THE EFFECT OF EXCHANGE RATE VOLATILITY ON SHARE PRICE FLUCTUATIONS IN NIGERIA

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Abstract-This study examined the impact of exchange rate volatility on share price fluctuations in Nigeria. applying a GARCH (1,1) model and the granger causality test on monthly dataset spanning 1985:1 to 2012:4 the results showed that whereas exchange rate expectation has positive impact on stock returns the impact of exchange rate volatility was statistically not significant. Further results showed that information flow has significant impact on exchange rate uncertain. This model is robust to serial correlation and further ARCH effect as indicated by the ARCH LM test for serial correlation and the LM test for ARCH effect. However, exchange rate volatility impacts negatively on share price fluctuations. Also, there exists a unidirectional causality running from share prices to exchange rate. The study therefore conclude that although exchange rate expectations help to predict returns on share prices exchange rate volatility had a negative impact on share price fluctuations in Nigeria.

Keywords – Exchange rate, Fluctuations, Returns on Share prices, Volatility

JEL Classification –F41 G14 G18

1. INTRODUCTION

The stock market is an important component of the financial sector in every economy. Its importance hinges on its statutory role of providing medium to long – term funds for investments. But the interdependence of world economies have made it such that nationals/firms from foreign economies can buy shares of firms domiciled in other economies and by such virtue entitled to dividends. In as much as foreign nationals will invest in economies order than their domestic economies and that their domestic currencies are not legal tenders in other economies, there is the need to source for currencies that are acceptable for international transactions. This makes it imperative for foreign investors to demand for the dollar equivalent of domestic currencies to hold the investment outlays in the capital importing economy. It is based on the amount of the domestic currency that is exchanged for the dollar and the demand for the dollar that the exchange rate affects domestic stock markets.

The Nigerian exchange system has gone through different regimes since independence. In the 1960s Nigeria operated a fixed exchange rate system in which the currency was fixed at par with the British pound. In 1967 when the British pound was devalued the authorities decided to peg the currency to the US dollar and imposed restrictions on imports via strict administrative controls on foreign exchange. Following the financial crisis and the subsequent devaluation of the US dollar, Nigeria had to abandon the dollar peg and reverted to the British pound and kept faith with it until 1973 when the new Nigerian naira was once again pegged to the US dollar. These developments brought to fore the need for independently managed exchange rate system. Therefore, in 1978, the naira was pegged to a basket of twelve (12) currencies of the country's major trade partners (Obudah and Tombofa, 2014).

Subsequently, in 1986 following the adoption of the structural adjustment programme Nigeria moved from fixed to flexible exchange rate system in accordance to the Britton Woods agreement. This was to mitigate the decline in foreign exchange receipts resulting from declining oil revenue due to the sharp fall in oil prices in the early 1980s. The so adopted exchange rate system (the flexible system) is one that depends on the interplay of the forces of demand and supply to determine the amount of the domestic currency (herein the Naira) that is exchanged for a dollar at every point in time. There are situations where the exchange rate is entirely determined by market forces (demand and supply) – "clean float" and ones where government intervention is permissible – "dirty floating". The argument for the flexible exchange rate regime is anchored on the notion that it allows for a continuous response to changes in the fundamentals of the economy, neutral with respect to inflation, causes higher growth and leads to balance of payment (BOP) equilibrium without inducing demand restraints and protectionism that may cause further distortions in resource allocation (Dornbusch and Fischer, 1980).

It is almost a global consensus that changing exchange rates have important effects on the international competitiveness of firms (Stavárek, 2005). Firms whose entire operations are domestic can also be affected by exchange rate, if their input and output prices are influenced by currency movements (Adler and Dumas, 1984). Volatility in exchange rate is a major source of macroeconomic uncertainty affecting firms. It is therefore not surprising that firms domiciled in Nigeria are continuously being affected by exchange rate volatility and the sterile economic situations that have

characterized the Nigerian economy for many years. The Nigerian Stock Exchange which is saddled with the task of providing corporate entities with medium to long-term finance has exhibited swings that have resulted in declining returns and capital depreciations across all sectors in the country. Although there is a good number of empirical works on the relationship between exchange rate volatility and stock prices and economic theory postulates that changes in foreign exchange rate influences stock price by affecting cash flow, investment and profitability of firms, empirical results show that the debate is still inconclusive. This study, therefore examines the impact of exchange rate volatility on share price fluctuations in Nigeria.

