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Abstract
We investigate key macroeconomic factors that impact the price returns of precious metals markets. The markets investigated were gold, silver, platinum and palladium; whereas the macroeconomic factors accommodated business cycle, monetary environment and financial market sentiment factors. The key findings present limited evidence that the same macroeconomic factors jointly influence the volatility processes of the precious metal price series, although there is some evidence of volatility feedback between the precious metals. This finding lends weight to views that individual commodities are too distinct to be considered a single asset class or represented by a single index; a finding of considerable importance for portfolio managers and investors.

The Macroeconomic Determinants of Volatility in Precious Metals Markets

1. Introduction

Trading in commodities, in both cash and derivatives markets, as an alternative investment class to traditional portfolios comprising stocks and bonds has grown significantly in recent years. This reflects their use both as individual investments and as part of the diversified portfolios of hedge and other investment funds (Edwards and Caglayan, 2001), although individual investors have clearly been attracted to the spectacular gains in prices made in recent years and especially following the collapse of equity markets in March of 2000. Volumes now traded are significant. For example, as at June 2007 commodity contracts outstanding, comprising agricultural commodities as well as metals, oils and other resource commodities, were in excess of US$7.6 trillion compared with equity related contracts of US9.2 trillion. Of these totals gold and trading in other key precious metals (silver, platinum and palladium) comprised a significant US$0.5trillion in outstandings (BIS, 2008: Table 19). Given the economic significance of the precious metals market it is surprising the paucity of published research investigating the price dynamics and linkages between these assets as well as between precious metals and other asset classes.

Our primary goal in this article is add to the existing knowledge of these price relationships as well as determining the precise nature and role of precious metals trading both as individual assets and as a general asset class. To accomplish this task we investigate the macroeconomic determinants of volatility in the precious metals market defined by those financial contracts on gold, silver, platinum and palladium. We argue that existing theoretical and empirical relationships evident in key macreoeconomic factors that are known to drive stock markets (Chen, 1991; Kearney, 2000; Racine, 2001; Flannery and Protopapadakis, 2002), should also be present and impact upon the volatility structure of this relatively homogeneous subset of commodities, if one could speak of commodities as a single asset class. We include in our empirical analysis macroeconomic factors that are known to be important for these metals, considering their economic and industrial uses (Abanomey and Mathur, 2001; Ciner, 2001; Erb and Harvey, 2006; Fleming et al. 2006).

Our study also offers several additional contributions. First, although there is significant prior work on the macroeconomic determinants of volatility in equity markets, little evidence exists from other non-financial markets. If similar factors are important in all or at least other asset markets, it could be argued that they should figure in arbitrage based asset pricing models. While to the best of our knowledge this is the first paper to provide empirical evidence on this issue in commodity markets, it usefully extends Ross (1989), who argues that since volatility is a proxy for information flow, focusing on the volatility structure rather than returns, provides additional and valuable insights into portfolio and price dynamics.

Second, our focus on precious metals permits us to analyze the nature of the arbitrage and price relationship between the gold and silver markets, which have also been discussed in prior work. For instance, it is frequently argued, especially by practitioners, that since gold behaves like surrogate money it provides a hedge against inflation and hence, should be considered among the choices for investment by both households and institutions. Since silver has significant industrial uses, as mentioned by Erb and Harvey (2006) among several others, its use for these purposes may not be so clear cut. Thus, our empirical study will also provide useful evidence on the substitutability of gold and silver, as suggested by their historical use as coinage, or whether they occupy separate markets with different uses and functions, as has been suggested in the recent finance literature (eg. Ciner, 2000; Erb and Harvey, 2006).

The remainder of the paper is organized as follows. Next, a brief review of the key literature is undertaken; then, the statistical method and data used in the analysis is discussed. The key findings are then discussed in section 4, while the final section (5) provides some concluding remarks.

2. Related Literature

Commodities are important economically since fluctuations in their prices tend to impact on the viability of production and investment decisions made by firms. In this sense, they clearly impact upon the general level of economic activity (Bernard et al. 2006) as well as having a key role in the formation of inflationary expectations. For financial researchers, commodities are also of interest for their potential role in asset allocation decisions. In this regard, recent papers by Abanomey and Mathur (2001), Georgiev (2001), Nijman and Swinkels (2003) and Chan and Young (2006) argue that commodities provide risk reduction in portfolios along with stocks and bonds. Similarly, Edwards and Caglayan (2001) show that commodity funds provide higher returns when stocks perform poorly, while Chow et al. (1999) suggest that commodities are in fact more attractive when the general financial climate is negative. This evidence argues of a positive contribution from the inclusion of key commodity contracts for trading and investment. Of particular interest in recent years has been the market for precious metals, with large rises in gold and silver prices and associated increases in other related metals.

