**Apéndice Nº 1.** Diagnóstico de los residuos de los modelos estimados.

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| **Modelo: ARCH(3) con modelo de la media ARMA (2,1)** | | | | | | | | |
|  | Mediana | | Media | Varianza | Error estándar | | Asimetría | Kurtosis |
| Residuos (R) | -0,0102 | | 0,0945 | 1,0805 | 1,0395 | | 2,2280 | 52,4957 |
| Shapiro-Wilk (R) | | 0,7511 | | Prob[S-W(R)] | | < 2.2e-16 | | |
| Shapiro-Wilk (R2) | | 0,0827 | | Prob[S-W(R2)] | | < 2.2e-16 | | |
| Ljung-Box(R) | | 0,96641 | | Prob[L-B(R)] | | 0,3256 | | |
| Ljung-Box(R2) | | 0,05164 | | Prob[L-B(R2)] | | 0,8202 | | |
| Efectos ARCH (LM) | | 8,0977 | | Prob[L-M] | | 0,7774 | | |

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| **Modelo: GARCH(1,1) con modelo de la media ARMA (2,1)** | | | | | | | |
|  | Mediana | | Media | Varianza | Error estándar | Asimetría | Kurtosis |
| Residuos (R) | -0,0057 | | 0,0964 | 1,1236 | 1,0600 | 0,2378 | 28,6771 |
| Shapiro-Wilk (R) | | 0,7898 | | Prob[S-W(R)] | | < 2.2e-16 | |
| Shapiro-Wilk (R2) | | 0,1332 | | Prob[S-W(R2)] | | < 2.2e-16 | |
| Ljung-Box(R) | | 0,44873 | | Prob[L-B(R)] | | 0,5029 | |
| Ljung-Box(R2) | | 0,11783 | | Prob[L-B(R2)] | | 0,7314 | |
| Efectos ARCH (LM) | | 4,5966 | | Prob[L-M] | | 0,9701 | |

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| **Modelo: EGARCH(1,1) con modelo de la media ARMA (2,1)** | | | | | | | | | | | | |
|  | Mediana | | | | Media | Varianza | | Error estándar | | Asimetría | | Kurtosis |
| Residuos (R) | -0,00272 | | | | 0,04448 | 0,242307 | | 0,492247 | | 0,513172 | | 25,00642 |
| Shapiro-Wilk (R) | | | | 0,7945 | | Prob[S-W(R)] | | | | < 2.2e-16 | | |
| Shapiro-Wilk (R2) | | | | 0,1482 | | Prob[S-W(R2)] | | | | < 2.2e-16 | | |
| Ljung-Box(R) | | | | 0,53262 | | Prob[L-B(R)] | | | | 0,4655 | | |
| Ljung-Box(R2) | | | | 0,03404 | | Prob[L-B(R2)] | | | | 0,8536 | | |
| Efectos ARCH (LM) | | | | 6,0061 | | Prob[L-M] | | | | 0,9158 | | |
| **Modelo: GJR-GARCH(1,2) con modelo de la media ARMA (2,1)** | | | | | | | | | | | | |
|  | Mediana | | | | Media | Varianza | | Error estándar | | Asimetría | | Kurtosis |
| Residuos (R) | -0,0064 | | | | 0,0932 | 1,087327 | | 1,04275 | | 0,32399 | | 25,4524 |
| Shapiro-Wilk (R) | | | | 0,8003 | | Prob[S-W(R)] | | | | < 2.2e-16 | | |
| Shapiro-Wilk (R2) | | | | 0,1448 | | Prob[S-W(R2)] | | | | < 2.2e-16 | | |
| Ljung-Box(R) | | | | 0,37367 | | Prob[L-B(R)] | | | | 0,541 | | |
| Ljung-Box(R2) | | | | 0,02645 | | Prob[L-B(R2)] | | | | 0,8708 | | |
| Efectos ARCH (LM) | | | | 4,6775 | | Prob[L-M] | | | | 0,9679 | | |
| **Modelo: APARCH (1,1) con modelo de la media ARMA (2,1)** | | | | | | | | | | | | |
|  | | Mediana | | | Media | Varianza | Error estándar | | Asimetría | | Kurtosis | |
| Residuos (R) | | -0,0026 | | | 0,04678 | 0,25599 | 0,50596 | | 0,62847 | | 27,2023 | |
| Shapiro-Wilk (R) | | | 0,7758 | | | Prob[S-W(R)] | | | < 2.2e-16 | | | |
| Shapiro-Wilk (R2) | | | 0,1425 | | | Prob[S-W(R2)] | | | < 2.2e-16 | | | |
| Ljung-Box(R) | | | 0,0177 | | | Prob[L-B(R)] | | | 0,8939 | | | |
| Ljung-Box(R2) | | | 0,0792 | | | Prob[L-B(R2)] | | | 0,7783 | | | |
| Efectos ARCH (LM) | | | 8,3436 | | | Prob[L-M] | | | 0,7577 | | | |

**Fuente:** elaboración propia. Nivel de significancia = 5%