

Cryptocurrency Transactions and ADR Volatility

A research proposal of ECO3088

Junwoo Yang

Department of Finance
Hanyang University

December 3, 2021

1. Introduction
2. Empirical strategy
3. Data and descriptive analysis
4. Preliminary regression results
5. Discussion and what to do next

Introduction

- Several papers argue that favorable attitudes toward gambling might be associated with higher levels of volatility in financial markets.
- One explanation is that in cultures with favorable attitudes toward gambling, managers of firms are likely to take greater risks, hence stock prices become less stable.
- The cryptocurrency market has grown rapidly in recent years and related regulations are also being institutionalized.
- At the same time, the cryptocurrency market is very volatile, so it would be an ideal arena for gamblers who seek skewness.

The main goal of this research proposal is to confirm whether the above argument holds for other measures derived from cryptocurrency.

Hypothesis

Countries with active cryptocurrency transactions would experience greater stock price volatility.

Empirical strategy

- ADRs are securities of non-US companies but are traded on US stock exchanges.¹
- The use of ADRs allows us to control the possibility that stock volatility in a particular country can be determined endogenously by the structure of the country's stock market.
- Since ADRs are linked through arbitrage transactions with stocks in the home country, it is possible to compare cryptocurrency transactions of multiple countries with only stocks traded in the US.

¹ADRs based in Korea include POSCO, KB, SK Telecom, KEPCO, KT, LG Display, Shinhan Group, and Woori Bank.

How can we measure risk preference using cryptocurrencies at the country level?

Cryptocurrency measures

For ADR home country j during the second half of year t (2019 or 2020), we define

$Exch_{jt}$ the number of cryptocurrency spot exchanges per capita (in 10 thousands)

$DollarVol_{jt}$ the sum of the average daily dollar volume per capita

Control variables

Macroeconomic variables

For country j in year t ,

$\log GDP_{jt}$ GDP per capita

$\log Unemp_{jt}$ the unemployment rate

ADR specific characteristics

For ADR i and its home country j during the second half of year t , the average of daily

$\log Price_{it}$ closing price

$Turn_{it}$ trading volume/shares outstanding

$Spread_{it}$ bid-ask spread/closing price

$\log Illiq_{it}$ absolute value of daily returns/trading volume (in 100,000 shares)^a

^aAmihud's measure of illiquidity

$$\log Volatility_{it} = \beta_1 Exch_{jt} + \sum_r \beta_r W_{rit} + \alpha_i + \lambda_t + u_{it}$$

$$\log Volatility_{it} = \beta_1 DollarVol_{jt} + \sum_r \beta_r W_{rit} + \alpha_i + \lambda_t + u_{it}$$

Data and descriptive analysis

- **CoinMarketCap**: country and daily dollar volume of cryptocurrency spot exchanges
- **WRDS CRSP**: daily closing bid, ask, and price, trading volume, shares outstanding
- **Stock Market MBA**: ADR home country
- **World Bank**: GDP, population, unemployment rate

Country	2020 2H			2019 2H		
	No. ADRs	No. Exchanges	USD Volume	No. ADRs	No. Exchanges	USD Volume
Argentina	15	2	18	15	2	24
Australia	11	3	2066	10	3	1349
Belgium	4	0	0	4	0	0
Brazil	19	2	394	15	2	520
Cayman Islands	1	7	346815	1	5	291876
Chile	7	0	0	7	0	0
China	138	7	241167	112	7	673449
Colombia	1	0	0	1	0	0
Denmark	6	0	0	5	0	0
Finland	1	0	0	1	0	0
France	12	1	3	10	0	0
Germany	9	1	666	8	1	2861
Hong Kong	5	6	162491	4	5	396877
India	9	3	3217	9	2	70
Indonesia	1	2	537	1	1	686
Ireland	4	0	0	4	0	0
Israel	18	0	0	17	0	0
Italy	2	1	71	2	1	60
Japan	10	5	13796	9	5	11044
Mexico	13	1	671	13	1	366
Norway	2	1	4	2	1	47
Peru	3	0	0	2	0	0
Philippines	1	0	0	1	0	0
Russia	5	2	3899	4	2	3033
Singapore	2	10	59664	2	6	68259
South Africa	6	1	1	6	0	0
South Korea	9	9	86001	9	8	100713
Spain	4	0	0	4	0	0
Sweden	2	0	0	1	0	0
Switzerland	5	2	17497	4	2	66281
Taiwan	7	2	388	7	2	360
The Netherlands	7	0	0	6	0	0
Turkey	1	3	3448	1	2	1225
United Arab Emirates	1	1	14214	0	0	0
United Kingdom	40	8	4370	33	8	3525
Total	381	80	961398	330	66	1622625

