



HEITMAN™

ANALYTICS

Sample Report

Market Sensitivity

30 Year, Fixed, Conforming Mortgages

DATA is for informational purposes and is "not specific" to any bank

Contact Us:

Phone: 1-800-727-7346

Fax: 541-344-1975

Email: info@heitmananalytics.com

Executive Summary

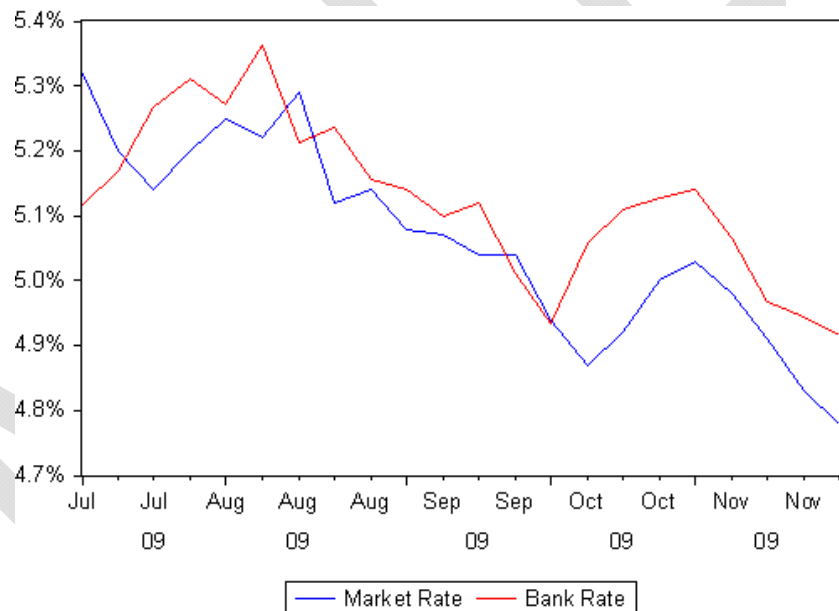
Determine the relationship between market rates and a specific product performance.

Period: 7/01/2009 – 11/30/09

	Market Rate	Bank Rate	Bank Volume
Mean	5.06%	5.12%	\$390,584,000
Maximum	5.32%	5.36%	\$794,853,500
Minimum	4.78%	4.91%	\$22,054,860
Std. Dev.	0.1502%	0.12%	\$18,897,671
Correlation	0.7874		
Observations	22		

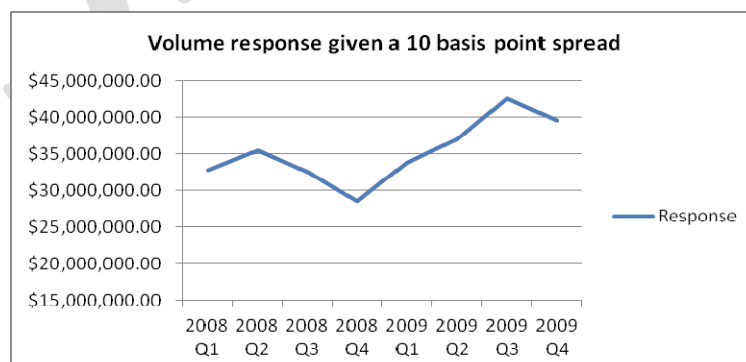
Heitman Market Rate compared against Bank Rate

Ranking	Correlation Strength Index
	Near Perfect Correlation
	Strong Correlation
	Moderate Correlation
	Weak Correlation
	No Correlation



Heitman Analytics Conclusions:

- I. A 10 basis point spread from the market rate has caused volume to respond by \$39,500,000.
- II. During 2009, 4th quarter market rates have become more highly correlated.
- III. Increased volume response is observed from overall market stabilization.



Market Sensitivity Report

30 Year Fixed Conforming

Abstract

The purpose of this report is to provide a quantitative understanding of product sensitivity to aggregate market movements. The duration of this study analyzes data collected from July 1st, 2009 to November 30th 2009.

