our univariate and multivariate tests show that, relative to non-Chinese ADRs, the liquidity of Chinese ADRs significant decreases in response to this shock. In particular, we find an

[3] When conducting these tests, we examine spreads during the four-month window around the announcement. We note that the 10% increase in spreads for pharmaceutical firms is statistically different from zero ($t$-statistic = 3.42). We also find that during the post-announcement periods, the 10 basis point difference between spreads for pharmaceutical firms and spread for non-pharmaceutical firms is also statistically significant ($t$-statistic = 6.85).

[4] Given that the prices of ADRs closely follow the prices of foreign shares (Kato, Linn, & Schallheim, 1991; Wahab, Lashgari, & Cohn, 1992), any type of risk (or volatility), whether in the ADR market or the home-country market, should influence inventory holding costs and affect the width of the ADR bid-ask spread.

[5] As mentioned above, countries with lower levels of trust might have more issues with financial disclosure, which could lead to lower levels of liquidity in ADRs. According to the U.S. Securities and Exchange Commission, ADRs are only subject to disclosure requirements from their own country.

[6] Admittedly, we are not the first study to examine financial market quality using ADRs. Eleswarapu and Venkataraman (2006) show that legal and political institutions in the home country of ADRs affect the liquidity of ADRs. Blau, Brough, & Thomas (2014) show that economic freedom in an ADR's home country is associated with more stable stock prices.