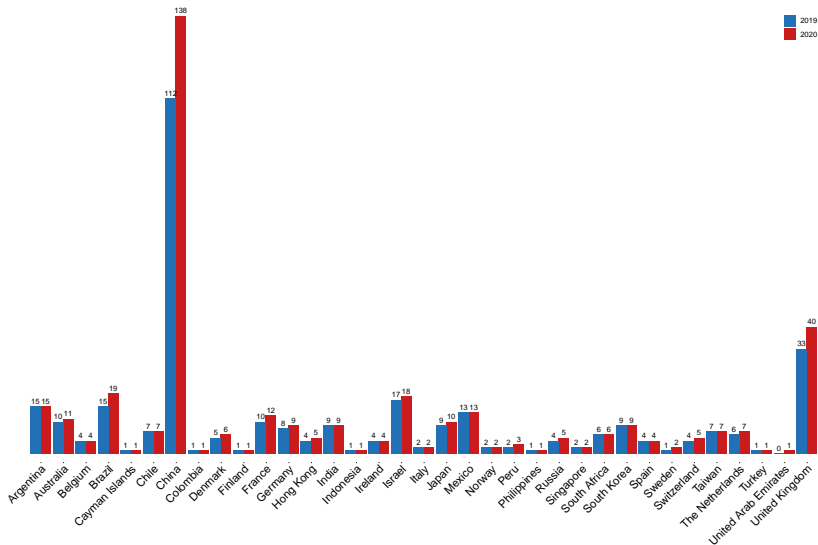


Figure 1: The number of ADRs

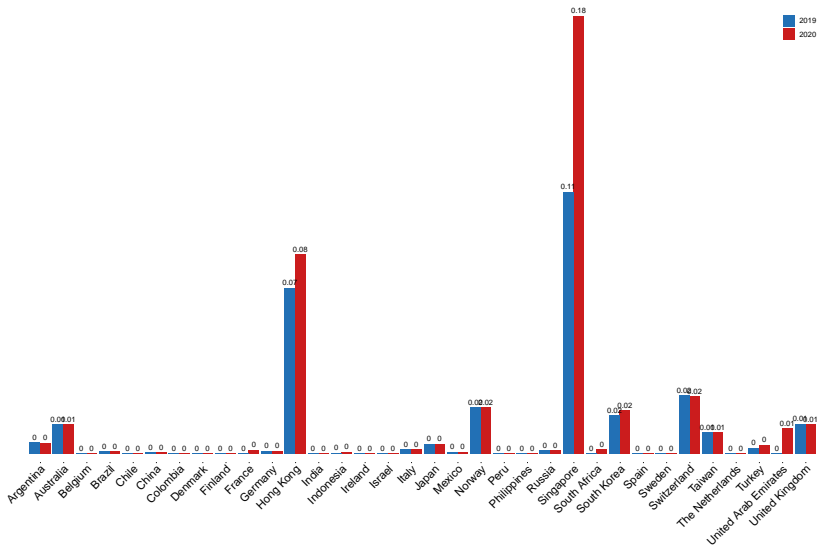


Figure 2: $Exch_{jt}$

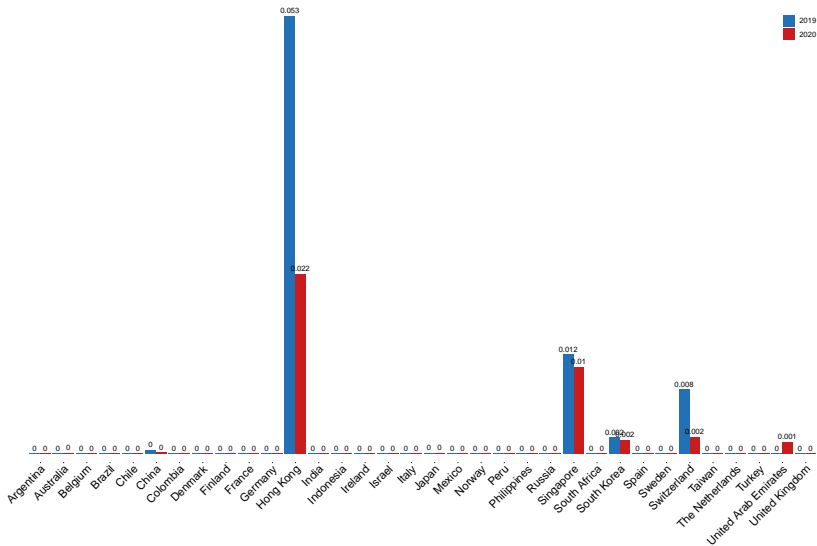


Figure 3: $DollarVol_{jt}$

Preliminary regression results

	log Volatility					
	(1)	(2)	(3)	(4)	(5)	(6)
No. Exchanges	0.022*** (0.007)	0.034*** (0.007)	0.058 (0.104)	-0.073 (0.095)	-0.129 (0.090)	-0.106 (0.074)
log GDP		-0.016 (0.023)		0.262 (0.377)		0.383 (0.348)
log Unemp		0.192*** (0.050)		1.121*** (0.169)		-0.069 (0.196)
log Price		-0.182*** (0.018)		-0.028 (0.060)		-0.008 (0.057)
Turn		0.448* (0.235)		0.281** (0.117)		0.265*** (0.102)
Spread		0.049*** (0.009)		0.038*** (0.007)		0.049*** (0.006)
log Illiq		0.054*** (0.009)		0.032 (0.032)		0.048 (0.033)
2020.year					0.284*** (0.030)	0.320*** (0.042)
Intercept	-3.484*** (0.039)	-3.099*** (0.276)	-3.636*** (0.447)	-7.371* (3.905)	-2.985*** (0.383)	-6.566* (3.581)
Observations	711	711	711	711	711	711
Adjusted R-squared	0.011	0.384	0.001	0.180	0.221	0.292
Entity effects	No	No	Yes	Yes	Yes	Yes
Time effects	No	No	No	No	Yes	Yes
Clustered standard errors	No	No	Yes	Yes	Yes	Yes
Number of id			381	381	381	381
Time effects = 0: F-stat					88.10	56.91
Time effects = 0: p-value					0	0
Robust standard errors in parentheses				*** p<0.01, ** p<0.05, * p<0.1		

Table 1: Regression results of the effect of the number of exchanges

	log Volatility					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Exch</i>	0.057 (0.043)	0.020 (0.040)	-0.346*** (0.014)	-0.328*** (0.055)	-0.444*** (0.021)	-0.377*** (0.051)
log <i>GDP</i>		-0.057** (0.024)		0.309 (0.371)		0.447 (0.344)
log <i>Unemp</i>		0.065 (0.045)		1.064*** (0.173)		-0.142 (0.213)
log <i>Price</i>		-0.184*** (0.019)		-0.046 (0.060)		-0.031 (0.057)
<i>Turn</i>		0.438* (0.240)		0.284** (0.118)		0.271*** (0.104)
<i>Spread</i>		0.049*** (0.009)		0.037*** (0.008)		0.047*** (0.006)
log <i>Illiq</i>		0.053*** (0.009)		0.026 (0.033)		0.041 (0.033)
2020.year					0.269*** (0.028)	0.318*** (0.042)
Intercept	-3.390*** (0.024)	-2.332*** (0.267)	-3.378*** (0.000)	-8.024** (3.787)	-3.519*** (0.015)	-7.492** (3.486)
Observations	711	711	711	711	711	711
Adjusted R-squared	0.001	0.362	0.008	0.185	0.226	0.296
Entity effects	No	No	Yes	Yes	Yes	Yes
Time effects	No	No	No	No	Yes	Yes
Clustered standard errors	No	No	Yes	Yes	Yes	Yes
