Sample Report

Market Reaction

30 year, fixed, conforming mortgages

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

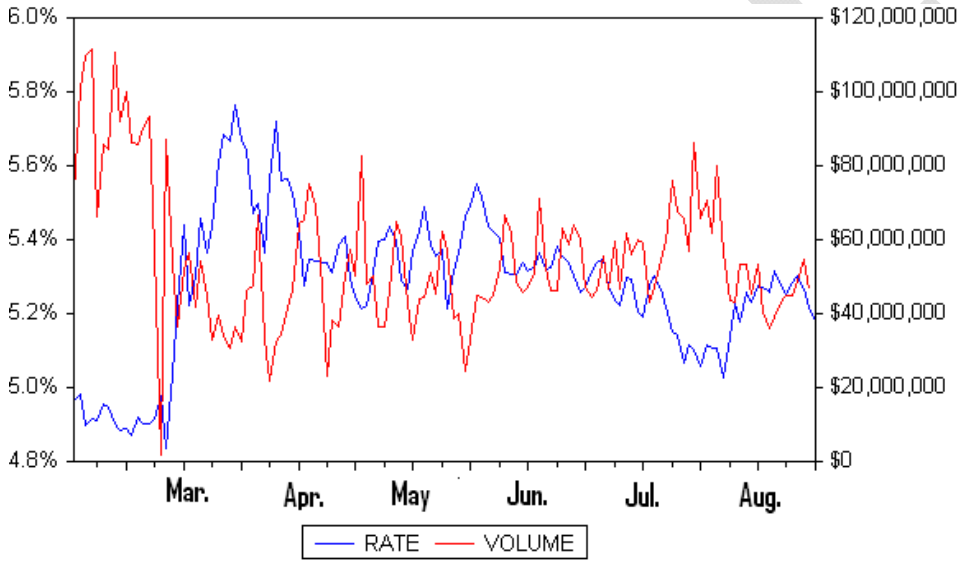
Contact Us:
Phone: 1-800-727-7346
Fax: 541-344-1975
Email: info@heitmananalytics.com

Executive Summary

Determine the best estimate of market response Time, relevant to a specific loan product.

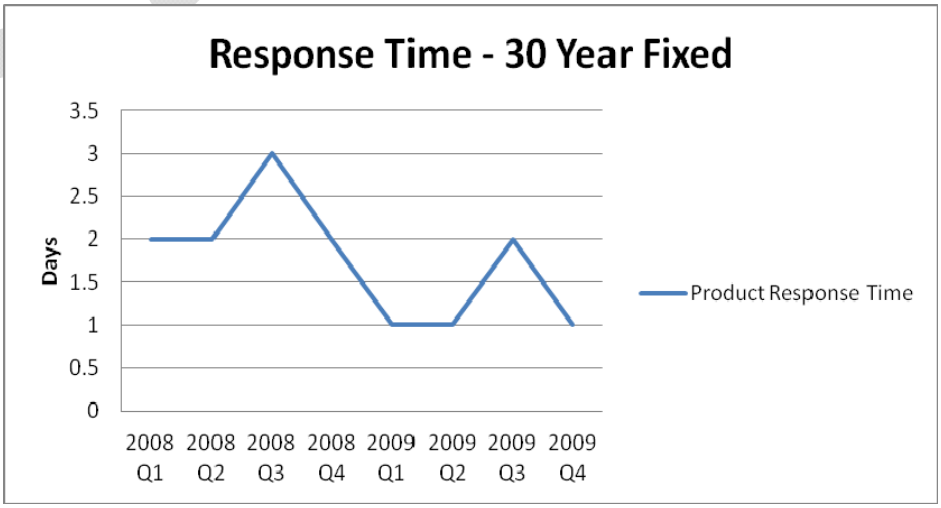
Period: 3/1/2009 – 8/14/2009

	Rate	Volume
Mean	5.28%	$54,597,418
Maximum	5.77%	$112,459,800
Minimum	4.83%	$1,516,000
Std. Dev.	0.19%	$18,897,671
Correlation	-0.68377	
Observations	130	



Heitman Analytics Conclusions:

I. **One Day Response time observed over stated period.**
II. **Product Rate impacts volume over following three days.**
III. **Current accelerated response time comes from market shift toward 30 year Fixed mortgages, high product sales and increased market competition.**