The Data

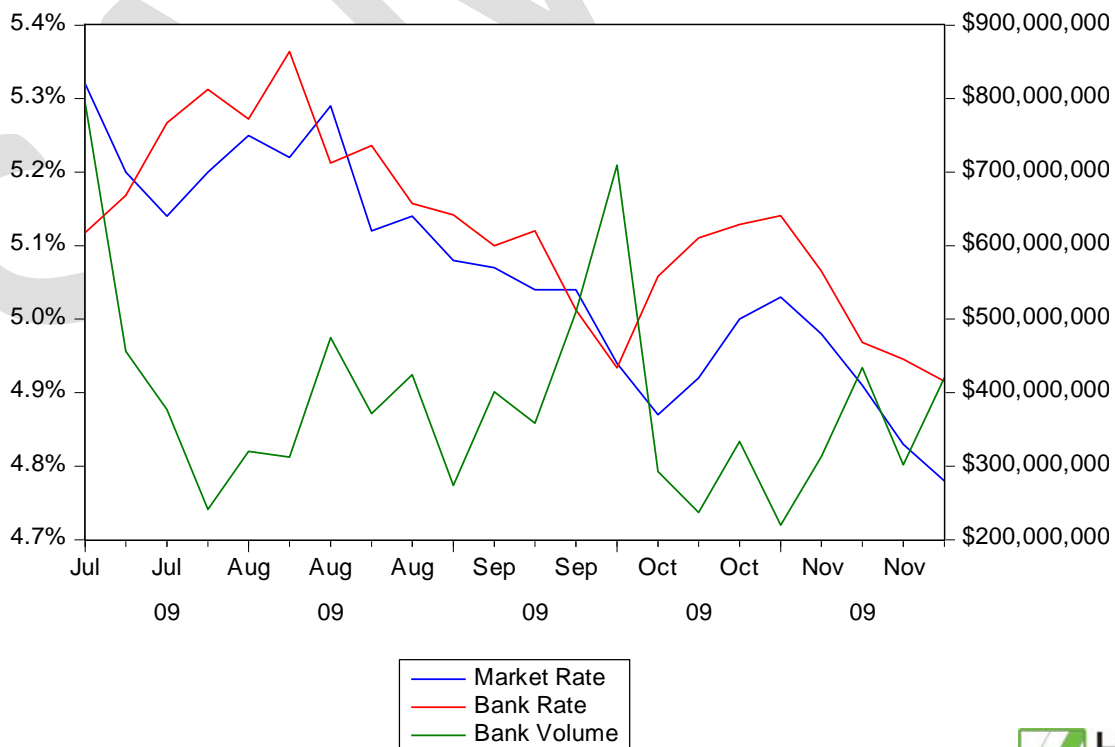
This report is built on a foundation of time series data. The primary variables used in this report are: market rate, the bank's lending rate, and the bank's volume for 30 year fixed conforming loans.

The market rate is generated in house at Heitman Analytics. This number represents a National weekly average rate for 30 year, fixed conforming mortgages.

The quoted bank lending rate is a weekly average rate specific to 30 year fixed conforming mortgages. Bank volume is the sum of total mortgage volume locked for a given week. *(Market volume is not disclosed in this report, but can be included upon request.)*

	Market Rate	Bank Rate	Bank Volume
Mean	5.06%	5.12%	\$390,584,000
Maximum	5.32%	5.36%	\$794,853,500
Minimum	4.78%	4.91%	\$22,054,860
Std. Dev.	0.1502%	0.12%	\$18,897,671
Correlation	0.7874		
Observations	22		

Ranking	Correlation Strength Index
	Near Perfect Correlation
	Strong Correlation
	Moderate Correlation
	Weak Correlation
	No Correlation