Two recent studies provide detailed accounts of the potential risk-return tradeoff in commodity markets. Gorton and Rouwenhorst (2006) focus on the behavior of the one of the most commonly used indexes, namely the Goldman Sachs Commodity Index (GSCI). These authors construct the equally-weighted monthly GSCI index for the period between 1959 and 2004 and show that this index has the same risk premium as equities, although the actual risk was less during the period. Importantly, they point to a negative correlation of the GSCI index with stocks and bonds, indicating important financial benefits to investors from including commodities in portfolio diversification strategies. In addition, there is a useful hedging advantage linked to the importance of commodity prices to underlying inflation. The conclusions of Gorton and Rouwenhorst (2006) imply that commodities can be best viewed as a single asset class that have attractive risk-return patterns and furthermore, are useful for portfolio diversification. This last point is of considerable significance for hedge and investment fund managers who are limited in their international investments due to the increasing integration of international stock and bond markets.

Erb and Harvey (2006), however, focus on the composition of the main commodity market indexes used in practice, including the GSCI, and investigate whether these indexes provide a representation of the aggregate commodity market. They question whether commodity markets can actually be considered as a single asset class since differences in the behavior of prices between individual commodities seem significant. In their empirical work, they demonstrate that historically commodity futures returns have largely been uncorrelated with one other and they caution against extrapolating historical returns on an index like the GSCI into the future. In fact, they argue that it should be questioned whether the commodity markets can be represented by a single index, which appears contrary to the contentions raised by Gorton and Rouwenhorst (2006).

3. Method and Data

(a) Method

Following the results of prior work, (e.g. Strongin and Petsch, 1995; Vrugt et al.,2004; Rouwenhurst and Gorton, 2006; Fleming et al. 2006) we posit that precious metals prices are related to a key set of macroeconomic variables that represent the broader monetary environment (such as inflation and monetary aggregates), the business cycle (such as industrial production) and financial markets conditions (such as the US dollar exchange rate, stock index returns and consumer confidence indexes). These are discussed in greater detail in the next section. Hence, the expected returns can be expressed as:

$$E_t(r_t^M \mid I_{t-1}) = f(E_t \mid C_t(X_t)) \qquad (1)$$

where r is the return on a precious metal (M = gold, palladium, platinum or silver) at time = t, conditional on the information (I) available at the previous time interval time (t-1).

Note that this process assumes the price return is characterized as a submartingale process (Ross, 1989) and X denotes the vector of macroeconomic explanatory variables at time t. Since we are interested in volatility linkages, the conditional standard deviation of returns can be written as:

$$E_t(\sigma_t \mid I_{t-1}) = f(E_t(\sigma_t^x)) \qquad (2)$$

Macroeconomic factors are observed monthly, therefore, we rely on the methodology developed by Davidian and Carroll (1987) when estimating the conditional standard deviations. It is noteworthy that this approach is used in prior work by Sadorsky (2003), Kearney (2000) and Kautolas and Kryzanowski (1996) among others. Allow σ_t^x to denote the unconditional standard deviation of the vector of macroeconomic variables and h_t^x to denote the conditional standard deviations of these variables. The conditional standard deviations are then estimated as $h_t^x = \sigma_t^x - u_{2,t}^x$ utilizing the equation below, where

$$\sigma_t^x = \beta_1(L)\sigma_t^x + \sum_{j}^{12} \beta_{s,j} DUM_{j,t} + u_{t,t}^x \qquad (3)$$

and $\beta_1(L)$ is a 12[th] order polynomial in the lag operator, while *DUM* is a monthly seasonal dummy variable. The series $\sigma^x = \mid u_{1,t}^x \mid$ is calculated as the residuals from the following regression

$$u_{1,t}^x = \Delta X_t - E_t(\Delta X_t \mid I_{t-1}) = \Delta X_t - \lambda_1(L)\Delta X_t - \sum_{j=1}^{12} \lambda_{s,j} DUM_{j,t} \qquad (4)$$

