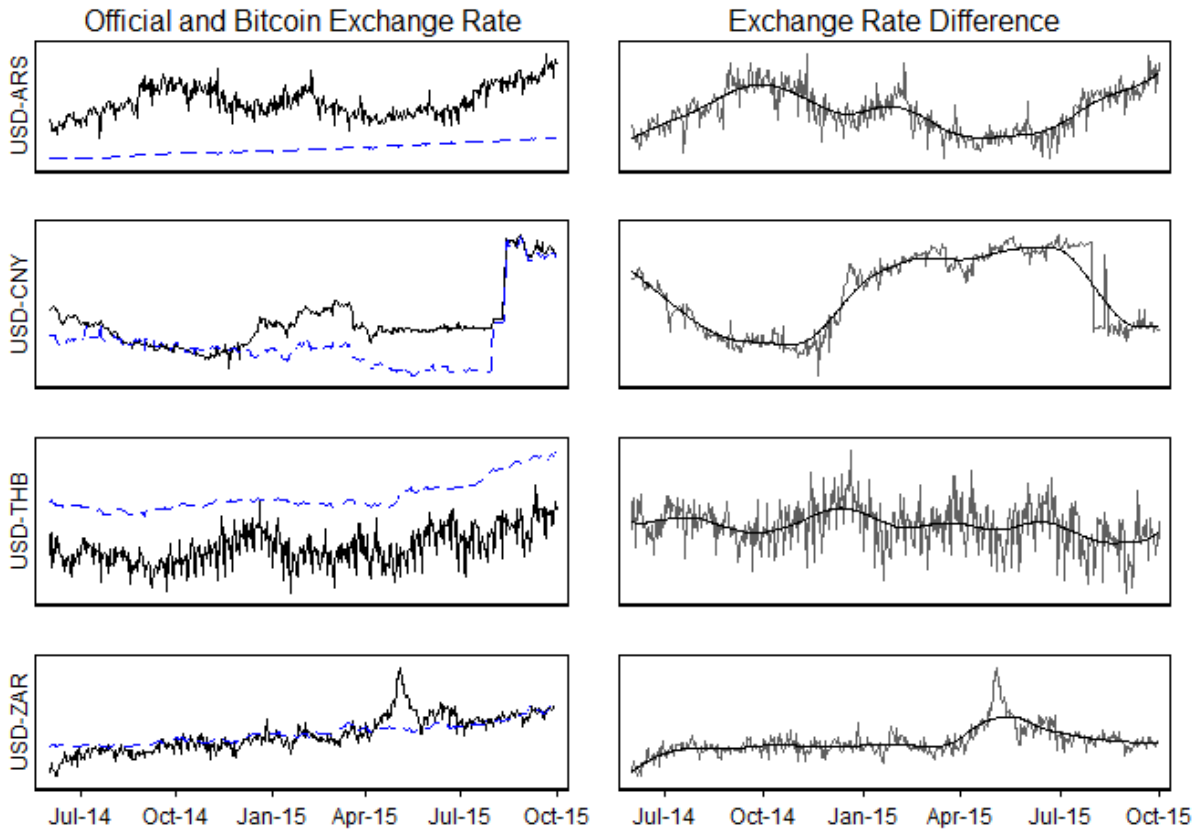


Online Appendix: Bitcoin Reveals Unofficial Exchange Rates and Detects Capital Controls

G.C. Pieters*

Trinity University, Economics Dept, 1 Trinity Place, San Antonio, Texas, 78212.

Figure 1: Comparison of Bitcoin(solid) and Official (dashed) Exchange Rates for High Barrier Currencies



*Corresponding author

Email address: pieters.econ@gmail.com (G.C. Pieters)

¹I am grateful for helpful comments and suggestions from Christoffer Koch and participants at the 2016 International Trade and Finance Association Conference at Occidental College.

