VOLATILITY PERSISTENCE IN SELECTED EQUITY MARKETS BEFORE AND AFTER 2020

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ABSTRACT

This paper investigates volatility persistence in the following equity markets: Germany, UK, Turkey, China and the USA. The data period is from January 4, 2017 to September 29, 2023. However, the data period is divided into two parts, before and after January 2020. Data collected and analyzed are daily returns on exchange traded funds (ETFs) of the sample countries, based on MSCI indices. Specific methods used to study the data are GARCH (1, 1) (Bollerslev, 1986; Brooks, 2014) and EGARCH (1, 1) (Nelson, 1991; Alexander, 2008).

Preliminary results of GARCH (1,1), show that in the selected period before 2020, the USA market's ETF (IVV) exhibits the highest Arch coefficient (α value) (.1951), meaning that volatility reacts intensely to market movements while Germany market's ETF (EWG) has the lowest Arch coefficient (.0278) indicating stable short term volatility. On the other hand, Chinese market's ETF (MCHI) has the highest value of Garch parameter ß (.9585) indicating that volatility takes a long time to die out following a crisis in the market. Also, China market's ETF shows the highest sum of $\alpha + \beta$ (.9927) showing that the effects of the volatility shocks fade slowly (Table 1).

Table 1: Volatility Persistence (GARCH, 1,1) (Before 2020)

coefficient	CHINA MCHI	GERMANY EWG	TURKEY TUR	UK EWU	USA IVV
Constant (ω)	0.009 (0.113)	0.0213 (0.022)	0.0663 (0.008)	0.0861 (0.000)	0.0293 (0.000)
ARCH(-1) (α)	0.0342 (0.000)	0.0278 (0.003)	0.0549 (0.000)	0.1529 (0.000)	0.1951 (0.000)
Garch(-1) (β)	0.9585 (0.000)	0.9470 (0.000)	0.9277 (0.000)	0.7284 (0.000)	0.7693 (0.000)
$\alpha + \beta < 1$	0.9927	0.9748	0.8926	0.8813	0.9644
AIC	2.989196	2.642800	4.090388	2.374492	2.070145
SIC	3.013760	2.667363	4.108810	2.399056	2.094709
ARCH-LM test statistic (Obs*R-squared)	0.374276	0.000390	1.633938	0.122702	0.000594
Prob. Chi-Square(1)	0.5407	0.9843	0.2012	0.7261	0.9806

In the second period, (after 2020), as presented in table 2, the USA market continues to react intensely to market movements (the highest α value) just like in the period prior to 2020. In this period (after Jan. 2020) the highest Garch parameter ß is exhibited by German market's ETF. Also, German market's ETF shows the highest sum of $\alpha + \beta$ while the Chinese market's ETF shows the lowest sum of Arch and Garch parameters implying that the effects of the volatility shocks fade away quickly.

Table 2: Volatility Persistence (GARCH, 1,1) (After Jan. 2020)

coefficient	CHINA MCHI	GERMANY EWG	TURKEY TUR	UK EWU	USA IVV
Constant (ω)	0.3218 (0.000)	0.0553 (0.000)	0.3088 (0.000)	0.0676 (0.000)	0.0546 (0.000)
ARCH(-1) (α)	0.1351 (0.000)	0.1169 (0.000)	0.1058 (0.000)	0.1221 (0.000)	0.1625 (0.000)
Garch(-1) (β)	0.7732 (0.000)	0.8666 (0.000)	0.8491 (0.000)	0.8455 (0.000)	0.8112 (0.000)
$\alpha + \beta < 1$	0.9083	0.9835	0.9549	0.9712	0.9737
AIC	3.979382	3.522800	4.475153	3.257690	3.112389
SIC	3.999951	3.543368	4.495722	3.278258	3.132958
ARCH-LM test statistic (Obs*R-squared)	1.075689	1.372537	0.088359	0.463598	0.235694
Prob. Chi-Square(1)	0.2997	0.2414	0.7663	0.4959	0.6273

Finally, we found that EGARCH (1,1) provides a better fit for selected ETFs because AIC criterion and SIC criterion are slightly lower for all ETFs.

These findings should be useful to portfolio managers for better risk assessment, portfolio selection and diversification as well as to international investors.

Key words: Volatility persistence, GARCH, EGARCH

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