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Contagion: China Evergrande Group's Collapse and its impact on Belt and Road Stock Indices

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ABSTRACT

The Evergrande Group is a giant: a company that has liabilities proportional to 2% of China's overall GDP. While there is evidence that Evergrande's collapse harmed China and its surrounding economies, this thesis analyzes Evergrande's default within the context of China's central foreign policy: the Belt and Road Initiative. Through four selected event dates, a difference in means and medians test and standard panel regression is conducted to analyze differences in impacts for Belt and Road and non-Belt and Road participating countries' stock indices. This paper's hypothesis implies that Belt and Road countries would see comparatively more negative impacts on their stock indices. Empirical analysis reveals that events before and after Evergrande's September 2021 warning were statistically different for both Belt and Road and non-Belt and Road groups, with Fitch Ratings' declaration of Evergrande's default being the most detrimental. On the other hand, warnings the year prior to Evergrande's widespread media coverage in September 2020 opposed the hypothesis, seeing non-Belt and Road countries being more negatively affected. Further findings suggest, however, that Belt and Road countries relative to non-Belt and Road countries showcase comparatively worse stock return performance across the majority of the events, fortifying the hypothesis that Belt and Road countries were more negatively impacted by Evergrande's default relative to non-Belt and Road countries.

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I. INTRODUCTION

The Evergrande Real Estate Group is, by all means, a giant: an immensely sized private-sector Chinese property developer and home builder that ranks as China's second-largest estate company by sales (Zhen 2017). However at the end of June Evergrande had nearly "2 trillion yuan of debts on its books, plus an unknown amount of off-books debt" (Wang Jing, Chen, Yu, Zhu, Wang Juanjuan and Jia 2021). The risk of a default garnered massive global attention. After their eventual default on an offshore bond at the beginning of December 2021, the default became the largest-ever by a company in Asia.

Current literature states that in the financial world, leveraged bubbles precede financial crises: when a crisis nears, the initial bubble signals from the explosive growth in credit and asset prices are followed by a lift-off in debt-servicing costs (Virtanen et al. 2018). Therefore, global markets were on high-alert as early as June of 2021, when China's Evergrande Group publicly announced their difficulties in paying back their bonds. When taking notice of Evergrande's $310 billion USD debt crisis, many in the media asked whether or not it would become China's "Lehman moment" (Oi, 2021) and whether their bankruptcy would lead to a "financial tsunami" (Wang Jing, Chen, Yu, Zhu, Wang Juanjuan and Jia 2021).

While there is substantial evidence that Evergrande's collapse has caused negative local spillover effects in Asia, this paper aims to examine Evergrande's collapse and its impacts on China's central foreign policy: the Belt and Road Initiative (BRI). Starting with a 2013 speech in Kazakhstan— Xi Jinping mentioned recreating the Silk Road, an

ancient network that linked Asia, the Middle East, and Europe for almost 2000 years (Jinping, 2017). Holding over 60% of the world's population, China's Belt and Road initiative is the world's largest infrastructure project, and is both the informal recreation of the Silk Road, and the cornerstone of President Xi Jinping's foreign policy.

Four premises form the theoretical foundation for this paper's hypothesis: 1) the collapse of Evergrande has a negative impact on China's local economy, 2) the BRI is negatively impacted by the Chinese economy's instability through decreased lending and increased debt repayment pressure, 3) the economic conditions of BRI borrower countries are negatively impacted by decreased lending and increased debt repayment pressure, and 4) the stock indices of the BRI borrower countries are negatively impacted by their decreased economic conditions. The hypothesis for this thesis claims that Evergrande's collapse– backed by the aforementioned theory– will create a noticeable negative spillover effect on BRI-participating countries, more so than non-BRI participants. Granted that Evergrande's media coverage was most substantial in September 2021, it is also hypothesized that the empirical results of the September 2021 event window will be the most comparatively significant.

Daily stock market returns for various BRI and non-BRI indices (see Appendix. 2) are collected from Bloomberg Terminal, and four key event dates (September 2020, August-September 2021, September 2021, and December 2021) are established as the underlying foundation of the methodology. Testing for these impacts involves two stages– for one, a difference in means and medians test is undertaken to examine for the existence of any significant impact of Evergrande's default on country stock indices and

their comparative magnitude between BRI and non-BRI countries. Next, a differences-in-differences-framed regression model is applied to discover if there are significant differences in impacts seen in BRI countries relative to non-BRI countries.

The results evoke a perplexing picture. The differences in means and medians suggest that the most significant impacts were seen in events prior to and directly after the main September 2021 event. They indicate that BRI countries saw less of a negative impact when compared to non-BRI countries in the September 2020 event time frame, opposing this paper's hypothesis. Even so, BRI countries did, in fact, see significant differences in means and medians that align with the hypothesis during the December 2021 event. This implies that the official label of a "default" being placed on the Evergrande group's name in December 2021, had the most significant negative impact on BRI country stock returns. While on the other hand, the circulating online letters in September 2020 seemed to create a more significant impact on non-BRI stock returns. The regression results suggest that the average differences in cumulative stock returns during the majority of events were significantly negative for BRI countries, relative to non-BRI countries. Thus, while the differences in mean and median framework suggest that the two other events (August-September 2020 and September 2021) were not significantly different, they embolden certain areas of the regression results. December 2021 was still mainly negative for BRI countries, and September 2020 was still mainly negative for non-BRI countries. Overall, compared to non-BRI countries, BRI countries showcase comparatively worse stock return performance across the four key events highlighted in this paper, emboldening the hypothesis that BRI countries are more negatively affected by Evergrande's default.

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These results have implications for regulators, equity market participants, creditors in understanding and effectively handling the Evergrande debt crisis in their decision-making processes and foreign policy decisions.

II.   BACKGROUND

2.1 Company Overview

Founded in 2006 and headquartered in Shenzhen, China, the company is specified as an investment holding company specializing in developing, investing, and managing real estate properties. It operates through four main segments: 1) Property Development, 2) Property Investment, 3) Property Management Services, and 4) Other Businesses (China Evergrande Group, Forbes). In 2020 alone, China Evergrande Group's land reserves were large enough to house over 10 million people (China Evergrande Group, Yahoo Finance).

It is also worthwhile to consider the group's aggressive expansion into other ventures: electric vehicles, energy, theme parks and hotel operations, among others. Ocean Flower Island is an Evergrande-led 100 billion RMB (US$15.5B) project to build an artificial island on the north shore of Hainan in the South China Sea. The company also has a majority ownership stake in Guangzhou F.C. (also known as Guangzhou Evergrande Taobao Football Club), which happens to be China's richest football club.

The group is a significant part of China's economy; as of 2021, their liabilities alone were equivalent to about 2% of China's GDP. The urban Chinese have nearly 78% of their wealth tied to residential property, while 20% of China's overall GDP is related to real estate (Xie and Bird 2020). By September of 2021– when news broke that they

would miss their next interest payment– the company had already become the poster child of the growing problems in China's property sector.