II. LITERATURE REVIEW

The impact of exchange rate volatility on share price volatility has been widely debated in the finance literature. The literature suggests mixed results. Whereas some studies suggest causality running from share prices to exchange rate some suggests the traditional approach of exchange rate transmission mechanism and others argue that the exchange rate and stock prices have bidirectional relationship.

The studies of Soenen and Hennigar (1988) and Aggarwal (1981) suggests that exchange rate has a significant impact on share price volatility. If the firm is operating internationally then the exchange rate impacts on its profit and its share prices. Fama (1981) argued that there are many factors that reflect in stock prices of firm, the important one that causes the volatility of share prices mainly depends on its volatility.

Maysami-Koh (2000) attempted to investigate the impact of interest rate and exchange rate on stock returns. He arrived at the conclusion that both variables reflects on stock prices of firm. Najang and Seifert (1992) attempted a similar study and showed that exchange rate significantly contributes to stock return volatility. Solnik (1987) in their studied of the impact of exchange rate on stock returns showed that negative shock causes negative volatility in share prices and positive shocks causes positive fluctuation.

The study of Gazioglu (2000) suggests that globalization is a key factor that causes volatility. It stimulates debt crises, balance of payment disequilibrium and ultimately impacts the operation of firms. The adverse effects are reflected in share price volatility.

Najang and Seifert (1992) showed that relationship is unidirectional. Exchange rate volatility causes the share price fluctuation. Ajayi and Mougoué in (1996) studied the short and long run dynamics of both variables and concluded that whereas stock prices fluctuations have deteriorating impact on exchange volatility in short run, in the long-run things a no longer the same as share price fluctuations impacts positively on exchange rate volatility. Ajayi et al. (1998) showed a unidirectional causality running exchange rate to share prices. The study of Kim (2003) showed that negative share price shocks negatively affects exchange rate. Smyth and Nandha (2003) studied this relationship and concluded that in some countries the relationship is unidirectional running from exchange rate to share price volatility while in other countries bidirectional causality was found in the short-run. However, the variables were independent from each other in the long-run. Doong et al. (2005) found no evidence of exchange rate co-integration with share prices. Ozair (2006), showed little evidence of co-integration and causality of exchange rate with the returns on share prices. Vygodina(2006) showed that causality runs from exchange rate to stock return volatility and not the other way round.

On the domestic front Osisanwo and Atanda (2012), analyzed the determinants of stock market returns in Nigeria using the OLS method with a coverage of 1984 to 2010. Amongst other things exchange rate was found to be a major determinant of stock returns. Yaya and Shittu (2010), examined the impact of inflation and exchange rate on conditional stock market volatility. Using the Sentana's QGARCH model they showed a significant relationship of inflation and exchange rate to conditional stock market volatility. Olugbenga, (2012) examined the long-run and short-run effects of exchange rate on stock market development in Nigeria over 1985:1 – 2009:4 using the Johansen cointegration tests and a bi-variate model the empirical results showed a significant positive stock market performance to exchange rate in the short-run and a significant negative stock market performance to exchange rate in the long-run. The Granger causality test showed that causality runs from exchange rate to stock market performance, implying that variations in the Nigerian stock market is explained by exchange rate volatility.

Mbutor (2010), tried to answer the questions: was the depreciation in the naira exchange rate responsible for the stock market collapse? Or was the reverse the case? Did banks curtail lending because of the depreciation or the fluctuation in the stock indices? This study empirically answers these questions. The vector auto regression (VAR) methodology is applied, treating the data series for temporal properties unit roots and co integration. He showed that exchange rate volatility and equity price fluctuations no significant effect on banks and that the fluctuation of the stock index caused the naira to depreciate and there was no reverse causality. Changes in bank loans also led to equity price fluctuations and again, there was no evidence of reverse causality.