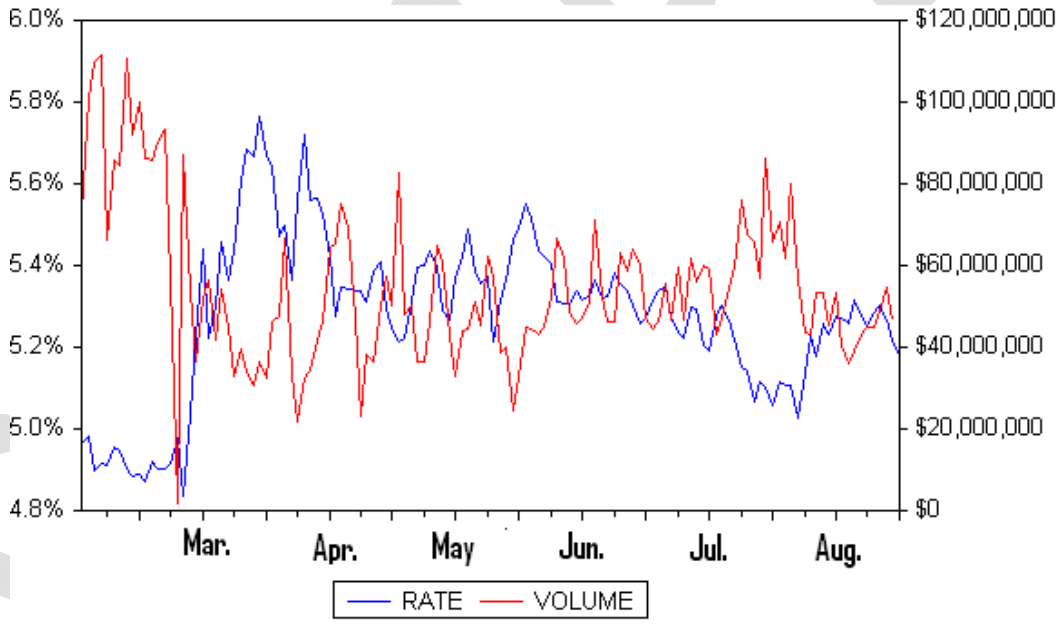
I. Abstract

The purpose of this analytic report is to provide an estimate with the highest degree of certainty of market response time. The duration of this study analyzes data collected from March 1st, 2009 to August 14th 2009.

II. The Data

This report is built on a foundation of time series data. It compares two variables; Rate and Volume. Rate is a daily average of 30 year Fixed Conforming Mortgages. Volume is the total dollar amount closed in Mortgages for a specific day. The time series consists of 130 observations. Over the course of the year, we observed an average daily rate of 5.28%, with approximately $54M being closed daily. Since the data is reported daily, a high variation was also observed in the product's volume. This was especially seen with significant drops during the weekend periods. To provide a more accurate estimation, weekends were omitted from the data sample.

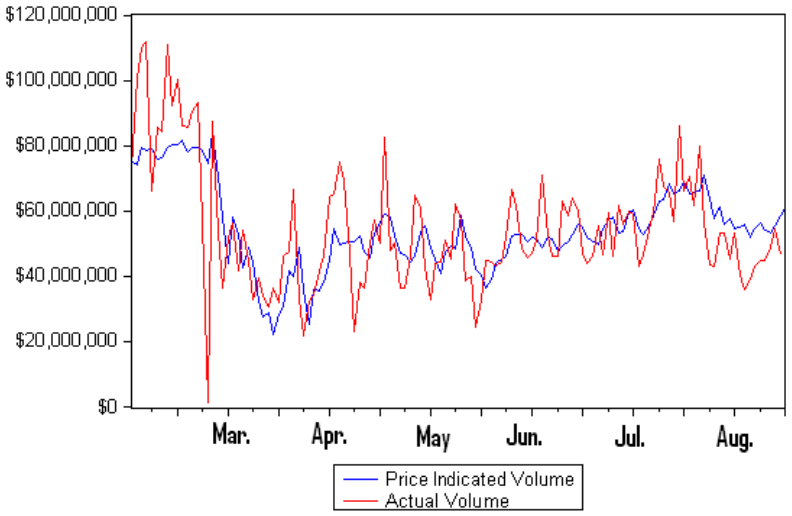
	Rate	Volume
Mean	5.28%	$54,597,418
Maximum	5.77%	$112,459,800
Minimum	4.83%	$1,516,000
Std. Dev.	0.19%	$18,897,671
Correlation	-0.68377	
Observations	130	



Above graph depicts Daily Rate compared against Daily Volume

III. Heitman Analysis

Graph of Forecasted volume using Price



A bi-variate regression was used to determine the desired relationship between rate and volume. The primary purpose of this report is to determine the level of significance indicated in the output; and not the finite vector of the beta coefficient.

Rate is a significant factor affecting volume. If the day rate is used solely to predict the day volume, without any lags, we notice a close fitting approximation. *The graph of this result is seen on the right.*

This process was duplicated using an autoregressive model to capture all lagged rate effects. This model proved to be a closer fit, as expected, and is graphically depicted below.