2.2 A Brief Timeline of the Evergrande Liquidity Crisis

According to reports, the Evergrande Group wrote to the Guangdong government on August 24, 2020, telling them that a failure to complete asset restructuring attempts could have detrimental effects to the country's financial system. On September 24, 2020, the leaked letter received extensive media coverage (Hongyuran and Jia 2020), with Evergrande claiming the letter was fraudulent. In June of 2021, Evergrande warned investors that it was arranging a restructuring of its debts, as they stated they had failed to pay some commercial paper on time (Jim 2022). As bonds and shares slumped in the coming weeks, Chinese regulators also instructed major credits of Evergrande to conduct a fresh round of stress tests on their exposure to the developer ("China Tells Banks to Stress Test Their Evergrande Exposure" 2021). In a statement in August 2021, Evergrande officially raised warnings that it would default on its debts if they failed to raise enough cash to cover them (Hale 2021f). On the 23rd of September, Evergrande missed off-shore bond payments totalling 83.5 million USD (Galbraith 2021), leaving many creditors confused (Hale et al 2021c). On December 9th 2021 Evergrande officially defaulted on its debt, according to Fitch Ratings (Fitch Ratings 2021), downgrading the company and its subsidiaries to "restricted default." By December 17, S&P followed suit, declaring the property developer to be in default ("S&P Dumps Chinese Property Giant Evergrande into Default" 2021).

2.3 Growth of the Chinese Property Bubble

Retrospectively speaking, it is clear that over the past two decades, China's property sector was the shining example of an over-leveraged bubble. Analyzing into the overarching context of Evergrande's liquidity crisis makes this quite explicit. Average real estate sale prices in China between 1998 and 2020 grew to astronomical levels (National Bureau of Statistics of China 2021). The rush to buy property was so immense that developers, such as the Evergrande group, were selling out building complexes before even breaking ground for construction.

From 2008-2009, China introduced a massive 4 trillion yuan stimulus package– the Chinese economic stimulus plan– in an attempt to minimize the impact of the 2008 financial crisis on China. Real estate developers such as Evergrande could capitalize on this financial freedom as lending was made comparatively cheaper. While most developers would lease a piece of land from the overarching government and then turn around and sell the houses to receive full payment, developers such as Evergrande did not use the cash flow from the sale to start construction (Farrer, 2022). Instead, money was used as downpayment to buy even more land for future construction. Responsibility was transferred to local governments directly benefiting from the risk: nearly 50% of local Chinese government revenue in 2009 consisted of leasing land to developers (Cohen, 2010).

Moreover, this phenomenon is further exacerbated by China's societal norms: Chinese citizens prefer to invest their money into housing and residential buildings. As of 2021, China's families have, on average, invested around 70 percent of their wealth in

real estate (Lau 2021). In 2019, price-to-income ratios in cities like Beijing and Shanghai were so high that some would even pay as much as 23 times their annual income to buy property, with their mortgage payments taking more than half of a Chinese citizen's gross take-home pay (Lin 2019). Putting this into perspective– mid 2022– the United States' price-to-income ratio hovers around 4.58 (Property Prices Index by Country 2022 Mid-Year, Numbeo).

The property surge can be further examined through the preliminary results of a nationwide study based on the China Household Finance Survey in 2017, which indicate that approximately 22 percent of homes in China are unoccupied. This adds up to more than 50 million empty apartments and homes across the country (Blazyte 2018). Moreover, Chinese citizens were buying their second and third homes– all while property developers had not started production for them.

In 2021, China was constructing a near-15-million homes– five times as many houses as the United States and Europe combined. Interestingly, demand for homes in 'good' locations were so high, while supply was still considered so limited that several cities used lottery systems to allocate homes, with some odds as low as one in sixty ("Can China's Long Property Boom Hold?" 2021).

2.4 Initial Governmental Responses

The Chinese government's responses had many phases: for one, the government formally banned non-residents who are single from purchasing property in the country. Married couples are welcome, but only so long as they have proven to have paid local taxes for at least two years and make a third of the purchase in cash. ("For Whom the Bubble Blows"

2016). In September 2021, local governments in Zhuhai, Nanshan, and Shenzhen took control of the sales revenue for Evergrande's properties in a custodial account controlled by the state. This was done to protect home-buyers and continue construction of the company's in-progress projects (White et al. 2021).

Other governmental regulations rolled out by central and local governments in 2021 included mortgage lending limits, rent caps in the bigger metropolitan areas, and land auction cancellations which aided in slowing down the property sector (Hale and Yu 2021a). In order to curb reckless borrowing, Chinese authorities drafted the "three red lines" in August 2020 to curb debt. Financial regulations were placed under this policy relating to the ratio of debt to cash, equity and assets. The framework was set up to deleverage the real estate industry– the more leveraged the company was, the more outstanding debt had to be reduced. However, fourteen of China's thirty biggest property developers had violated the three red lines regulations at least once by October 2021. Guangzhou R&F violated all three regulations; Evergrande and Greenland Holdings violated two regulations. All in all, the fourteen developers posted total sales in 2020 of over 4.34 trillion RMB, or, US$672 billion (Hale et al. 2021d). It will take years to dismantle Evergrande in its more than 200 cities, while assuring buyers that they will ultimately receive any properties they purchased.

2.5 China's Foreign Policy: One Belt, One Road

The Belt and Road Initiative (BRI) is China's largest infrastructure project and greatest international economic ambition. It is considered the centerpiece of China's and by

extension, Chinese leader Xi Jinping's foreign policy ("The Pandemic Is Hurting China's Belt and Road Initiative." 2020).

The strategy aims to build a connective line of cooperation across six main economic 'corridors,' they encompass: 1) Mongolia and Russia, 2) Eurasian countries, 3) Central and West Asia, 4) Pakistan, 5) countries of the Indian subcontinent, 6) and Indochina (OECD 2018). Geographically, the Silk Road Economic Belt consists of three routes however. The first is from China through Central Asia and Russia to Europe. The second route follows China through Central Asia and West Asia to the Persian Gulf and Mediterranean. The third route follows China throughout Southeast Asia and South Asia to the Indian Ocean. The Maritime Silk Road runs through China's coastal ports through South China and to the Indian Ocean expanding throughout Africa, Europe and the Pacific Ocean (Huang 2016).

The primary purpose of the BRI is to encourage regional economic development, and unlike other forms of international cooperation like WTO and G20, the BRI does not exclude any interested parties (Huang 2016). Being the largest development project in human history, studies from the World Bank have estimated that the BRI has the potential to boost trade flows in the over 130+ participating countries by over 4 percent as well as cutting the cost of global trade by 1.1 to 2.2 percent (Ruta 2019). If successful, the BRI could potentially generate important contributions to the world economy; the "Belt and Road" region accounts for 64% of the world population and 30% of the world's GDP. A successful economic initiative could create a new segment of the global supply chain (Xiaoyan 2015).