This approach is based on the notion that standard deviations based on the absolute value of the prediction errors are more robust than measures based on the squared residuals alone (Davidian and Carroll, 1987). Moreover, as argued by Sadorsky (2003), the conditional volatility series generated by this approach can be regarded as a generalization of the 12-month rolling standard deviation estimator used in Fama (1984). The generated statistic allows the conditional mean to vary over time (Equation 4), permits varying weights on the lagged absolute unpredicted changes in returns (Equation 3), and hence is consistent with ARCH models now commonly used in financial markets research, which accommodate time varying volatility and autocorrelation evident in financial asset returns. Finally, the testing equation for the relation between conditional volatilities of precious metal returns and macroeconomic variables can be simply written as

$$h_t^M = \alpha_o + \alpha_1(L)h_t^X + u_{3,t} \tag{5}$$

where M denotes the precious metals considered in the paper and X is the set of key macroeconomic variables, as mentioned above.

(b) Data

We employ a large set of macroeconomic variables to investigate the underlying causes of volatility in precious metals markets. Our data include variables that are well known as usefully accounting for the effects of the business cycle, monetary environment and financial market sentiment on asset returns. As mentioned in the introduction, linkages between the macroeconomy and commodity price movements have been documented in Strongin and Petsch (1996) and Gorton and Rouwenhorst (2006). Additionally, Pesaran and Timmermann (1995) suggest macro variables could help increase trading results in equity markets via time strategies and in fact, Vrugt et al. (2004) and Chan and Young (2006) consider various trading strategies in commodity markets. Our rationale in choosing the explanatory variables for the present study largely follows these papers. Chen (1991) argues that dividend yield and the default spread are associated with business cycle conditions and hence, we include annualized dividend yields on both S&P 500 and the World excluding the US stock indexes in our analysis. Also, we use the annualized yield spread between corporate bonds, given as the yield spread between Moody's rated BAA- and AAA-bonds, as our default spread. Additionally, we include change in industrial production, calculated as change in year-over-year figures, to capture the link between the business cycle and annual production growth.

With regard to monetary environment variables, Gorton and Rouwenhortst (2006) argue commodities are inflation hedges and hence, we include the rate of inflation (calculated as year-over-year) in the data set. Furthermore, we include the monetary aggregate M2, which is likely to be important to describe changes in monetary conditions in the economy and for financial market sentiment variables, we rely on the stock market returns, using both the total return on the S&P 500 and World ex US indexes. In addition, we include the consumer confidence index for the US, since the US is the most important market for the consumption of commodities, and the trade weighted US dollar index, similarly since precious metals are denominated in US dollars. All data are obtained from *Datastream.*

(Insert Table 1 about here)

4. Empirical Findings

(a) Preliminary Analysis

We first report the estimation results for equations (5) and (4) in Table 1, which are used to obtain the conditional volatility estimates of the variables in our data set. The results for equation (5), reported in the upper panel of Table 1, suggest that there is significant dependency in some of the variables in our sample, such as the dividend yield on both S&P 500 and World-ex-US indexes, and various macroeconomic variables including money supply, industrial production and inflation. This is supported by both statistically significant *F-tests* for joint exclusion of dependent variables in the equation and also, by relatively large *R-squared* values. This is noteworthy since equation (5) focuses on the predictability of the growth rate of the series. However there is little evidence for monthly seasonality in the variables, again evidenced by the *F-tests* reported in the table. Moreover, Ljung-Box *Q-tests* for autocorrelation at 24 lags do not indicate any remaining dependency in the residuals of equation (5) for any of the variables.

Estimation results for equation (4), which focus on unconditional standard deviations of the variables, are reported in the lower panel of Table 1. It can be observed that there is dependency in unconditional standard deviations of precious metal prices, consistent with the notion that there is a general dependency in volatility present in financial markets. In addition, dividend yields, money supply and inflation series also exhibit dependency, while there is little evidence of seasonality. It also appears that autocorrelation in the series are fully accounted for, evidenced by the insignificant values of the Ljung-Box *Q-tests* on the residuals.

(Insert Table 2 about here)

Next, we present the summary statistics of the estimated conditional standard deviations that are used in our primary regression analysis. As reported in Table 2, the highest conditional standard deviation is for our term structure variable (a mean of 1.001) followed by dividend yields on the US and World stock indexes (means of 0.915 and 0.770 respectively). There is evidence of excess kurtosis in several of the series, indicating deviations from the expected normal distribution. It is also important to determine whether the estimated series contain a unit root, or are nonstationary, since this will directly affect the regressions. We rely upon conventional Augmented Dickey-Fuller and Phillips-Perron tests to investigate this issue and report these findings in Table 3. The results of this investigation suggest that all estimated series can be characterized as stationary and hence, can be used in standard regression analysis.