Figure 2: Comparison of Unadjusted Bitcoin (solid) and Official (dashed) Exchange Rates

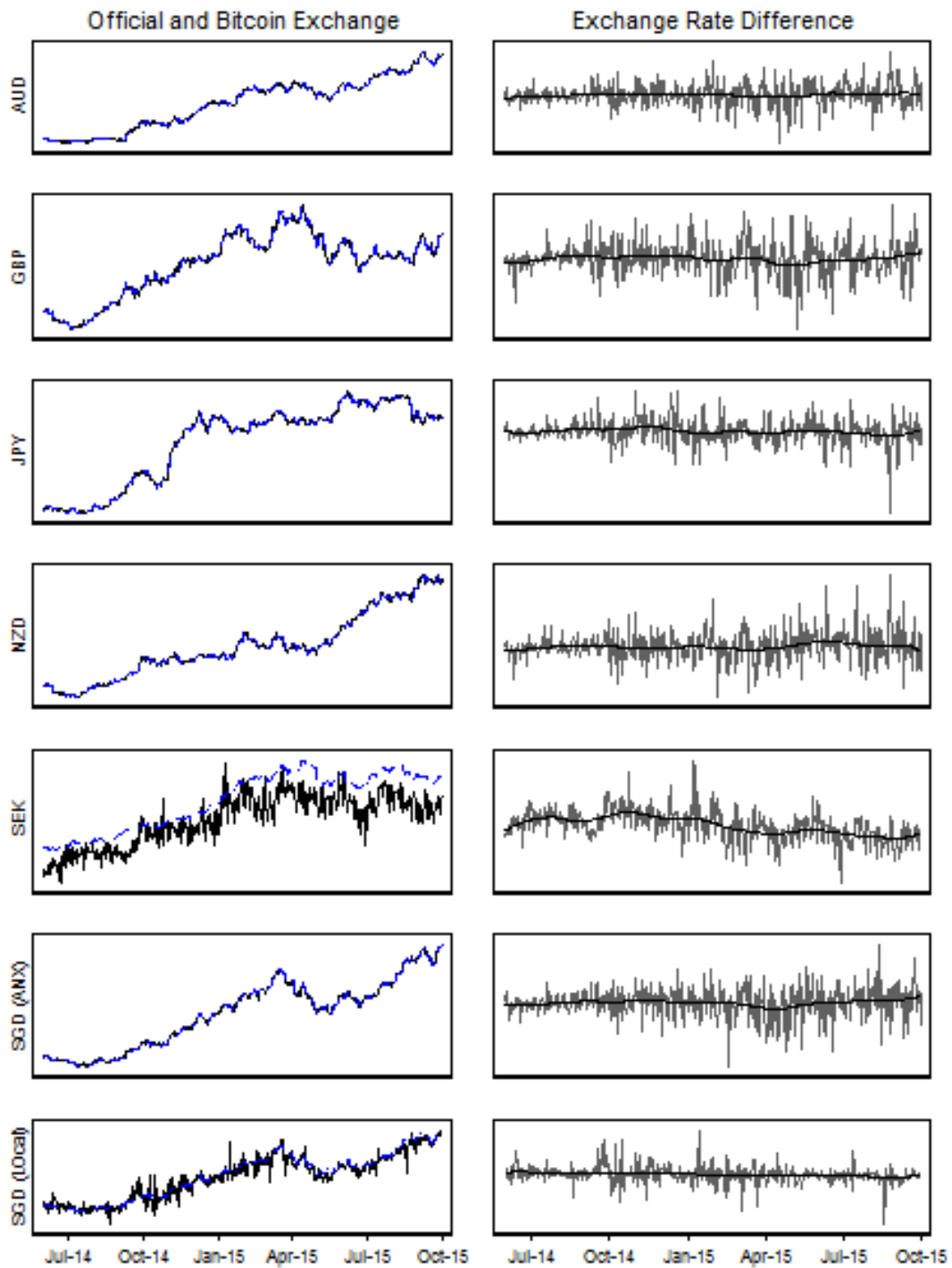


Figure 3: Comparison of Unadjusted Bitcoin (solid) and Official (dashed) Exchange Rates