Financial cooperation and support are one of the most essential pillars of the BRI, as it works with a wide array of cross-border financial policy agendas. According to Yiping Huang, these include "currency convertibility and settlement, the Asian bond market, cross-border issuance of RMB-denominated bonds, the AIIB and BRICS New Development Bank, the Silk Road Fund, and the China-ASEAN Banking Consortium." (Huang 2016). These efforts showcase China's hope to promote stability in Asian monetary and investment systems. Yet, it is important to note that Evergrande and its affiliate businesses have global implications in terms of their investments and financing.

Major American and European companies have had significant exposure to the Evergrande group through corporate bonds. UBS reportedly owned over $300 million, while Ashmore Group and BlackRock owned over $400 million across all their funds, with one high-yield BlackRock fund acquiring an extra $18 million in August. (Hale et al 2021b). Though we cite American bondholders (not a part of the BRI), Evergrande's downgrade to a "defaulted" company by many credit rating agencies such as Fitch, as well as numerous Chinese-initiated sovereign investments are indicators that China's real estate crisis could complicate foreign policy projects such as the BRI.

Given their collapse, there is strong reason to believe that the Belt and Road Initiative could be immediately impacted. The participating countries of the BRI are therefore, the target of this study.

III.   LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

As mentioned briefly in the introduction, the theoretical framework for this paper's hypothesis is entailed through four main assumptions: 1) Evergrande's collapse negatively impacts China's local economic health, 2) Economic turmoil in the Chinese economy negatively impacts the BRI through decreased lending and increased debt repayment pressure, 3) Decreased lending and increased debt repayment pressure negatively affects BRI borrower countries' economic conditions, and 4) Decreased economic conditions in the BRI borrower countries negatively affect their respective stock indices.

a) Evergrande's collapse adversely impacts the Chinese economy

Besides the fact that Evergrande could potentially fail to pay back citizens who have bought property before building work began, China's financial system is also at risk. Altman et al. (2022) examined and focused on Chinese markets, finding that the spillover effect of Evergrande's collapse is more robust in the credit market rather than the stock market (which still saw a milder downturn). Evergrande's default may force banks and other lenders to lend less, leading to a credit crunch. China's attempts to circumvent this issue can be seen during Evegrande's collapse– on September 23rd 2021, China's central bank injected 120 billion yuan (US$18.6 billion) into the banking sector through reverse repurchase agreements (Tania Chen and Tian Chen 2021).

There is more evidence to suggest that Evergrande's fallout has produced negative domestic impacts in China's stock markets. Almeida et al. (2022) examined the effects of

Evergrande's collapse on six Asian stock markets, including China's, using an event study approach. They found that the markets showed a strong adverse reaction from the markets towards the event, even anticipating it. Deev et al. (2022) estimated returns of Evergrande and 275 liquid shares traded on major Chinese stock exchanges using time-varying left-tail exposure analysis, revealing that the most exposed sectors were that of larger corporations in terms of market capitalization, as well as the real estate and utilities sector. However, the literature on the impact of Evergrande's collapse on the international level is sparse.

Beyond Evergrande and the real estate sector's woes, China has other troubles, including a slowing Chinese economy. China's real estate market is– evidently– slowing, and there is less demand for new apartments. Just like Evergrande, many Chinese property developers are amassing immense debt and are being forced by regulators to pay them off under the three red lines policy (Stevenson and Li 2016). Industry practices that helped the property market stay buoyant– like pre-selling apartments before construction– are coming into the limelight and have raised fears that China's residential and commercial property market (which has, again, been considered the country's main driver) could crumble. Evergrande's collapse has already become the catalyst for the reversal of direction observed in the 12 months following their infamous warning to the public in September: house prices in China have been falling each month. ("China Housing: Prices Fall as Slump Reaches One Year in Deepening Crisis" 2021). According to research by Citigroup in September 2022, nearly a third of all property loans are now classed as bad debts – 29.1%, up from 24.3% at the end of 2021 (Chia 2022).

There is reason to believe in a stark outlook for China's economic future. Given that homebuyers purchased properties that have not started construction, and Evergrande's torrential downturn, massive mortgage boycotts that have ignited throughout the country, demanding the completion of the unfinished building projects. As of Mid-September 2022, buyers have been boycotting their mortgage payments on at least 343 projects ("China Mortgage Boycott Widens as Homebuyers Take Aim at Quality" 2022).

b) *Economic turmoil in China negatively impacts the BRI through lowered lending and increased debt repayment pressure*

China announced on November 10 of 2021 its plan to take apart Evergrande 'slowly' by selling off assets (Zhai et al. 2021). Beijing aimed to limit damage to homebuyers while allowing China to maintain its Belt and Road efforts and other costly financial programs, showcasing a link between Evergrande's collapse and the BRI (Rosenberg 2022).

The Chinese state is the primary source of funding for the BRI through its four state-owned banks. As China battles its mounting economic crisis in regards to Evergrande, it must grapple with issues implicated with the Belt and Road Initiative. Yong Wang (2016) observes that the BRI is rooted in the combined pressure of the slowing Chinese economy and deteriorating relations with neighboring countries due to the Global Financial Crisis in 2008. This paper's economic theory would suggest that Evergrande's collapse, which has no doubt further deteriorated China's economic health and international relations, could put even more pressure on the initiative. Still, whether or not Evergrande's collapse had a significant impact on China's foreign policy decisions

is intuitive, but has not been empirically or publicly proven. Theoretically, this paper's hypothesis assumes that China's negatively affected economy would lower lending and increase debt repayment pressure on participating BRI countries, negatively impacting the initiative.

It is important to note that Chinese contractors of the BRI would execute projects in borrower countries and manage them after they were completed. However, if the host country failed to pay back its debt, the projects would fully come under Chinese government control (Ezrati 2022). It is, again, intuitive to see that with an economic crisis on the horizon for China; there could be a tightening of debt repayment schedules for the Belt and Road countries as China might recall loan payments to reduce their economic risk. Moreover, China is one of the world's largest single creditor nations, and its loans to lower and middle-income countries have tripled over the past decade by the end of 2020– reaching US$170 billion (Wang 2022). Though China does not publish records of its foreign loans publicly, it is noteworthy that in September 2022 (post-Evergrande collapse), China reportedly slowed down foreign lending as Belt and Road problems grew (Watanabe and Hanada 2022). With the Evergrande-related property crisis negatively impacting the Chinese economy, it is also intuitive to see a relationship existing between a weakening Chinese economy and lowered levels of lending in the BRI.

There is evidence to suggest that lending countries would operate more cautiously in the wake of borrower countries facing crises. Trebesch et al (2012), discuss the potential spillover effects of a sovereign default within the context of the Latin American

debt crisis. Creditors exposed to sovereign default risks– though holdings or government debt– reduced their overseas exposure and or raised country-risk premiums. While the underwriters of the BRI– Chinese state-owned banks– can operate in riskier manners than private institutions, it could imply that they would operate more conservatively in the wake of borrowing countries exhibiting financial stress.