(Insert Table 3 about here)

(b) Main Estimation Results

In this section, we report the analysis of the determinants of conditional volatility in the precious metals markets used in our sample. The findings, which are reported in Table 4, put forward several points. First, regarding the main research question of the paper, we find no evidence that the same macroeconomic factors influence the volatility processes of the commodity price series examined in this paper. This seems to be consistent with the arguments raised by Erb and Harvey (2006) that individual commodities are too distinct to be considered as a single asset class and represented by an index, which is contrary to the arguments of Gorton and Rouwenhorst (2006).

Focusing on individual precious metals, we find that gold is largely affected by monetary variables, such as the term premium and money supply. It can be argued that this finding is largely consistent with the notion that gold can be regarded as a financial asset, perhaps acting as a surrogate currency, and hence, its price movements are sensitive to the actions of monetary authorities (or central banks).

We also detect significant dependency in the conditional volatility of gold prices on its own lags, which is of course consistent with the ARCH effects documented and well known in the financial literature. In fact this phenomenon is also observed in the other precious metal prices. Furthermore, there is evidence of volatility spillover from silver prices to gold markets indicated by the significant test statistics on the lagged silver conditional volatility variable. The results for the palladium markets are similar to those for gold with volatility spillover from lagged gold series to palladium. We find that conditional volatilities of financial variables, both S&P 500 and its dividend yield, as well as money supply are significant as determinants of the volatility of palladium prices.

The findings for platinum and silver present a different picture. Specifically, we find that none of the macroeconomic variables usefully explain the volatility structure of these precious metals. This is particularly interesting for silver since prior empirical research argues that silver has significant economic uses and can be considered an industrial metal

Erb and Harvey, 2006). Furthermore, these results seem to indicate that the link between gold and silver, again investigated in several articles (eg. Ciner, 2001; Georglev, 2001), is weak. Overall, these findings present evidence against the use of gold and silver as a hedge against similar risks in stock portfolios. However, we do detect a feedback, bivariate volatility spillover, relation between gold and silver markets that might be exploitable by option traders, who are more concerned with volatility movements between assets than simply changes in prices between assets.

(Insert Table 4 about here)

(c) Robustness Analysis

In this section, we conduct a subperiod analysis to determine whether the conclusions are robust in different time periods. We divide the sample into two subperiods and report the findings from the first half in Table 5 and the second half in Table 6. Importantly, the findings are somewhat different relative to the full sample analysis, with important time-varying properties evident in the impact of the macroeconomics variables on the precious metals returns. For example, we detect that volatility in the gold market is impacted by conditional volatility of the dollar index in the first subperiod (but not the second), although the first subperiod finding is largely consistent with the view that gold is a financial asset.

(Insert Table 5 and Table 6 about here)

We also find that palladium volatility is sensitive to volatility in financial markets, in particular the conditional volatilities of S&P 500 returns and its dividend yield, which is again largely similar to the findings of the full sample. Platinum volatility is also impacted by stock market volatility in the first half of the sample, although this was not observed in the full sample analysis. Interestingly silver volatility, is largely unaffected by any of the macroeconomic variables for the full and first subperiod, although there is some evidence of effects from the term structure variable upon silver returns in the second half. This would be consistent with expectations of future silver demand based upon business cycle effects..

Overall, analysis in the second half of the sample, however, paints a different picture to the earlier findings. In summary, our models lose their explanatory power in the latter part of the sample as none of the macroeconomic variables figures significantly. This could indicate changes in the dynamics of these markets and the fundamental variables that affect them. It is also possible that this finding is due to the great price increase in the precious metals markets, which occurred during the second half. If the momentum effects dominate and are largely responsible for volatility in these markets, the statistical analysis may not capture the linkage with more fundamental macroeconomic variables in a subperiod analysis. It would be of interest to investigate this issue further in future work to uncover the underlying market dynamics.