Number of id			381	381	381	381
Time effects = 0: F-stat					92.92	57.53
Time effects = 0: p-value					0	0

Robust standard errors in parentheses

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

Table 2: Regression results of the effect of *Exch*

	log Volatility					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>DollarVol</i>	0.118 (0.078)	0.045 (0.076)	-1.372*** (0.102)	-1.116*** (0.212)	-1.630*** (0.048)	-1.423*** (0.194)
log <i>GDP</i>		-0.057** (0.024)		0.296 (0.371)		0.433 (0.343)
log <i>Unemp</i>		0.065 (0.045)		1.051*** (0.174)		-0.170 (0.212)
log <i>Price</i>		-0.184*** (0.019)		-0.045 (0.060)		-0.031 (0.057)
<i>Turn</i>		0.438* (0.240)		0.285** (0.119)		0.272*** (0.104)
<i>Spread</i>		0.049*** (0.009)		0.038*** (0.008)		0.048*** (0.006)
log <i>Illiq</i>		0.053*** (0.009)		0.026 (0.033)		0.041 (0.033)
2020.year					0.268*** (0.028)	0.321*** (0.042)
Intercept	-3.390*** (0.024)	-2.330*** (0.267)	-3.368*** (0.001)	-7.867** (3.791)	-3.508*** (0.014)	-7.296** (3.481)
Observations	711	711	711	711	711	711
Adjusted R-squared	0.001	0.362	0.009	0.183	0.225	0.296
Entity effects	No	No	Yes	Yes	Yes	Yes
Time effects	No	No	No	No	Yes	Yes
Clustered standard errors	No	No	Yes	Yes	Yes	Yes
Number of id			381	381	381	381
Time effects = 0: F-stat					91.98	58.64
Time effects = 0: p-value					0	0

Robust standard errors in parentheses

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

Table 3: Regression results of the effect of *DollarVol*

- The number of exchanges has a significant positive correlation with volatility.
- Contrary to expectations, both measures have negative effects.
- An unit increase in the number of cryptocurrency exchanges per capita is associated with a 40% decrease in volatility.
- A dollar increase in the sum of the average daily dollar volume per capita is associated with a 140% decrease in volatility.
- These results are robust to different fixed effect model specifications.

Discussion and what to do next

- Lack of sophistication in measuring
 - Extreme values like Cayman Islands
 - The proportion of foreign transactions
- The negative effect

Any questions?



Blau, Benjamin M and Whitby, Ryan J (2020)

Gambling activity and stock price volatility: A cross-country analysis

Journal of Behavioral and Experimental Finance, 27: 100338.