Hurley et al. (2019), suggest that complications (such as China's real estate crisis) of projects like the BRI that utilize infrastructure financing usually entail challenges in lending to sovereign borrowers. This raises the risk of debt distress in BRI borrower countries. After the Global Financial Crisis of 2008, emerging and developing countries experienced a significant increase in capital outflows as developed economies' financial situations withdrew their liquid investments to clean up their balance sheets (Primo Braga and Vincelette 2011). In the middle to low-income countries, the present value of public debt to GDP deteriorated by 5-7 percentage points when compared to pre-crisis, implying that **as** the financial crisis occurred, middle to low income countries (such as the majority of BRI participants) would increase their debt repayments to developing economies (IDA and IMF 2010). In the long term, however, the debt-to-GDP ratio is higher when reflecting a country at risk of a sovereign default.

c) *Lowered power in lending countries negatively impacts borrower countries'*
   economic conditions

Sturzenegger and Zettelmeyer (2006) exacerbate that when government borrowing is not accompanied by enough economic growth and revenue to support debt fully, it can generate a downward spiral that ends in the need for debt restructuring or reduction. This,

in theory, could suggest that China's troubling economic problems, when coupled with the BRI's mounting debt issues, could exhibit different negative economic conditions on the BRI countries.

The primary concern of the BRI's US$8 trillion initiative is that it will leave countries in serious debt. Public borrowing to support productive public investments is central to the foreign policies of many countries and their economic growth. Countries like Sri Lanka and Kyrgyzstan have massive state debt, taking on billions of loans for a series of infrastructure plans under the BRI (Standish 2022). Criticisms of the BRI involve comparing the initiative to a 'debt-trap.' While the BRI provides infrastructure funding to developing countries, it also leaves unsustainable debt. In one example, China is funding a high-speed rail system in Laos that will cost approximately half the country's GDP (Janssen 2017). In a case that perhaps is familiar to most, Pakistan has sought debt relief from the Belt and Road Initiative in February of 2021, asking for relief on payments over eight years of financing (Mangi 2021). The BRI has seen China giving out loans totaling over $942 billion, heavily implicating that the aforementioned countries are just small samples of debt issues crippling developing countries along the Belt and Road region.

The impact of detrimental increases in country-risk premiums and sovereign defaults in borrowing countries implies significant damage to their economies. In terms of specific outcomes: according to Shabbir and Yasin (2015), as borrower debt repayment pressure increases, domestic spending on infrastructure and social services may be forfeited in an attempt to service the debt. This problem is even further amplified if

borrowing governments borrow even more funds to meet debt repayment schedules. According to Nicolini (2016), increasing concerns on whether or not a borrowing country can service their debt as their debt ratios worsen, have the potential to increase the borrowing country's cost of capital as investors demand a higher return to compensate for the higher risk– a "self-fulfilling debt prophecy." Nicolini cites Argentina's default as an example, as before default, the average interest rate of public debt increased from 5.8% in 1996 to 9.4% 2001. Moreover, when imbalances in external public accounts due to damaging crises (or shocks) occur in terms of trade, it can result in the depreciation of the country's real exchange rate. This further increases the overall burden of payments in the local currency and increases the chance of a sovereign default, in another point discussed in Sturzenegger and Zettelmeyer's paper (2006).

d) *Worsening economic conditions are reflected in stock market indices*

Literature on the relationships between a country's economic conditions and their respective stock indices is immense. Using an international dataset, Wisniewski and Jackson (2020) document a negative relationship between the debt-to-GDP ratio and dollar-denominated stock index returns. Cheung and Ng (1998) examine that real returns on national stock indexes are typically related to deviations from long-run relationships in macroeconomic variables.

Stock markets often act as indicators of the overarching economies and politics of many countries, sometimes constituting predictors of various events. Markets often "anticipate" events prior to the actual event date. Event studies are a common strategy for analyzing effects in fields such as finance. In one case, Ragin and Halek (2016) analyzed

the 43 most significant disasters in insurance since 1970 based on equilibrium prices and quantities. As a result, their findings indicated that insurance brokers received abnormal stock returns on the day of the incident. Lanfear et al. (2019) used the event study approach to see the impact of US North Atlantic hurricanes from 1990 to 2017 on stock returns and found that emergencies that impact consumer growth strongly impact the stock market.

The literature on the impact of crisis events on stock markets in general is wealthy. In terms of financial crises, Jiang et al. (2017) investigated the impact of recent financial crisis events on six major stock markets during three different periods. Using a VAR (vector auto-regression model), they concluded that financial crisis events had reinforced the interdependent relationship found in global stock markets. Another study conducted by Lim et al., (2008) explored the change of efficiency of eight different Asian stock markets in order to find the impacts of the Asian financial crisis in 1997, and found that Hong Kong was a major victim. Ali and Afzal (2012) examined recent global financial crises rooted from the United States and their impact on Indian and Pakistan stock indices, revealing that negative shocks have an extremely pronounced impact on stock volatility. Alper and Yilmaz (2004) investigated the relationship between Istanbul and other prominent stock markets and how they were impacted by financial crises stemming from Turkey, Asia, and Latin America. Results found that international contagion prevails among stock markets. Many studies have exacerbated this effect: Michel (2011) and Liow (2012) found that international stock markets are co-integrated.

Other emergencies (such as pandemics) have illustrated impacts on stock indices as well: Chen et al. (2007) examined the impact of the SARS epidemic on Taiwanese hotel stock price movements and found that a majority– 7 of 8– suffered steep declines and earnings and stock price during the event period. Rahman et al. (2021) examined how the Australian stock exchange– in terms of market capitalization– was impacted by the COVID-19 pandemic and the resulting stimulus package from the government. They found an adverse stock market reaction to the pandemic.

Current literature also examines the effect of international stock market movements and suggests an immense amount of interdependence amongst national stock markets. Aloui, Aissa and Nguyen (2011) researched global markets in 2011, and confirmed that during the global financial crisis from 2007-2008, extreme co-movement existed in markets pertaining to the US, China, India, Russia, and Brazil. Studies on the pre-post analysis of the global financial crisis from Lee and Jeong (2014) have indicated that the level of market integration between Europe and global stock markets temporarily saw an increase during the event but slowly returned to its pre-crisis level during the post-period. According to Jiang et al (2020), there are various derivations of theories (namely, the Efficient Market Hypothesis) stemming from stock market correlations. In theory, the EMH should further support the hypothesis that Evergrande's collapse has harmed the international Belt and Road stock indices. The efficient market theory states that stock prices will fully reflect the information it contains. A market is efficient if "prices always 'fully reflect' available information" (Fama, 1970). In theory, Evergrande's collapse should be reflected fully– negatively, positively, or neither– through stock prices in various countries. In essence, if the market is efficient in its strong

form, it should reflect relevant information about the asset in the stock price. The flow of information between different stock markets should also lead to a correlation between international stock markets that should be reflected in the statistical analysis. Of course, the EMH is a restrictive theory, but a generally accepted view is that when new information rises, news spreads quickly and is reflected quickly into prices of securities (Malkiel, 2003).