Mlambo, et al (2013), assessed the effects of currency volatility on the Johannesburg Stock Exchange. The Generalised Autoregressive Conditional Heteroskedascity (1.1) (GARCH) model was used in establishing the relationship between exchange rate

volatility and stock market performance. Monthly data for South Africa spanning the period, 2000 – 2010. A very weak relationship between currency volatility and the stock market was confirmed. The research finding is supported by previous studies. Prime overdraft rate and total mining production were found to have a negative impact on Market capitalisation. Surprisingly, US interest rates were found to have a positive impact on Market capitalisation. The study recommended that, since the South African stock market is not really exposed to the negative effects of currency volatility, government can use exchange rate as a policy tool to attract foreign portfolio investment. The weak relationship between currency volatility and the stock market suggests that the JSE can be marketed as a safe market for foreign investors. However, investors, bankers and portfolio managers still need to be vigilant in regard to the spillovers from the foreign exchange rate into the stock market. Although there is a weak relationship between rand volatility and the stock market in South Africa, this does not necessarily mean that investors and portfolio managers need not monitor the developments between these two variables.

The foregoing revealed that, although the literature is replete with empirical works the findings on the relationship between exchange rate volatility and share price fluctuations (movement) is mixed thus keeping the debate open. This study is therefore embarked upon as a contribution to the ongoing debate.

III. METHODOLOGY AND DATA

This study employed both univariate and bivariate time series econometric technique. The univariate technique in form of the Autoregressive conditional heteroskedasticity family of model was used to examine the responsiveness of exchange rate to information shocks while the bivariate technique was used to examine the effect of exchange rate volatility on stock price fluctuations.

3.1 Model Specification

This study, specifically employs the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model. The GARCH model was developed by Tim Bollerslev (1986) and its general form is specified as follow:

$$Y_t = \alpha + \beta' X_t + u_t \quad . \ . \ . \quad (1)$$

$$u_t|\Omega_t \sim iid\ N(0, h_t)$$

$$h_t = \varphi_0 + \sum_{i=1}^{p} \delta_i h_{t-i} + \sum_{j=1}^{q} \gamma_i u_{t-j}^2 \quad . \ . \ . \quad (2)$$

Equation (1) is the mean equation. It states that exchange rate (share prices), Y_t depends on so covariates, X_t which may include own lags and or other exogenous variables and u_t is the disturbance term. Where u_t given the information set Ω_t at time t is identical and identical and dependently distributed with zero (0) mean and h_t variance. Equation (2) is the variance equation and it states that the value of the variance scaling parameter h_t depends both on past shocks (volatility), which are captured by the lagged squared residual terms, and on past values of itself, which are capture by lagged h_t terms.

If p=q=1 the model is GARCH(1,1) and Bollerslev (1986) noted that this specification usually performs very well and is easy to estimate. He also noted that the GARCH(1,1) model is equivalent to an infinite order ARCH model with coefficients that decline geometrically, which makes it reasonable to estimate a GARCH(1,1) model as alternative to higher order ARCH models because with the GARCH (1,1) model one has less parameters to estimate and thus lose fewer degrees of freedom.

To identify the direction of causality between exchange rate movements and returns on share prices the granger causality test is adopted. A general form of the test equation is presented as follows:

$$aspi = a + \sum_{i=1}^{p} \beta_i exr_{t-i} + \sum_{i=1}^{q} \delta_i aspi_{t-i} + u_{1t} \quad . \ . \ . \quad (3)$$

$$exr = b + \sum_{i=1}^{p} \gamma_i exr_{t-i} + \sum_{i=1}^{q} \varphi_i aspi_{t-i} + u_{2t} \quad . \ . \ . \quad (4)$$

Where all the variables remain as earlier defined. p and q are optimum lag length that is empirically determined using the information criteria. If β_i's in (3) are statistically significant and φ_i's in (4) are not, a unidirectional causality runs from exr to aspi but if β_i's are not statistically significant and φ_i's are then causality runs from aspi to exr and not the other way round. Furthermore, if β_i's and φ_i's are simultaneously statistically significant then there is feedback (bidirectional causality) exr causes aspi and aspi also causes exr. Finally, if both β_i's and φ_i's are statistically not significant then there is independence, exr does not cause aspi and apsi does not cause exr.

3.2 Data

The study employed monthly time series data spanning January 1985 to December, 2012. This period is chosen due to availability of data. The period also marked the transition from fixed exchange rate regime to market determined (floating) and or dirty (managed) – floating exchange rate regimes in Nigeria. The use of monthly data is informed by the fact that high frequency data produce better and more robust results in measuring volatility.