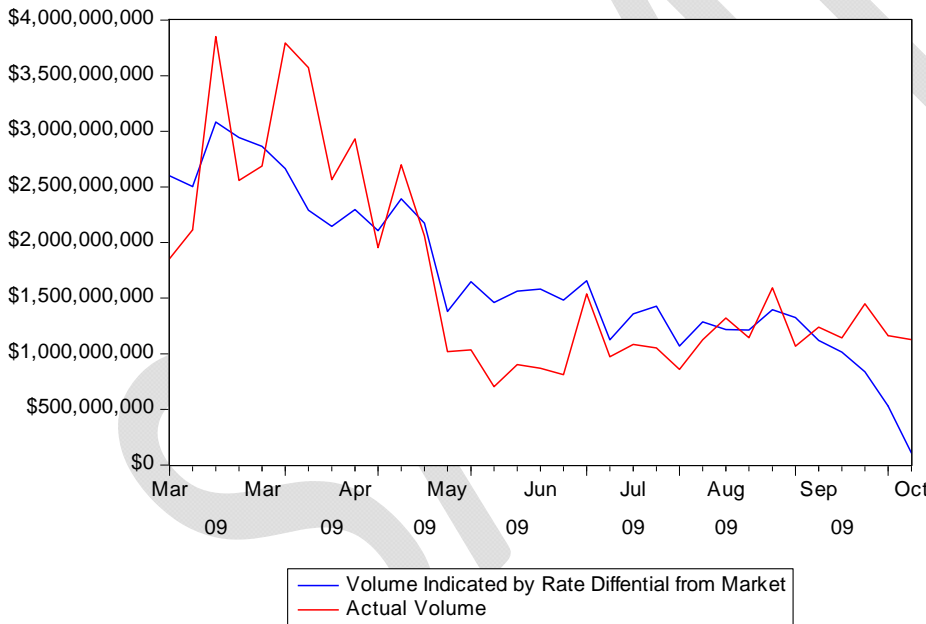
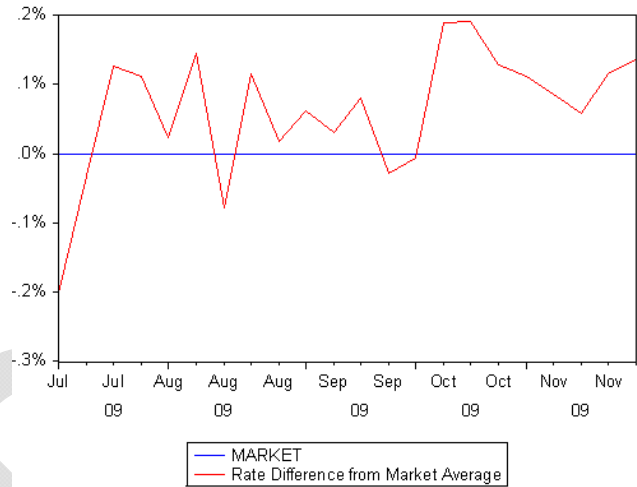
Heitman Analysis

A multi variable regression was used to generate the desired elasticity relationships. When specifying the economic model, the Log-Log or constantly elasticity model was chosen. After rigorous tests, this model has proved to be the most robust and statistically significant.

Heitman Analytics generates an in-house representation of the National rate for mortgages as well as specific regional rates. A national rate was chosen for use in this report. A spread was then generated depicting the rate difference between the specific bank rate, and the market.

(see graph right)

The spread was regressed and compared against the specific bank rate and volume.