5. Concluding Remarks

The key objective of this paper was to investigate and present the key macroeconomic factors that impact the price returns of precious metals markets. The markets investigated were gold, silver, platinum and palladium, whereas the macroeconomic factors considered were variables that are well known as usefully accounting for the effects of the business cycle, monetary environment and financial market sentiment on asset returns. The study extends existing work in this area, including papers in commodity markets by Strongin and Petsch (1996) and Gorton and Rouwenhorst (2006) and those in stock markets, such as Pesaran and Timmermann (1995), Vrugt et al. (2004) and Chan and Young (2006). The key findings present limited evidence of the same macroeconomic factors jointly influencing the volatility processes of the commodity price series examined, although there is limited evidence of volatility feedback between the precious metals. This finding lends weight to Erb and Harvey (2006) that individual commodities are too distinct to be considered as a single asset class or represented by a single index.

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Table 1- Estimation of Auxiliary Regressions

Panel A: Equation (5)	*F1*	*F2*	*Q(24)*	*R-sq*
S&P 500	.91	.37	.98	.08
S&P 500 Dividend Yield	.00	.48	.99	.98
World ex US	.82	.46	.92	.09
World ex US Dividend Yield	.00	.44	.99	.95
Term Structure	.29	.31	.99	.12
US M2	.00	.87	.34	.32
Industrial Production	.00	.04	.99	.18
Inflation	.00	.29	.99	.49
US Dollar Index	.00	.39	.95	.25
Consumer Confidence	.71	.01	.99	.19
Gold	.12	.48	.98	.12
Palladium	.71	.50	.95	.08
Silver	.45	.26	.99	.10
Platinum	.09	.39	.71	.12

Panel B: Equation (4)	*F1*	*F2*	*Q(24)*	*R-sq.*
S&P 500	.75	.83	.40	.07
S&P 500 Dividend Yield	.00	.88	.28	.15
World ex US	.12	.49	.93	.12
World ex US Dividend Yield	.24	.50	.94	.11
Term Structure	.20	.00	.99	.22
US M2	.00	.59	.99	.20
Industrial Production	.74	.00	.92	.16
Inflation	.02	.05	.98	.18
US Dollar Index	.60	.84	.97	.07
Consumer Confidence	.05	.44	.96	.13
Gold	.00	.79	.99	.15
Palladium	.13	.90	.36	.10
Silver	.00	.92	.97	.14
Platinum	.04	.39	.76	.13

Note- F_1 refers to an F-statistic to test for joint exclusion of all lagged dependent variables, while F_2 is similarly F-test for joint exclusion of all seasonal variables. P-values are reported. Q(24) is Ljung-Box Q test for auotocorrelation with 24 degrees of freedom.

Table 2: Summary Statistics of the Estimated Conditional Standard Deviations

	Mean	Std. Deviation	Skewness	Kurtosis
S&P 500	.028	.006	.070	.073
S&P 500 Div. Yield	.915	.275	.872	1.039
World ex US	.029	.089	.549	.272
World ex US Div. Yield	.770	.236	.245	-.291
Term Structure	1.001	.767	1.044	.403
US M2	.002	.000	1.069	2.464
Ind. Production	.328	.112	1.786	3.467
Inflation	.001	.000	.301	.093
US Dollar	.008	.001	-.173	.037
Con. Confidence	.046	.016	.704	.330
Gold	.026	.009	.996	2.271
Palladium	.066	.021	.385	-.201
Silver	.044	.014	.700	.830
Platinum	.037	.013	.344	-.042

Note- This table provides the descriptive statistics for conditional volatilities.

Table 3- Unit Root Tests of the Estimated Conditional Standard Deviations

	ADF	PP
S&P 500	-4.30	-15.46
S&P 500 Div. Yield	-5.08	-8.82
World ex US	-3.83	-10.83
World ex US Div. Yield	-4.68	-11.12
Term Structure	-8.17	-15.41
US M2	-3.35	-11.53
Ind. Production	-9.84	- 17.38
Inflation	-7.09	-10.86
US Dollar	-7.54	-19.99
Con. Confidence	-4.51	- 9.63
Gold	-3.68	-13.49
Palladium	-4.78	-10.59
Silver	-7.32	-10.55
Platinum	-8.33	-12.28