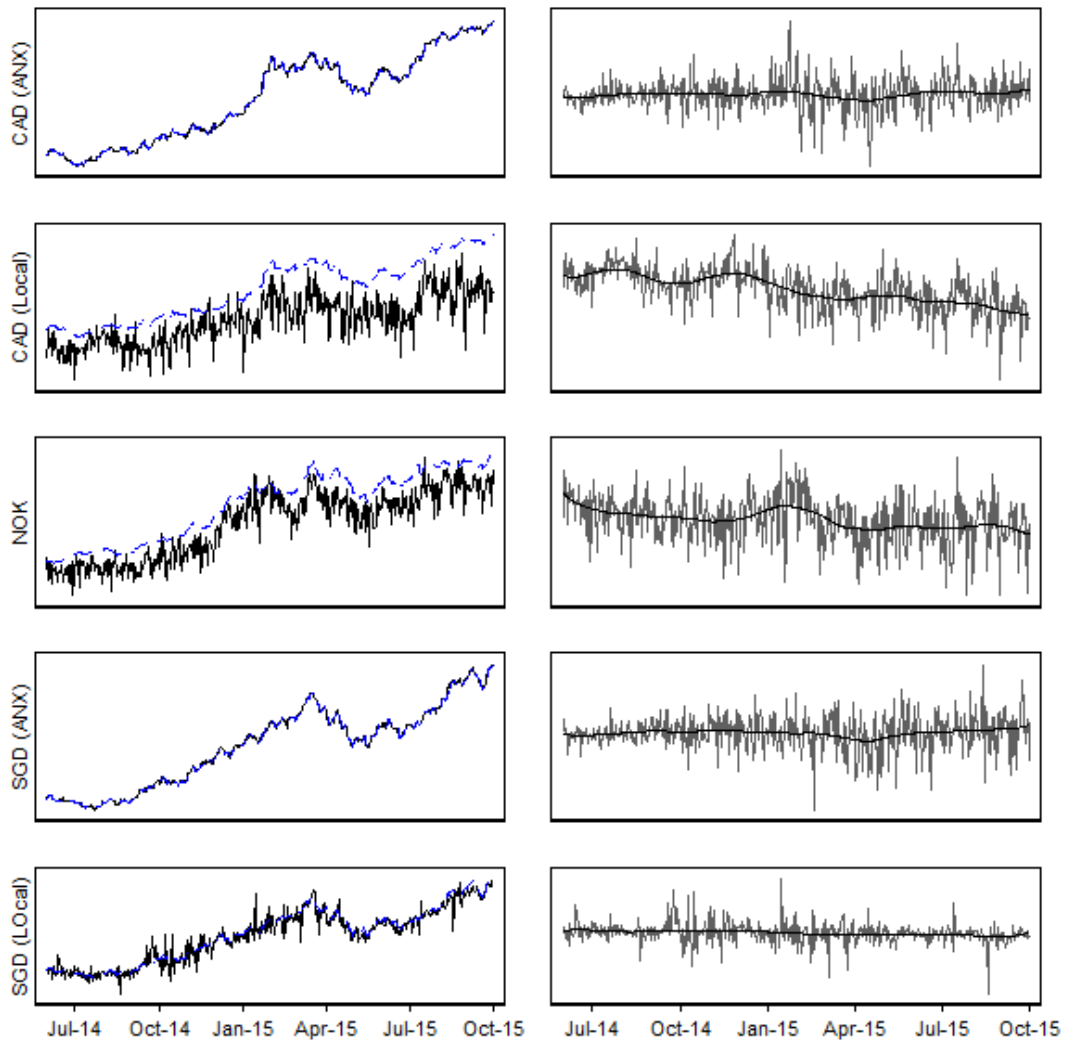


Figure 4: Comparison of Unadjusted Bitcoin (solid) and Official (dashed) Exchange Rates: Intermediate Barriers