IV.   DATA METHODS

4.1 Sample Formation - Event Dates

This study will be the first to apply a pre-post analysis of Evergrande's collapse on a broader scale, involving country stock indices along the Belt & Road. More specifically, the methodology behind this study aims to see the extent to which the comparative impact of Evergrande's bond default on the BRI countries is more significant when juxtaposed to non-participating BRI countries over four key event timeframes.

While aiming to understand the impact of Evergrande's bond default, this study incorporates three other event dates apart from the infamous September 2021 event. In the pursuit of significant results, a more detailed and spread-out understanding of the unfolding of Evergrande's events and its correlation to Belt and Road stock indices should be taken into account to generate the most robust analysis possible.

According to MacKinlay (1997), when creating inferences with event dates with an overarching level of uncertainty (for example, when the event's announcement appears in the news), you cannot guarantee whether or not the global markets were informed prior

to the close of the market in the previous trading day. Either the current day, or prior day could be the event day– as such for the remainder of the event timelines the event period for the majority of indexes used is an extended event window from **three days before the event to one day after the event.** If specific markets are closed within the timeframe, the analysis counts the next, or, prior business day.

a) *Event 1 - 21st September to 25th September, 2020*

A letter, dated on August 24, 2020 was reportedly sent from the Evergrande Group to the Guangdong government, warning them that a failure to complete asset restructuring attempts could trigger risks in the financial system. However, the leaked letter gained widespread media attention on **September 24th of 2020** (Hongyuran and Jia 2020). The circulating letter showed that Evergrande was seeking government support for a corporate restructuring– yet the company denied the document's authenticity and filed a police report for defamation. In this study, the September 2020 event window is used to examine if the window served as a significant precursor event that had any impact on stock index returns.

b) *Event 2 - 27th August to 1st September, 2021 (Markets Closed on Aug 28, Aug 29)*

In a statement on **August 31st of 2021,** Evergrande warned that it would default on its debts if it failed to raise enough cash (Hale 2021f). Even then, the Evergrande Group was already China's most heavily indebted property developer. Negative reports about its business already harmed its liquidity, but the wording in the statement from the company confirmed that the group was at risk of defaulting on borrowings. In this study, the August-September 2021 event window is used to examine if the window served as

another significant precursor event that had any impact on stock index returns.

c) *Event 3 - 16th to 27th September, 2021 (Markets Closed on Sept 18, Sept 19, Sept 25, Sept 26)*

On the 24th of September 2021, Evergrande missed off-shore bond payments that totaled US$83.5 million (Hale et al 2021c). The deadline was at midnight in New York on the 23rd of September, or at noon on the 24th of September in Hong Kong. Evergrande, which had been widely reported to default for weeks, had already heavily impacted Wall Street and commodity markets on the **20th of September 2021** (Hale et al 2021e), yet the missed payment was the surefire indicator of Evergrande's future financial woes. The September 2021 event window incorporates two potential event dates: 1) the 24th of September 2021 in which Evergrande misses the US$83.5 million payment, and 2) the 20th of September, in which markets had reacted to the increasing stress of Evergrande's liquidity crisis. In this study, the September 2021 event window is proposed to be the most impactful on the BRI stock index returns, and will be considered the "main event."

d) *Event 4 - 6th December to 10th December, 2021*

On the 9th of December 2021, rating agency Fitch downgraded the Evergrande Group to an "RD" (Restricted Default) rating, declaring that the group had defaulted on offshore bonds (Fitch Ratings, 2021). As the first time Evergrande was declared publicly "defaulted"in some way or another, the paper will aim to examine if the December 2021 window served as a significant event that had any impact on stock index returns. It is noteworthy that on the 17th of December 2021, the credit rating agency S&P Global also

declared that Evergande was in a "selective default" with regards to payments for outstanding bonds. ("S&P Dumps Chinese Property Giant Evergrande into Default" 2021). Furthermore, on the 10th of December 2021, a third party sold about 3.4% of Chairman Hui Ka Yan's personal Evergrande stock as an enforced "security interest" (Ren, 2021).

Almeida et al. (2022), in their analysis of Evergrande's impact on Asian stock indices, utilized an event window similar to a template shown in MacKinlay's (1997) paper. They held an event window between September 16th to the 22nd of 2021 in order to calculate impacts on six Asian stock indices. It can be argued that this methodology behind this thesis aims to incorporate even more event windows in order to create a comparatively more robust analysis.

4.2 Sample Formation - Belt and Road Country Data

This paper aims to understand the impact of Evergrande's liquidity crisis on the Belt and Road stock indices' stock returns through particular event time-frames. Moreover, it takes into account stock returns from countries that are considered not to be a part of the Initiative.

The Green Finance & Development Center has compiled a list (since updated in March 2022) of the Belt and Road Initiative countries used in this study to identify participating Belt & Road areas (Nedopil 2022). As per the list: 43 countries are in Sub-Saharan Africa, 35 BRI countries are in Europe & Central Asia (including 18 countries of the European Union (EU) that are part of the BRI), 25 BRI countries are in East Asia & Pacific, 20 BRI countries are in Latin America & Caribbean, 18 BRI

countries in Middle East & North Africa, and 6 countries are in South East Asia. The index quotes were retrieved from Bloomberg Terminal, and were selected considering the following criteria:

1) *Markets with daily stock return data available on Bloomberg Terminal;*

2) *Markets that cover BRI and non BRI stock markets;*

3) *For BRI countries, there must be independent information that they have signed a Memorandum of Understanding (MoU) to become an official country of the BRI;*

4) *China and Hong Kong, SAR will not be considered in the dataset*

Of the 147 countries on the database, 140 countries were identified to be certain BRI countries– 7 countries are speculated to have joined the BRI per The Green Finance & Development Center. However, there is no information on whether they have signed an MoU. 83 countries of the BRI also did not fit the aforementioned criteria, and thus did not have the necessary information needed to complete the analysis. As a result, the study analyzes 57 BRI countries (See Appendix A for reference). Of the 195 countries in the world, 140 are on the BRI. The remaining 55 countries are subject to the control group of non-BRI countries, and of the 55 countries, 26 fit the aforementioned criteria and will therefore be used during the statistical analysis.

4.3 Empirical Method

Bloomberg Terminal defines daily "Period Return" as the total return from the previous day's to the current day. Utilizing this tool, the analysis applies the aforementioned event

dates to tabulate period returns of 57 available BRI countries against 26 non-BRI countries. Total cumulative returns are then calculated using Bloomberg's Excel formula: "BDP(Index,"CUST_TRR_RETURN_HOLDING_PER", "CUST_TRR_END_DT=xxxx", "CUST_TRR_START_DT=xxxx" over the course of the event window to obtain a single number.