Table 4- Main Estimation Results

Variables	*Gold*	*Silver*	*Platinum*	*Palladium*
S&P 500	.42 (.79)	1.20 (.31)	1.65 (.16)	2.90 (.02)
S&P 500 DivY	.76 (.55)	.32 (.86)	.89 (.47)	2.53 (.04)
W ex US	.59 (.67)	.70 (.59)	1.62(.17)	.78 (.54)
W ex US DivY	1.73 (.14)	1.39(.24)	1.66 (.16)	1.67 (.16)
Term Prem	2.88 (.02)	1.15(.33)	1.09 (.36)	1.78 (.13)
M2	2.44 (.04)	.67 (.61)	.98 (.42)	2.48 (.04)
Ind Prod	.60 (.66)	1.00(.41)	1.23(.30)	.56 (.69)
Inflation	.73 (.56)	1.42(.23)	.77(.54)	.64(.63)
Dollar	1.88(.11)	.43 (.78)	.09 (.98)	.54 (.70)
Cons Conf	.19(.94)	.59 (.67)	.33 (.85)	1.70 (.15)
Gold Volatility	15.73(.00)	2.89 (.02)	4.75 (.00)	3.78 (.00)
Silver Volatility	2.87 (.02)	8.86 (.00)	1.76 (.14)	.98 (.42)
Plat Volatility	.85 (.49)	.83 (.50)	5.44 (.00)	1.64 (.16)
Palla Volatility	.69 (.60)	.17 (.95)	4.82 (.00)	10.57 (.00)
R-sq	.5353	.4496	.5469	.6778
Adj R-sq	.3707	.2546	.3863	.5635

Table 5- Subperiod Analysis: First Half of Sample

Variables	*Gold*	*Silver*	*Platinum*	*Palladium*
S&P 500	1.43(.24)	.94 (.45)	2.77 (.04)	2.33 (.07)
S&P 500 DivY	.46 (.76)	.79 (.53)	4.01(.00)	2.55 (.05)
W ex US	.95 (.44)	.45 (.76)	.27(.89)	1.61(.19)
W ex US DivY	1.41 (.25)	1.31(.28)	.31 (.86)	3.19 (.02)
Term Prem	1.07 (.38)	.37(.82)	1.69 (.17)	.90 (.47)
M2	.36 (.87)	1.16(.34)	1.43(.24)	.91 (.46)
Ind Prod	.62 (.65)	.59(.67)	1.05(.39)	1.03(.40)
Inflation	1.70(.17)	.25(.90)	.73(.57)	.76(.56)
Dollar	2.81(.04)	1.04(.39)	.08 (.98)	1.20(.32)
Cons Conf	2.09(.10)	.98 (.43)	1.65(.18)	.39 (.81)
Gold Volatility	1.64(.18)	1.35 (.27)	.29 (.87)	.24 (.91)
Silver Volatility	1.49 (.22)	1.09 (.37)	2.09 (.10)	.25(.90)
Plat Volatility	1.22(.32)	3.50(.01)	8.72 (.00)	1.97 (.12)
Palla Volatility	.75 (.56)	1.22(.31)	1.20 (.32)	4.64(.00)
R-sq	.7182	.6509	.8707	.7960
Adj R-sq	.2674	.0923	.6639	.4697

Table 6- Subperiod Analysis: Second Half of Sample

Variables	*Gold*	*Silver*	*Platinum*	*Palladium*
S&P 500	.15 (.96)	.64 (.63)	.41 (.80)	.50 (.73)
S&P 500 DivY	.99 (.42)	1.26(.30)	1.94(.12)	.33 (.85)
W ex US	.37 (.82)	1.32(.28)	.98(.42)	.36(.83)
W ex US DivY	.82 (.52)	1.15(.34)	1.25 (.30)	1.07(.38)
Term Prem	1.36 (.26)	2.10(.09)	2.49 (.06)	.28 (.89)
M2	.47 (.75)	1.35(.26)	.95 (.44)	.82(.51)
Ind Prod	.35 (.84)	1.27(.29)	.86(.49)	.29(.87)
Inflation	.48 (.74)	1.08(.37)	1.25(.30)	.14(.96)
Dollar	.25(.90)	1.27(.29)	.85 (.50)	.36 (.83)
Cons Conf	.53(.71)	1.73(.16)	.45 (.76)	.37 (.83)
Gold Volatility	3.28(.00)	1.86 (.13)	2.23 (.08)	.42 (.79)
Silver Volatility	1.02 (.41)	.16 (.95)	.68 (.60)	.17 (.95)
Plat Volatility	.98 (.43)	.98 (.42)	5.28 (.00)	.49 (.73)
Palla Volatility	.16 (.95)	1.61(.19)	.78 (.54)	.81(.52)
R-sq	.7030	.7630	.8079	.7233
Adj R-sq	.2536	.4042	.5172	.3046

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