IV. RESULTS AND DISCUSSION

A GARCH (1, 1) model was estimated to examine exchange rate volatility, results for which are presented on table 1. The one-period lagged exchange rate term, LOG(EXR(-1)) in the mean equation showed positive sign as expected and it is statistically significant. It specifically revealed that the foreign exchange market is well behaved such that the future exchange rate cannot be predicted accurately (i.e. the

exchange rate follows a random walk process). For the variance equation the results show that both the ARCH and GARCH terms are positive and statistically significant at the 1 percent level, indicating that information flow has significant impact on naira exchange rate uncertain. The model however did not allow for information asymmetry therefore both bad (negative information) and good (positive information) news have the same and equal impact on exchanger rate uncertainty. People react the same way whenever there is information shock, it does not matter whether or not the information shock is a positive one. So long as there is information shock of one unit the level of uncertainty (conditional variance) increases by 51 percent. This model is robust to serial correlation and further ARCH effect as indicated by the ARCH LM test for serial correlation on table 4 and the LM test for ARCH effect on table 5.

Table 1: Exchange Rate Volatility

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.034483	0.006168	5.590713	0.0000
LOG(EXR(-1))	0.998521	0.000799	1249.705	0.0000
Variance Equation				
C	0.000133	4.94E-05	2.684237	0.0073
RESID(-1)^2	0.621419	0.093738	6.629328	0.0000
GARCH(-1)	0.510324	0.041105	12.41523	0.0000
R-squared	0.998969	Mean dependent var		8.300719
Adjusted R-squared	0.998966	S.D. dependent var		1.901909
S.E. of regression	0.061168	Akaike info criterion		-3.235539
Sum squared resid	1.242181	Schwarz criterion		-3.178486
Log likelihood	545.3350	Hannan-Quinn criter.		-3.212791
Durbin-Watson stat	1.693409			

An examination of the exchange rate conditional variance (volatility or uncertainty) in figure 1 revealed that the naira exchange rate experienced wild swings (periods of high volatility clustering) where high exchange rate volatility followed one another. The market became highly volatile between 2008 and 2010 and was relatively calm in other periods.

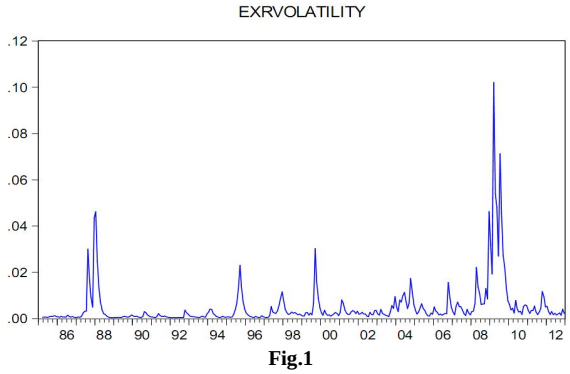


Fig.1

To measure the effect of exchange rate volatility on share price fluctuations the GARCH variance (exchange rate volatility) from the exchange rate GARCH (1 1) model is relevant. The results for the return on shares and share price volatility are presented on table 2. Both LOG(ASPI(-1)) and EXRVOALTILITY showed positive signs but it is LOG(ASPI(-1)) that was statistically significant, indicating that exchange rate volatility has no significant impact on returns to share prices, rather it was share price expectations that helps to explain returns on share prices. If share prices is expected to increase by 1 percent returns on share prices increase by 0.99 percent. However, EXRVOALTILITY became negative and significant in the variance equation, indicating that exchange rate volatility is negatively related to share price fluctuations.

Table 2: Share price Fluctuations

Dependent Variable: LOG(ASPI)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.049630	0.043933	1.129666	0.2586
LOG(ASPI(-1))	0.990048	0.010316	95.97279	0.0000
EXRVOLATILITY	0.048408	0.491998	0.098390	0.9216
Variance Equation				
C	0.011496	0.003106	3.701220	0.0002
RESID(-1)^2	0.014505	0.038282	0.378904	0.7048
GARCH(-1)	0.591717	0.107967	5.480560	0.0000
EXRVOLATILITY	-0.207798	0.041088	-5.057364	0.0000
R-squared	0.994774	Mean dependent var		3.538646
Adjusted R-squared	0.994742	S.D. dependent var		1.500695
S.E. of regression	0.108818	Akaike info criterion		-1.404556
Sum squared resid	3.919470	Schwarz criterion		-1.324681
Log likelihood	241.5608	Hannan-Quinn criter.		-1.372709
Durbin-Watson stat	2.018495			

Source: Author's Computation

The pairwise granger causality test is presented on table 3 and the results shows a unidirectional causality running from LOG(ASPI) to LOG(EXR). It is share price expectations that help to predict exchange rate movements. This reinforces the earlier finding that exchange rate volatility has no significant impact on returns to share prices and further clears the ground on whether or not share price fluctuations affects exchange rate variability.