Certain countries did not have their 'main stock exchange' (by market capitalization) listed on Bloomberg Terminal. In the pursuit of consistency, and if applicable, the analysis utilizes their MSCI equity index (Morgan Stanley Capital International's indices which represents the performance of broad equity universes of individual countries) in its stead. If specific markets have no response or have no data on event time-frames, they will be removed from the dataset. Moreover, if given the choice of local or composite indices, the analysis will choose the composite index. Regarding the Bloomberg Terminal data, all stock index returns are obtained through the Total Return Analysis (TRA) function, which calculates the gain or loss of an investment over a specified period of time, expressed as a percentage of the investment's cost. The data is converted into decimal points for data analysis purposes. According to the MSCI Index Calculation Methodology in July 2022, the MSCI equity indices are calculated using Laspeyres' concept of a weighted arithmetic mean along with chain-linking in both "local currency" and in USD for net returns (MSCI 2022). MSCI country and regional equity indices are calculated in "local currency" as well as in USD, with price, gross and net returns. The net stock returns extracted from both Bloomberg and MSCI are appropriate for empirical analysis, as they consist of historical data obtained from credible sources and successfully capture relevant data within the event timeframes.

The differences in means and medians test aim to determine if there is any significant difference in the impact of Evergrande's collapse on BRI and non-BRI countries. Data consists of the 57 BRI countries coupled with the 26 non-BRI countries allocated to two different groups denoted by 0 and 1 (1 being BRI and 0 being non-BRI), along with their respective cumulative returns on the four selected event dates– CUM_PR_EVT1, CUM_PR_EVT2, CUM_PR_EVT3, and CUM_PR_EVT4. Before the two sample t-test, a two sample variance-comparison test is completed: with no sample variance larger than twice the size of the other, this thesis conducts the difference in means (two sample t-test) with equal variances. Moreover, the empirical analysis utilizes the Wilcoxon signed-rank test to measure differences in medians between the two sample groups.

Similarly, the OLS panel regression is intended to examine the different levels of the impact seen across the four selected event dates for BRI and non-BRI groups. Data for the regression is tabulated and transformed to be eligible for panel regression, with indicator variables *Event1, Event2, Event3, and Event4* being denoted as 0 or 1 (1 being true), separated into BRI and non-BRI groups with *Cum_Ret* representing cumulative stock returns on respective event dates. The baseline model for the panel regression is as follows:

$$CumRet = \alpha 0 + \alpha 1 * BR + \alpha 2 * Event2 + \alpha 3 * Event3 + \alpha 4 * Event4 + $$
$$+ \alpha 5 * BR * Event2 + \alpha 6 * BR * Event3 + \alpha 7 * BR * Event4 \quad (1)$$

Summary statistics are obtained from the dataset and can be viewed in Table 4.1 below. Group 0 denotes non-BRI participating countries, and interestingly, mean

cumulative stock returns that are mostly negative during *Event 1*, are positive during

every other event. During *Event 2*, it's notable that minimum cumulative stock returns are

equal to -0.96, which is substantially higher than every other minimum cumulative stock

return on every other event for both groups. This could suggest that Evergrande's

collapse in the context of *Event 2* had substantially less impact for non-BRI groups.

Table 4.1 Summary Statistics

Group = 0 (non-BRI)				
VARIABLES	Mean	Std. Dev	Min	Max
CUM_PR_EVT1	-2.475952	2.286306	-7.326683	1.729508
CUM_PR_EVT2	0.825558	0.825558	-0.964801	3.832379
CUM_PR_EVT3	1.135356	0.167503	-2.945386	4.143394
CUM_PR_EVT4	1.678137	1.815988	-3.821404	4.873708

Group = 1 (BRI)				
VARIABLES	Mean	Std. Dev	Min	Max
CUM_PR_EVT1	-0.712112	2.466893	-6.614553	4.942966
CUM_PR_EVT2	0.753450	2.058919	-5.241626	9.243913
CUM_PR_EVT3	-0.230906	2.825025	-5.860067	10.933490
CUM_PR_EVT4	0.427787	2.205145	-8.736784	6.592084

On the other hand, Group 1 (which denotes BRI participants) sees negative

average cumulative returns during *Event 2* and *Event 3*. What is worth mentioning is that

the maximum cumulative stock returns observed throughout Group 1 are substantially

higher across all four events when compared to Group 0, especially when compared to

the mean. This is interesting as the difference in minimum cumulative stock returns observed by both groups and across all events is comparatively tamer (not including the aforementioned minimum of -0.96 for Group 0). Culprits for these outlying maximum observations are: 1) Panama during *Event 1*, 2) Mongolia during *Event 2*, 3) Bosnia and Herzegovina during *Event 3*, and 4) Turkey during *Event 4*. (See Table 4.2)

Table 4.2 Outlying BRI Countries

Group 1 Outliers	CUM_PR_EVT1	CUM_PR_EVT2	CUM_PR_EVT3	CUM_PR_EVT4
Bosnia and Herzegovina	2.156346	1.275239	10.93349	1.185297
Mongolia	1.091002	9.243913	-1.962209	5.229614
Panama	4.942966	-5.241626	5.789474	-1.918159
Turkey	1.12386	1.768011	-2.26339	6.592084

Below in Table 4.3 are new summary statistics calculated for both groups while dropping Bosnia and Herzegovina, Mongolia, Panama, and Turkey. While the maximum cumulative returns seem comparatively tamer in Group 1, there is not much of a difference in average cumulative returns that could paint a different story about the event timeframes. This is likely due to standard deviations in both groups being relatively equal.

Table 4.3 Summary Statistics (Dropped Outliers)

Group = 0 (non-BRI)				
VARIABLES	Mean	Std. Dev	Min	Max
CUM_PR_EVT1	-2.475952	2.286306	-7.326683	1.729508
CUM_PR_EVT2	0.825558	1.135356	-0.9648009	3.832379
CUM_PR_EVT3	0.167503	1.546988	-2.945386	4.143394
CUM_PR_EVT4	1.678137	1.815988	-3.821404	4.873708

Group = 1 (BRI)				
VARIABLES	Mean	Std. Dev	Min	Max
CUM_PR_EVT1	-0.941596	2.366311	-6.614553	3.620864
CUM_PR_EVT2	0.67738	1.567428	-3.20097	5.146111
CUM_PR_EVT3	-0.484133	2.30178	-5.860067	6.308823
CUM_PR_EVT4	0.250849	1.978328	-8.736784	3.696447

Moreover, in the two sample t-tests that were conducted for all event timeframes, there was no discernable difference between the dataset that included Bosnia and Herzegovina, Mongolia, Panama and Turkey and the ones without. When scoping for possible reasons as to why cumulative stock returns were so high on their respective timeframes for the four outlier countries, there were barely any significant events that could explain the phenomenon. During *Event 4* (December 2021), Turkey did see the 2021 FIVB Volleyball Women's Club World Championships held in Ankara, which may have been reflected in its stock returns (Vakıfbank becomes World Champion for 4th Time 2021).