Bank volume was forecasted using only rate differential. *(see graph left)*

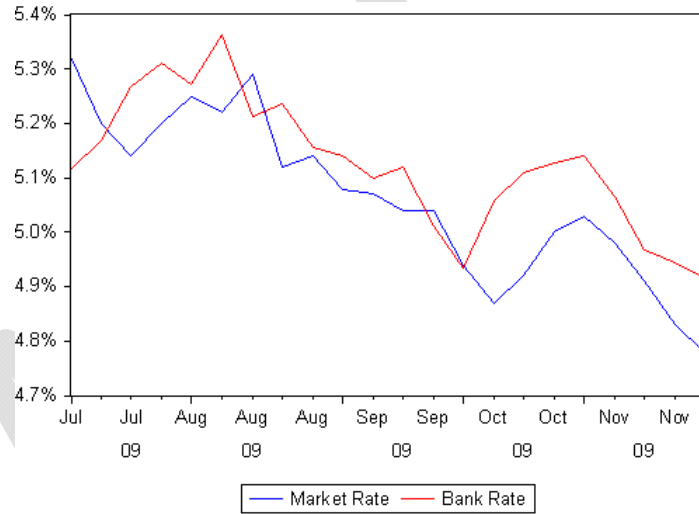
Conclusion

A 10 basis point spread from the market rate has caused volume to respond by \$39,500,000.

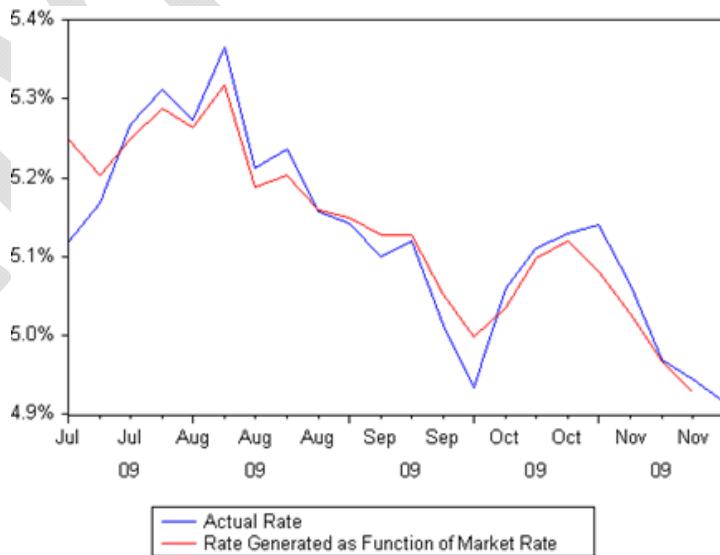
Appendix

I. Charts

Isolated view of Market Rate and Bank Rate



Rate forecast compared against actual Bank rate



Value Used

Bank rate = Market Rate(.762) + 1.285%

II. Regression outputs used in findings

Dependent Variable: RATE_THIRTYFIX
 Method: Least Squares
 Date: 02/04/10 Time: 13:01
 Sample: 7/06/2009 11/30/2009
 Included observations: 22

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MARKET_THIRTYFIX	0.643609	0.112638	5.713981	0.0000
C	1.866830	0.570442	3.272605	0.0038
R-squared	0.620130	Mean dependent var	5.124954	
Adjusted R-squared	0.601136	S.D. dependent var	0.122762	
S.E. of regression	0.077531	Akaike info criterion	-2.189774	
Sum squared resid	0.120221	Schwarz criterion	-2.090588	
Log likelihood	26.08751	Hannan-Quinn criter.	-2.166408	
F-statistic	32.64957	Durbin-Watson stat	1.404462	
Prob(F-statistic)	0.000014			

Dependent Variable: VOLUME_THIRTYFIX
 Method: Least Squares
 Date: 02/04/10 Time: 13:25
 Sample: 3/02/2009 10/12/2009
 Included observations: 33

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MARKET_THIRTYFIX	-1.96E+09	9.69E+08	-2.026388	0.0514
C	1.07E+10	4.46E+09	2.405010	0.0223
R-squared	0.116966	Mean dependent var	1.69E+09	
Adjusted R-squared	0.088481	S.D. dependent var	9.07E+08	
S.E. of regression	8.66E+08	Akaike info criterion	44.05600	
Sum squared resid	2.33E+19	Schwarz criterion	44.14670	
Log likelihood	-724.9240	Hannan-Quinn criter.	44.08652	
F-statistic	4.106247	Durbin-Watson stat	0.525317	
Prob(F-statistic)	0.051403			