Table 3: Pairwise Granger Causality Tests

Source: Author's Computation

CONCLUSION AND RECOMMENDATIONS

The conclusions drawn from this study are: (i) the naira exchange rate is highly volatile and responds significantly to information shock; (ii) exchange rate volatility has no significant impact on returns to share prices; (iii) share price expectations impacts positively on share price returns; (iv) exchange rate volatility impacts negatively on share price

fluctuations and; (v) causality runs from share prices to exchange rate and not the other way round. This study is therefore similar to that of Soenen and Hennigar (1988), Maysami-Koh (2000), Aggarwal (1981), Najang and Seifert (1992), Solnik (1987), Osisanwo and Atanda (2012), Yaya and Shittu (2010), who showed that exchange rate has a significant impact on share price volatility, and Mbutor (2010) who showed causality running from share price index to exchange rate. This study differs from that of Najang and Seifert (1992), Ajayi et al. (1998), Smyth and Nandha (2003) and Vygodina(2006) who showed unidirectional causality running from exchange rate volatility to share price fluctuation, and Smyth and Nandha (2003) who showed feedback relationship in some countries. It is therefore recommended that stabilization policy be put in place to strengthen the naira, since exchange rate volatility creates uncertainty. This could mean interventions in the exchange rate market in times of abnormal volatility. This could boost investors' confidence. The macroeconomic environment should be one that encourages production and export diversification.

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Table 4: Share price Volatility Residual Correlogram

Date: 29/07/14 Time: 10:54
Sample: 1985:03 2012:12
Included observations: 334

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
.|.	.|.	1	0.011	0.011	0.0383	0.845
.|.	.|.	2	-0.023	-0.023	0.2098	0.900
.|.	.|.	3	-0.032	-0.032	0.5616	0.905
.|.	.|.	4	0.027	0.027	0.8044	0.938
.|.	.|.	5	-0.029	-0.031	1.0971	0.954
.|.	.|.	6	-0.009	-0.008	1.1241	0.980
.|.	.|.	7	-0.018	-0.018	1.2416	0.990
.|.	.|.	8	0.015	0.012	1.3171	0.995
.|.	.|.	9	-0.015	-0.015	1.3931	0.998
.|.	.|.	10	-0.040	-0.041	1.9395	0.997
.|.	.|.	11	-0.003	-0.002	1.9433	0.999
.|.	.|.	12	-0.001	-0.006	1.9436	0.999
.|.	.|.	13	-0.028	-0.030	2.2248	1.000
.|.	.|.	14	-0.026	-0.025	2.4587	1.000
.|.	.|.	15	-0.044	-0.047	3.1319	0.999
.|.	.|.	16	-0.023	-0.027	3.3259	1.000
.|.	.|.	17	-0.019	-0.023	3.4587	1.000
.|.	.|.	18	-0.012	-0.016	3.5091	1.000
.|.	.|.	19	-0.038	-0.042	4.0252	1.000
.|.	.|.	20	-0.016	-0.023	4.1178	1.000
.|.	.|.	21	-0.010	-0.016	4.1555	1.000
.|.	.|.	22	0.018	0.010	4.2664	1.000
.|.	.|.	23	-0.005	-0.011	4.2763	1.000
.|.	.|.	24	0.021	0.015	4.4372	1.000
.|.	.|.	25	-0.011	-0.018	4.4815	1.000
.|.	.|.	26	0.006	-0.001	4.4938	1.000
.|.	.|.	27	0.001	-0.002	4.4942	1.000
.|*	.|.	28	0.077	0.069	6.6440	1.000
.|.	.|.	29	0.006	-0.001	6.6562	1.000
.|.	.|.	30	0.009	0.005	6.6866	1.000
.|.	.|.	31	-0.002	-0.001	6.6880	1.000
.|.	.|.	32	-0.025	-0.034	6.9131	1.000
.|.	.|.	33	-0.030	-0.030	7.2471	1.000
.|.	.|.	34	-0.027	-0.033	7.5137	1.000
.|.	.|.	35	-0.009	-0.014	7.5425	1.000
.|.	.|.	36	-0.008	-0.016	7.5654	1.000