V.   RESULTS

The two sample t-test results can be viewed in Table 5.1. Notably, significant differences were only observed in *Event 1* and *Event 4*.

Table 5.1 Difference in Means and Medians

| Event 1 (September 2020) | | | | Event 2 (August-September 2021) | | |
	BR	non-BR	Difference		BR	non-BR	Difference
Mean	-0.712	-2.476	-1.764***	Mean	0.753	0.826	0.072
Std. Dev	2.467	2.286		Std. Dev	2.059	1.135	
Median	-0.209	-2.728	-2.519***	Median	0.411	0.632	0.221
Event 3 (September 2021)				Event 4 (December 2021)		
	BR	non-BR	Difference		BR	non-BR	Difference
Mean	-0.231	0.168	0.398	Mean	0.428	1.678	1.250**
Std. Dev	2.825	1.547		Std. Dev	2.205	1.816	
Median	-0.273	-0.145	0.128	Median	0.716	1.721	1.005***

BR = Belt and Road, non-BR = Belt and Road, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

The mean and median differences across these periods paint a complex picture. Though differences in means and medians for both BRI and non-BRI groups were statistically significant during *Event 1*, the difference does not support this paper's hypothesis. Both mean and median cumulative returns were, in fact, significantly lower in non-BRI countries as compared to BRI countries by -1.76384 and -2.5189784, respectively. This suggests that the circulating warning letter in September of 2020, regarding Evergrande's financial situation, was substantially more impactful for non-BRI countries. Contrary to this paper's hypothesis that *Event 3* would see the most significant negative impact in BRI countries, the t-test results revealed no significant difference between BRI and non-BRI cumulative stock returns during *Event 2* and *Event 3*. What may be noteworthy however, is that cumulative stock returns were comparatively lower during *Event 3* than in any other event, for both groups. This could suggest that Evergrande's spillover effect, though not as pronounced in BRI economies, still broadly impacted global stock indices negatively. On the other hand, outcomes in *Event 4* support this paper's hypothesis. By a mean difference of 1.25035 and median difference of 1.005, the BRI countries' cumulative stock returns were significantly lower than non-BRI

countries in the wake of an official "default" label being placed onto the Evergrande

Group in December 2021 by Fitch Ratings. According to Alicia Garcia-Herrero (Natixis'

chief economist for Asia-Pacific), not putting an official "default" label on Evergrande

allowed the company to restructure its debt at a lower cost (Cheng 2021). Through

Fitch's rating downgrade, there seem to be real negative implications involving

debt-servicing costs, which may have further impacted China's foreign policy. Still, both

mean and median cumulative returns were positive. Though the BRI group's cumulative

returns are significantly lower than the non-BRI group, it is essential to note that the

non-negative returns imply lower return growth rather than a net negative return.

Tables 5.2 and 5.3 showcase the results of the OLS panel regression. The

variables all indicate a 0 or 1, depending on whether the event is happening. While it may

be clear that *Event2, Event3,* and *Event4* denote non-BRI countries during event

windows, and that *BR_Event2, BR_Event3,* and *BR_Event4* denote BRI countries, it is

essential to note that *BR* represents BRI countries during *Event 1*, and that the constant

Constant represents non-BRI countries during *Event 1.*

Table 5.2 Panel Regression Results		Table 5.3 RSE Regression Results	
VARIABLES	Cum_Ret	VARIABLES	Cum_Ret
BR	1.764***	BR	1.764***
	(0.526)		(0.553)
Event2	3.302***	Event2	3.302***
	(0.617)		(0.497)
Event3	2.643***	Event3	2.643***
	(0.617)		(0.537)
Event4	4.154***	Event4	4.154***
	(0.617)		(0.568)
BR_Event2	-1.836**	BR_Event2	-1.836***
	(0.744)		(0.655)
BR_Event3	-2.162***	BR_Event3	-2.162***
	(0.744)		(0.733)
BR_Event4	-3.014***	BR_Event4	-3.014***
	(0.744)		(0.719)
Constant	-2.476***	Constant	-2.476***
	(0.436)		(0.445)
Observations	332	Observations	332
R-squared	0.168	R-squared	0.168

Standard errors in parentheses   Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$ *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Considering robust standard error, the regression results further embolden some results shown in the two sample t-tests. In fact, it expands beyond the original picture. *BR, BR_EVENT2, BR_EVENT3, and BR_EVENT4* showcase belt and road countries' cumulative stock returns during the event relative to other non-BRI countries. Thus, the *BR_EVENT* coefficients reveal the difference in cumulative returns around each event for BRI countries relative to the event figure for non-BRI countries. Variables *Event2, Event3, Event4* and the constant, showcase cumulative stock return performance for non-BRI countries around each respective event

In the presence of *Event 1* for non-BRI countries, the cumulative returns see a negative percentage points change. On the flip side, for BRI countries, cumulative returns see positive changes in percentage points. When comparing these outcomes to ones seen in the differences in means and medians test, a similar picture is painted: the 26 non-BRI countries were significantly more impacted during *Event 1* than the BRI countries.

For both groups, there is another exciting pattern to behold. For non-BRI groups, past *Event 1,* there are increases in percentage points for each sequential event. For BRI groups, past *Event 1*, there are incremental decreases in percentage points for each sequential event. Moreover, as the Evergrande crisis unfolded across the four event timeframes, BRI countries saw the most significant decrease in cumulative returns being observed in *Event 4*. On the other hand, non-BRI countries saw the most significant percentage point increase in cumulative returns during *Event 4.* The estimated coefficients for *BR_Event4*, imply expected mean differences in cumulative returns relative to non-BRI countries; this further implies that the largest disparity between non-BRI and BRI cumulative stock returns also occurred on *Event 4,* which ties along with the outcomes of the two sample t-tests: BRI countries saw significantly more negative impacts to cumulative stock returns as compared to non-BRI countries during *Event 4*.

When further interpreting these results, the December 2021 event had significant negative impacts on country stock indices for both groups, specifically for the BRI group. However, while the September 2020 event was significant, it impacted non-BRI countries more negatively, contrary to the hypothesis. The regression results, however add to this

complex picture: overall, BRI countries, relative to non-BRI countries, showcase relatively poor stock return performance across the Evergrande events, emboldening this paper's hypothesis of BRI countries being more negatively affected by Evergrande's default.