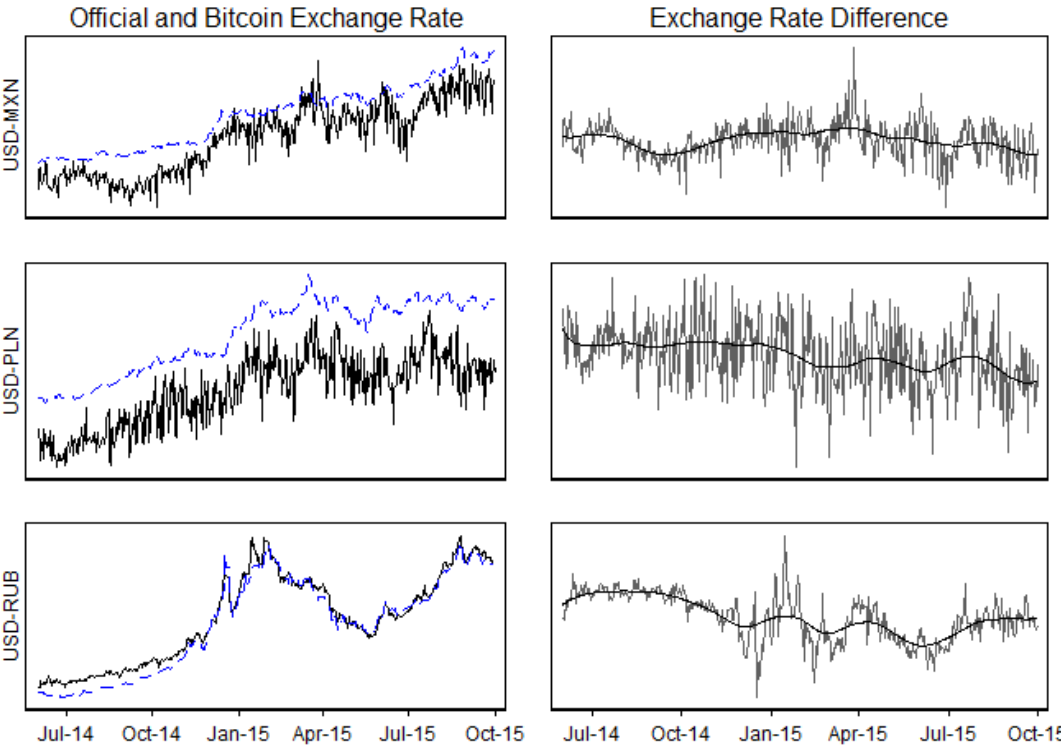


Figure 5: Currencies Mark-Ups: AUD to GBP

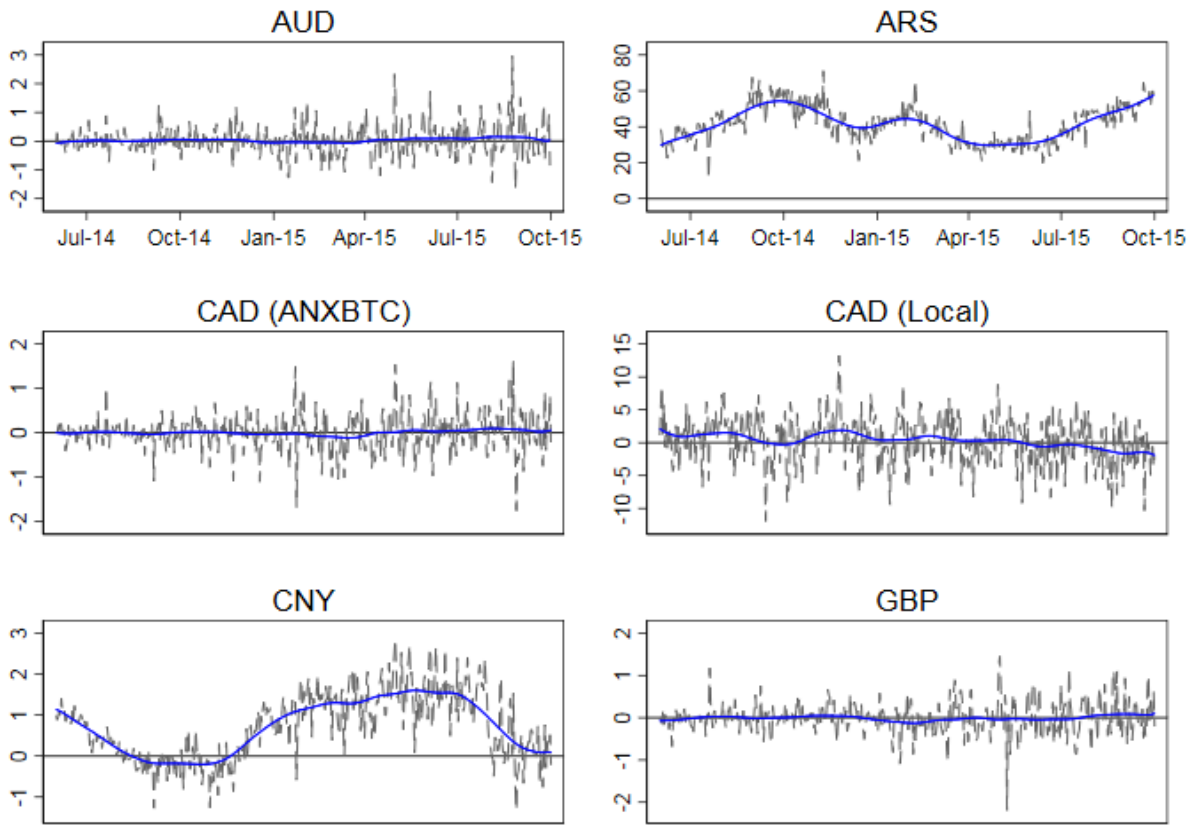


Figure 6: Currencies Mark-Ups: JPY to RUB

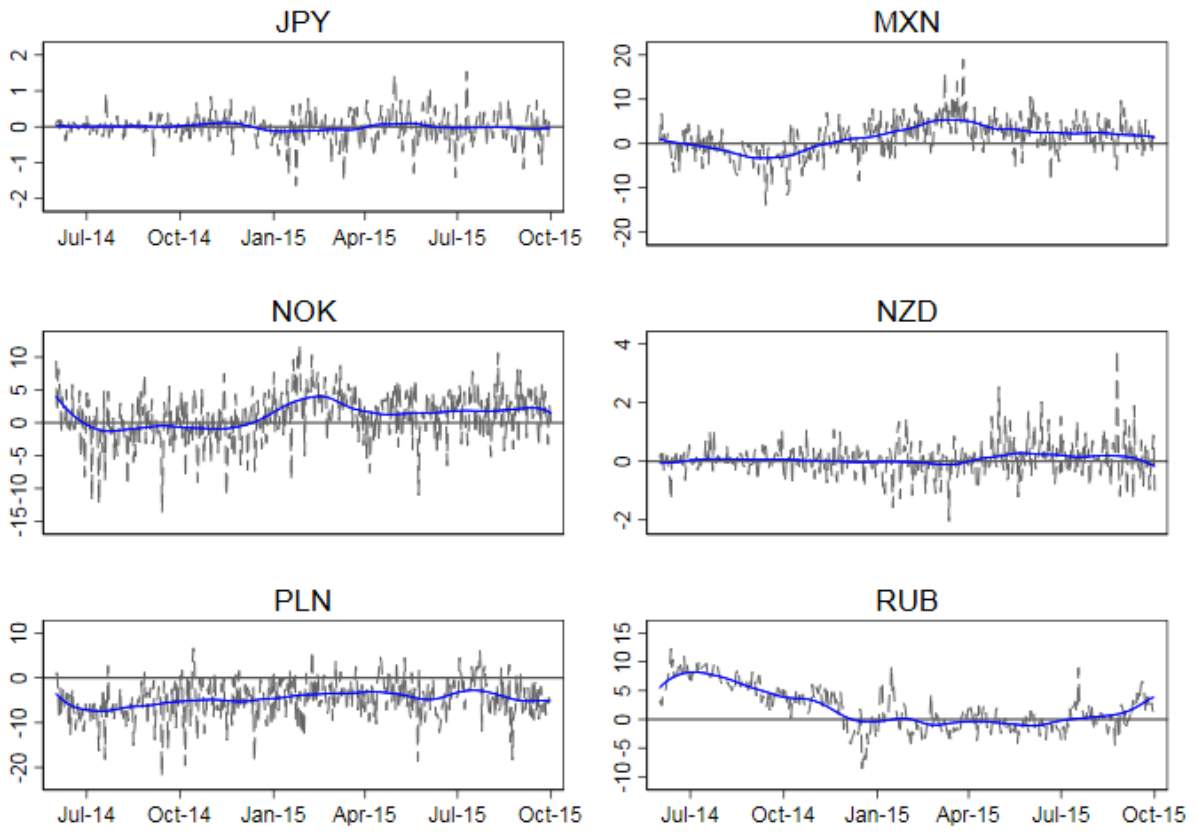


Figure 7: Currencies Mark-Ups: SEK to ZAR

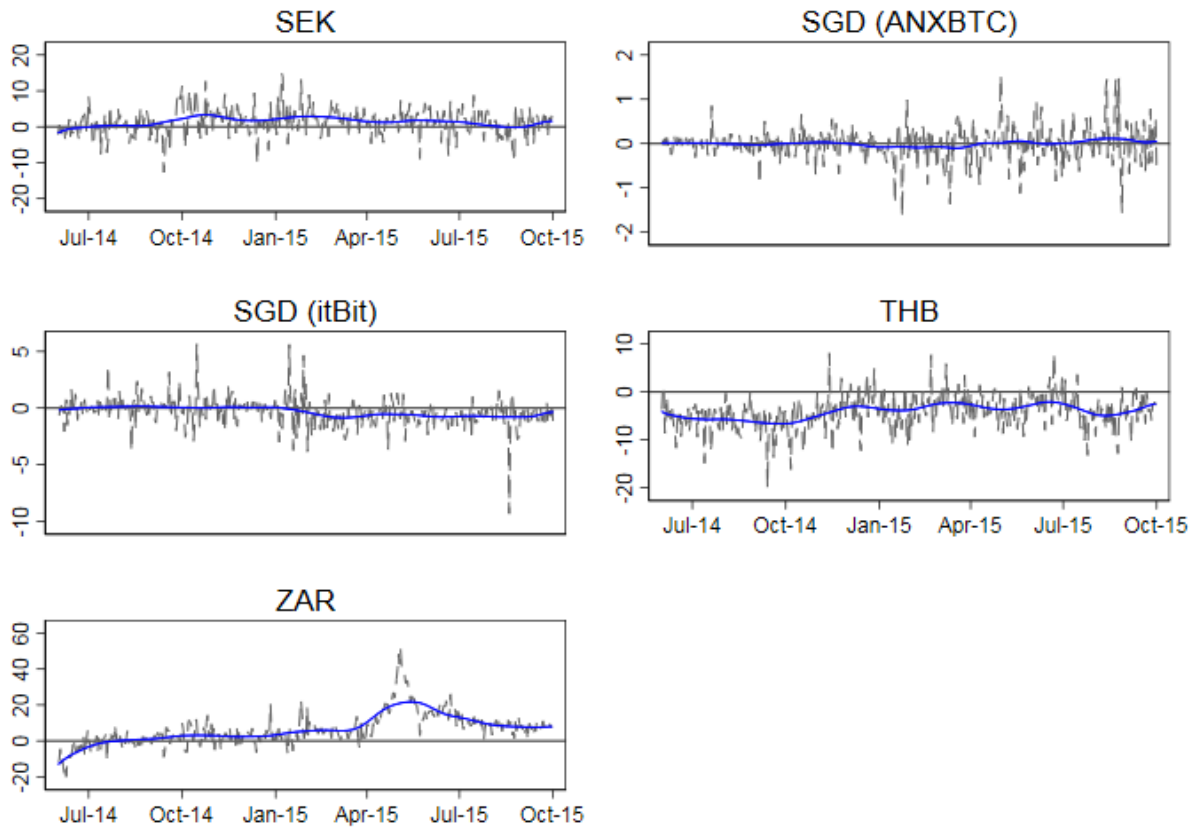


Table 1: The Norwegian Krone: Comparison of Bitcoin versus KAOPEN Index before and after December 8, 2014