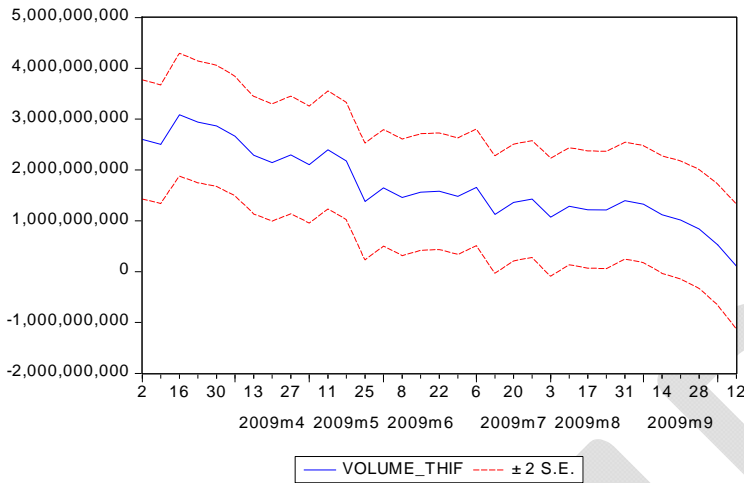
Dependent Variable: VOLUME_THIRTYFIX
 Method: Least Squares
 Date: 02/04/10 Time: 13:58
 Sample: 3/02/2009 10/12/2009
 Included observations: 33

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SPREAD	-3.95E+09	5.49E+08	-7.193327	0.0000
C	4.03E+09	3.39E+08	11.87426	0.0000
R-squared	0.625350	Mean dependent var	1.69E+09	
Adjusted R-squared	0.613265	S.D. dependent var	9.07E+08	
S.E. of regression	5.64E+08	Akaike info criterion	43.19863	
Sum squared resid	9.87E+18	Schwarz criterion	43.28933	
Log likelihood	-710.7774	Hannan-Quinn criter.	43.22915	
F-statistic	51.74395	Durbin-Watson stat	0.789117	
Prob(F-statistic)	0.000000			

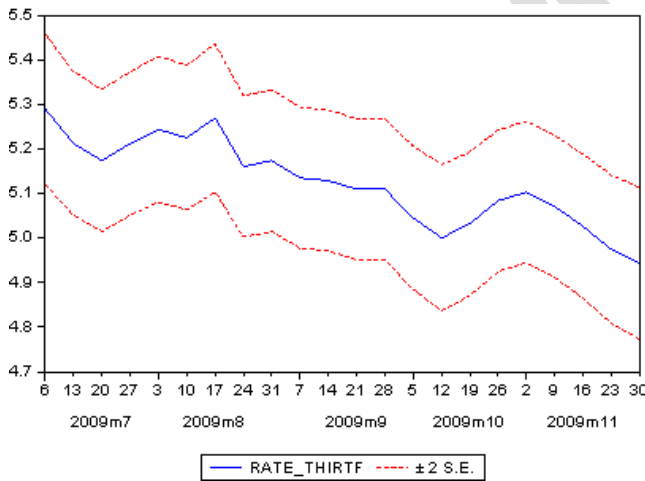
Dependent Variable: RATE_THIRTYFIX
 Method: Least Squares
 Date: 02/05/10 Time: 14:46
 Sample (adjusted): 7/06/2009 11/23/2009
 Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MARKET_THIRTYFIX(1)	0.762248	0.068223	11.17284	0.0000
C	1.285569	0.344657	3.729991	0.0014
R-squared	0.867902	Mean dependent var	5.134920	
Adjusted R-squared	0.860949	S.D. dependent var	0.116317	
S.E. of regression	0.043374	Akaike info criterion	-3.347515	
Sum squared resid	0.035745	Schwarz criterion	-3.248037	
Log likelihood	37.14891	Hannan-Quinn criter.	-3.325926	
F-statistic	124.8323	Durbin-Watson stat	0.844826	
Prob(F-statistic)	0.000000			