Table 5: Test for further ARCH effect in Share price Volatility Equation

Heteroskedasticity Test: ARCH

F-statistic	0.011036	Prob. F(36,261)	1.0000
Obs*R-squared	0.452947	Prob. Chi-Square(36)	1.0000

Test Equation:
Dependent Variable: WGT_RESID^2
Method: Least Squares

Date: 29/07/14 Time: 10:54
Sample (adjusted): 1988:03 2012:12
Included observations: 298 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.368472	0.278448	1.323305	0.1869
WGT_RESID^2(-1)	-0.005853	0.061897	-0.094565	0.9247
WGT_RESID^2(-2)	-0.006029	0.061896	-0.097403	0.9225
WGT_RESID^2(-3)	-0.006001	0.061897	-0.096958	0.9228
WGT_RESID^2(-4)	-0.005328	0.061897	-0.086079	0.9315
WGT_RESID^2(-5)	-0.006080	0.061897	-0.098226	0.9218
WGT_RESID^2(-6)	-0.005091	0.061897	-0.082243	0.9345
WGT_RESID^2(-7)	-0.006398	0.061896	-0.103365	0.9178
WGT_RESID^2(-8)	-0.006135	0.061896	-0.099121	0.9211
WGT_RESID^2(-9)	-0.006311	0.061895	-0.101962	0.9189
WGT_RESID^2(-10)	-0.006478	0.061895	-0.104655	0.9167
WGT_RESID^2(-11)	-0.005575	0.061895	-0.090075	0.9283
WGT_RESID^2(-12)	-0.005566	0.061895	-0.089921	0.9284
WGT_RESID^2(-13)	-0.005396	0.061894	-0.087179	0.9306
WGT_RESID^2(-14)	-0.006293	0.061893	-0.101675	0.9191
WGT_RESID^2(-15)	-0.006496	0.061891	-0.104965	0.9165
WGT_RESID^2(-16)	-0.006569	0.061890	-0.106135	0.9156
WGT_RESID^2(-17)	-0.006427	0.048981	-0.131219	0.8957
WGT_RESID^2(-18)	-0.005946	0.048982	-0.121389	0.9035
WGT_RESID^2(-19)	-0.004935	0.048982	-0.100747	0.9198
WGT_RESID^2(-20)	-0.005541	0.048981	-0.113124	0.9100
WGT_RESID^2(-21)	-0.006463	0.048981	-0.131942	0.8951
WGT_RESID^2(-22)	-0.005597	0.048982	-0.114271	0.9091
WGT_RESID^2(-23)	-0.005670	0.048983	-0.115750	0.9079
WGT_RESID^2(-24)	-0.006167	0.048983	-0.125898	0.8999
WGT_RESID^2(-25)	-0.006356	0.048983	-0.129768	0.8969
WGT_RESID^2(-26)	-0.006002	0.048984	-0.122537	0.9026
WGT_RESID^2(-27)	-0.006263	0.048985	-0.127857	0.8984
WGT_RESID^2(-28)	0.008491	0.048986	0.173339	0.8625
WGT_RESID^2(-29)	-0.006449	0.048987	-0.131657	0.8954
WGT_RESID^2(-30)	-0.006554	0.048987	-0.133789	0.8937
WGT_RESID^2(-31)	-0.006369	0.048988	-0.130006	0.8967
WGT_RESID^2(-32)	-0.005894	0.048988	-0.120324	0.9043
WGT_RESID^2(-33)	-0.005741	0.048989	-0.117187	0.9068
WGT_RESID^2(-34)	-0.005658	0.048991	-0.115498	0.9081
WGT_RESID^2(-35)	-0.006539	0.048993	-0.133475	0.8939
WGT_RESID^2(-36)	-0.006552	0.048995	-0.133736	0.8937

R-squared	0.001520	Mean dependent var	0.289429
Adjusted R-squared	-0.136201	S.D. dependent var	3.877043
S.E. of regression	4.132646	Akaike info criterion	5.791462
Sum squared resid	4457.558	Schwarz criterion	6.250497
Log likelihood	-825.9279	Hannan-Quinn criter.	5.975210
F-statistic	0.011036	Durbin-Watson stat	2.000108
Prob(F-statistic)	1.000000		

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