	Lag		Johansen Trace Test		PSS Test		Barrier Size		2013 KAOPEN
	SBIC	ℓ	$r = 0$	$r = 1$	F-stat	C?	$\hat{\beta}_{Local}^{NOK}$	$\hat{\rho}_{Local}^{NOK}$	
Full Sample	2	7	36.44	0.87***	—	Y	0.93***	0.17	0.00
Prior to Dec. 7	1	5	48.46	1.67***	—	Y	0.80***	0.00	0.00
After Dec. 9	2	2	—	—	4.22*	Y	0.71***	0.01	0.00

***1%, ** 5%.

Abbreviations: $\hat{\beta}_{Local}^{NOK}$: Cointegrating Coefficient; C?, Are Official and Bitcoin Exchange Rates Cointegrated?; KAOPEN, 1- 2013 Chinn-Ito Financial Openness index value; $\hat{\rho}_{Local}^{NOK}$: Bitcoin barrier estimate adjusted for bitcoin market trends, normalized to range from zero to one, equation (??). The cointegrating coefficient for the Euro is $\hat{\beta}_{Local}^{EUR} = 0.80$ prior to December 7 and $\hat{\beta}_{Local}^{EUR} = 0.72$ after December 9.; PSS, Pesaran-Shin-Smith; SBIC, Lag according to Schwarz Bayesian information criterion.