VI.   CONCLUSION

Evergrande's collapse had a tremendous impact on the already slowing Chinese economy. Results from the empirical analysis in this paper suggest that in the case of Evergrande's collapse, an official declaration of default had the most significant impact on the Belt and Road countries' stock index returns. Given more time, the methodology of this paper could be modified to include more data sources to extract more data from BRI-affiliated countries. Seeing that approximately ⅔ of the BRI countries and ½ of non-BRI countries are left out in this analysis, the results cannot conclusively say that all BRI countries were more dramatically affected by Evergrande's collapse. More regressions could be conducted for each event window to further strengthen this paper's results. In those specifications, 83 observations and 4 regressions could be evaluated on whether the coefficients on BR across the four regressions lead to the same inferences as doing a single pooled regression.

Moreover, it would have been interesting to include other variables to control for; perhaps different BRI and non-BRI countries would have been impacted differently depending on their geographic region, GDP, or average income level. Perhaps the

statistical analysis could be constructed in a way that would allow for a more in-depth

analysis– which specific countries were particularly more affected than others? The

COVID-19 pandemic was a significant event that had impacts on economies worldwide

in 2020; further research should be conducted to ensure results are not at odds with the

existence of such a crisis.

VII.   APPENDIX

Appendix A. BRI Countries v. non-BRI Countries

Belt and Road Participating Countries (with sufficient data)	Belt and Road Participating Countries (without sufficient data)	Non- Belt and Road Countries
Argentina, Austria, Bahrain, Bangladesh, Barbados, Bosnia and Herzegovina, Botswana, Bulgaria, Cambodia, Chile,, Croatia, Ecuador, Egypt Arab Rep., Estonia, Ghana, Greece, Hungary, Indonesia, Italy, Jamaica, Kazakhstan Kenya, Korea Rep., Kuwait, Lao PDR, Latvia, Lebanon, Lithuania, Luxembourg, Malaysia, Malta, Mongolia, Montenegro, Morocco, New Zealand, Nigeria, Oman, Pakistan, Panama, Philippines, Poland, Portugal, Qatar, Rwanda, Saudi Arabia, Singapore, Slovenia, South Africa, Sri Lanka, Tanzania, Thailand, Trinidad and Tobago, Tunisia, Turkey, Uganda, United Arab Emirates, Venezuela RB, Vietnam.	Afghanistan, Albania, Algeria, Angola, Antigua and Barbuda, Armenia, Azerbaijan, Belarus, Bolivia, Brunei, Darussalam, Burundi, Cabo Verde, Cameroon, Chad, Dem. Rep. Congo, Rep., Cook Islands, Costa Rica, Côte d'Ivoire, Cuba, Cyprus, Czech Republic, Djibouti, Dominica, Dominican Republic, El Salvador, Equatorial Guinea, Eritrea, Ethiopia, Fiji, Gabon, Gambia, Georgia, Grenada, Guinea Guinea-Bissau, Guyana, Iran Islamic Rep., Kiribati, Kyrgyz Republic, Lesotho, Liberia, Libya, Madagascar, Mali, Mauritania, Micronesia Fed Sts, Moldova, Mozambique, Myanmar, Namibia, Nepal, Nicaragua, Niue, North Macedonia, Papua New Guinea, Samoa, Senegal, Serbia, Seychelles, Sierra Leone, Slovak Republic, Solomon Islands, Somalia, South Sudan, Sudan, Suriname, Syrian Arab Republic, Tajikistan, Timor-Leste, Togo, Tonga, Turkmenistan, Uruguay, Uzbekistan, Vanuatu, Yemen, Rep. Zambia	American Samoa, Andorra, Australia, Austria, Bahamas, Belgium, Belize, Benin, Bhutan, Brazil, Burkina, Canada, Central African Republic, Colombia, Congo Republic, Cook Islands, Denmark, Faso, Finland, France, Germany, Ghana, Guatemala, Haiti, Holy See, Honduras, Iceland, India, Ireland, Israel, Italy, Japan, Jordan, Korea Dem. People's Rep, Liechtenstein, Marshall Islands, Mauritius, Mexico, Monaco, Nauru, Netherlands, Niger, North Korea, Norway, Palau, Palestine State, Paraguay, Romania, Russian Federation Saint Kitts and Nevis,, Saint Lucia, Saint Vincent and the Grenadines, Samoa, San Marino, Sao Tome and Principe, Spain Swaziland, Sweden, Switzerland, United Kingdom

Appendix B. List of Stock Indices used in Empirical Analysis

American Samoa	SAPIAS Index
Argentina	MERVAL Index
Australia	AS51 Index
Austria	ATX Index
Bahrain	BHSEASI Index
Bangladesh	DSEX Index
Barbados	BARBCOMP Index
Belgium	BEL20 Index
Bosnia and Herzegovina	MXBAH Index
Botswana	MXBW Index
Brazil	IBX Index
Bulgaria	SOFIX Index
Cambodia	CSX Index
Canada	SPTSX Index
Chile	MXCL Index
Colombia	MXCO Index
Croatia	CRO Index
Denmark	KFX Index
Ecuador	ECUINDEX Index
Egypt, Arab Rep.	EGX30 Index
Estonia	TALSE Index
Finland	HEX Index
France	CAC Index
Germany	CDAX Index
Ghana	GGSECI Index
Ghana	GGSECI Index

Greece	ASE Index
Hungary	BUX Index
Iceland	ICEXI Index
India	SENSEX Index
Indonesia	JCI Index
Ireland	ISEQ Index
Israel	TA-REAL Index
Italy	FTSEMIB Index
Jamaica	JMSMX Index
Japan	ILL Index
Jordan	JOSMGNFF Index
Kazakhstan	KZKAK Index
Kenya	NSEASI Index
Korea, Rep.	KOSPI Index
Kuwait	KWSEAS Index
Lao PDR	LSXC Index
Latvia	RIGSE Index
Lebanon	BLOM Index
Lithuania	VILSE Index
Luxembourg	LUXXX Index
Malaysia	FBMKLCI Index
Malta	MALTEX Index
Mexico	MEXBOL Index
Mongolia	MSETOP Index
Montenegro	MONEX Index
Morocco	MOSENEW Index
Netherlands	AEX Index

New Zealand	NZSE50FG Index
Nigeria	NGXINDX Index
Norway	OSEAX Index
Oman	MSM30 Index
Pakistan	KSE100 Index
Panama	BPIY Index
Philippines	PCOMP Index
Poland	WIG20 Index
Portugal	PSI20 Index
Qatar	DSM Index
Russia	IMOEX Index
Rwanda	RSEASI Index
Saudi Arabia	SASEIDX Index
Singapore	STI Index
Slovenia	SBITOP Index
South Africa	JALSH Index
Spain	MADX Index
Sri Lanka	CSEALL Index
Sweden	OMXS30 Index
Tanzania	DARSDSEI Index
Thailand	SET Index
Trinidad and Tobago	TTCOMP Index
Tunisia	TUSISE Index
Turkey	XU100 Index
Uganda	UGSXLSI Index
United Arab Emirates	ADSMI Index
United Kingdom	UKX Index

USA	SPX Index
Venezuela, RB	IBVC Index
Vietnam	VNINDEX Index

VIII.   BIBLIOGRAPHY

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