Data Appendix

7th May 2023

Raw Data

The raw daily (end of day) data has been acquired for each index from `investing.com` [18] with the exception for Switzerland. The Swiss volatility index data is from `onvista.de` [25]. The utilised data is 30-day implied volatility, calculated based on near-term and next-term option prices. [1] [7] As expected the VXFXI is implicit in the prices of its underlying FXI (iShares Trust FTSE China 25 Index Fund) options. However, the anomaly here is, that FXI – an instrument traded in NYSE Arca, New York – tracks Chinese equities traded on the Hongkong Stock Exchange and the VXFXI is traded at CBOE, Chicago. This will most certainly lead to subpar portrayal of China's implied volatility. [3] [7] Also the tradable hours should be treated with caution. Many derivatives exchanges offer night sessions or OTC trades to their customers. However, since most of the (transparent) total volume is traded during the opening and closing periods of regular trading hours, our modelling assumption is therefore supported. [20] The data from Table 1 give a total of 2724 observations, and after omitting rows with NA values, 1017 remain. Since the data is split with the ratio ⅓ and ⅔, the training set for the EM algorithm consists of 1816 rows and the remaining algorithms are trained with a set of 687 rows. Both are tested with a set of 330.

Data availability statement: The dataset generated by combining the cited sources from *investing.com* and *onvista.de* is available in the Dataverse repository, [`https://doi.org/10.7910/DVN/IGW6RQ`].

[2]Sometimes referred to as AXVI.
[3]Sometimes referred to as Nikkei 225 VI.

Index ticker	**Associated country**	**Short form**	**Underlying assets**	**Traded exchange**	**Tradable hours** (UTC)	**Available timeframe**	**Data source** *[accessed 27-April-2022]*
A-VIX[1]	Australia	AU	S&P/ASX 200	ASX (Sydney)	20:00 – 02:00 [2]	Jan 2012 – Dec 2021	investing.com [8]
VIXI	Canada	CA	S&P/TSX 60	TSX (Toronto)	04:30 – 11:00 [28]	Jan 2012 – Dec 2021	investing.com [16]
VXFXI	China	CN	FXI	CBOE (Chicago)	04:30 – 11:00 [4]	Jan 2012 – Dec 2021	investing.com [17]
VCAC	France	FR	CAC 40	Euronext Paris	11:01 – 19:30 [6]	Jan 2012 – Dec 2021	investing.com [12]
VDAX-NEW	Germany	DE	DAX	Deutsche Börse (Frankfurt)	10:00 – 18:30 [5]	Jan 2012 – Dec 2021	investing.com [13]
VHSI	Hongkong	HK	HSI	HKEX (Hongkong)	17:30 – 00:00 [21]	Jan 2012 – Dec 2021	investing.com [15]
NIFVIX	India	IN	NIFTY	NSE (Mumbai)	14:45 – 21:00 [24]	Jan 2012 – Dec 2021	investing.com [10]
JNIV[2]	Japan	JP	Nikkei	Osaka Exchange	18:00 – 00:15 [22]	Jan 2012 – Dec 2021	investing.com [9]
RVI	Russia	RU	RTSI	MOEX (Moscow)	13:00 – 21:45 [23]	Nov 2013 – Dec 2021	investing.com [11]
VSMI	Switzerland	CH	VMI	SIX Swiss Exchange (Zurich)	11:00 – 19:30 [27]	Jan 2012 – Dec 2021	onvista.de [26]
VFTSE	United Kingdom	GB	FTSE 100	Euronext Amsterdam	11:01 – 19:30 [6]	Aug 2012 – Jun 2019	investing.com [14]
VIX	United States	US	S&P500	CBOE (Chicago)	04:30 – 11:00 [4]	Jan 2012 – Dec 2021	investing.com [19]

Table 1: *Mapping of implied volatility data and their underlying asset to dedicated countries, including stock exchanges, tradable hours and available time frame with sources.*

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