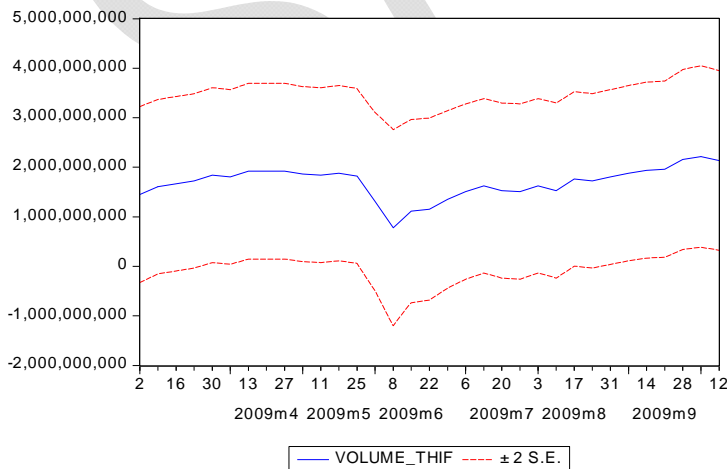
III. Forecast models used in report



Forecast: VOLUME_THIF
 Actual: VOLUME_THIRTYFIX
 Forecast sample: 3/02/2009 10/12/2009
 Included observations: 33
 Root Mean Squared Error 5.47E+08
 Mean Absolute Error 4.46E+08
 Mean Abs. Percent Error 31.81048
 Theil Inequality Coefficient 0.145876
 Bias Proportion 0.000000
 Variance Proportion 0.116825
 Covariance Proportion 0.883175



Forecast: RATE_THIRTF
 Actual: RATE_THIRTYFIX
 Forecast sample: 7/06/2009 11/30/2009
 Included observations: 22
 Root Mean Squared Error 0.073923
 Mean Absolute Error 0.059920
 Mean Abs. Percent Error 1.165684
 Theil Inequality Coefficient 0.007210
 Bias Proportion 0.000000
 Variance Proportion 0.118892
 Covariance Proportion 0.881108



Forecast: VOLUME_THIF
 Actual: VOLUME_THIRTYFIX
 Forecast sample: 3/02/2009 10/12/2009
 Included observations: 33
 Root Mean Squared Error 8.40E+08
 Mean Absolute Error 6.81E+08
 Mean Abs. Percent Error 42.92720
 Theil Inequality Coefficient 0.230989
 Bias Proportion 0.000000
 Variance Proportion 0.490309
 Covariance Proportion 0.509691

Glossary

- a. **Adjusted R(squared)** – Similar to R(squared), the term is adjusted in a way that penalizes you for adding excessive amounts of explanatory variables.
- b. **Akaike info criterion** – A common measure of goodness of fit for a given economic model.
- c. **Autocorrelation** – A statistical data property, when in regression the residual from a given data point is highly correlated with the residual from the next data point.
- d. **Bi-variant Regression** – A regression with only two variables specified.
- e. **F- Statistic** – Similar to the Test-statistic, F-static is used to determine the relevance of the entire specified model, not a single coefficient.
- f. **Hannan-Quinn Criterion**- Used as a guide to determine which economic model to use.
- g. **Heteroskedasticity**- Used to indicate unequal distribution at given data points.
- h. **Lagged Price**- Price that is used from previous day to indicate response time.
- i. **S.E. of Regression**- Standard Error of Regression
- j. **Schwarz Criterion**- Evaluation tool used to determine which economic model to use when constructing a regression. The statistic penalizes you for complexities, encouraging for a simpler model to increase robustness.
- k. **Test Statistic**- A summary statistic for a given data set, used in hypothesis testing to determine relevance and probability of a given coefficient.
- l. **Regression**- The process of constructed a best fit line through a series of data points, using ordinary least squares.
- m. **R (squared)**- A statistical measure to evaluate the goodness of fit for a line drawn through data points. Shown as a value between 0 and 1, with 0 being no fit line possible, and 1 being a perfectly fit line.