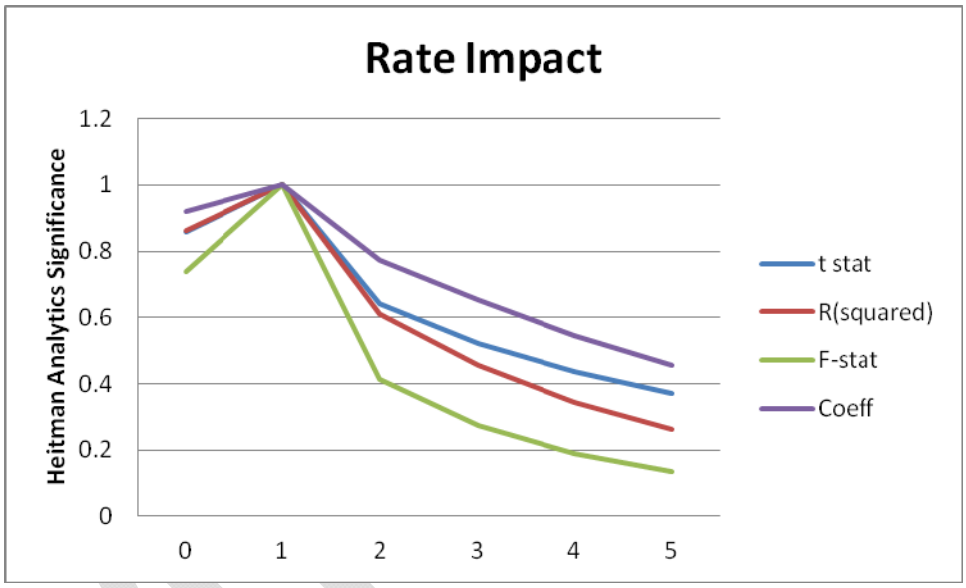
When detecting volume response time to a given rate, Heitman Analytics considers several indicators to determine the strongest aggregate solution. Four of these primary indicators include: T-statistic, F-statistic, R-Squared and the Beta Coefficient Vector. Since this is a tier one bank, potential borrowers are constantly monitoring rates, waiting for the most advantageous time to borrow. All of the bank's quotes are highly visible to the market and are updated quickly with any central change in pricing. When compared to a bank smaller in size and volume, the smaller bank is expected to have a slower response time. Heitman Analytics ran multiple regressions, all with the same model specification to generate consistent and comparable outputs. Each of these regressions had a lagged volume using single day intervals. Once the outputs were generated, several indicators were graphed and compared against one another.

Days lag	Test-Statistic	R(squared)	F-Statistic	Coefficient
0	10.56	0.46755	111.52	$ 65,776,659.00
1	**12.27866**	**0.5427**	**150.765**	**$ 71,512,635.00**
2	7.9	0.3312	62.415	$ 55,177,498.00
3	6.428	0.2484	41.32901	$ 46,632,755.00
4	5.34	0.1874	28.601	$ 39,002,600.00
5	4.538	0.1434	20.59	$ 32,640,758.00

Observations/Conclusions

What is readily observed is the daily rate will affect volume for multiple days following "a rate" adjustment. The results are inflated due to autocorrelation found in the model, however this does not affect the final conclusion.

When comparing multiple indicators, a ***one day market reaction time*** is observed. The t-statistic, f-statistic, R-Squared and Coefficient vector, all peak a day later from an observed change in price. With this sample, a tier one money center bank is utilized with nationally recognized rates. This result would be consistent with increased information transfers and rapid response times.



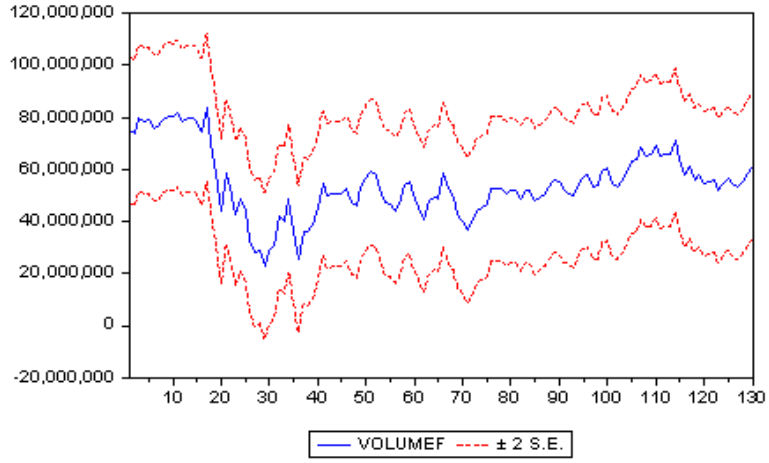
Since this data is based upon a money center bank, potential borrowers are constantly monitoring rates, waiting for the most advantageous time to borrow. All of the bank's quotes are highly visible to the market and are updated quickly with any central change in pricing. When compared to a bank smaller in size and volume, the smaller bank is expected to have a much slower response time.

Over 2009, the market reaction time has varied. In the first two quarters high volatility in national rates and increased uncertainty in the financial sector has caused borrowers to be hesitant with locking loans. As rates began to fall, and Federal Reserve purchases of MBS increased, barrowers reacted to changes in rates quicker. In the 4th quarter of 2009, rates had reached historical lows, and remained relatively stable, this has caused a surge for the 30 year fixed rate product thus, making the industry as a whole more competitive. These three factors have all simultaneously heightened the market response time for this specific product.

Looking forward, Heitman Analytics expects response time to slow. As the government reduces MBS purchases, and rates begin to rise, consumers may have increased uncertainty leading to less pressure to lock in rates. Other mortgage products will begin to rise in volume, decreasing the pool of 30 year fixed products. Lower buyer competition for the product will also keep response times lower than observed in the 3rd and 4th quarter.

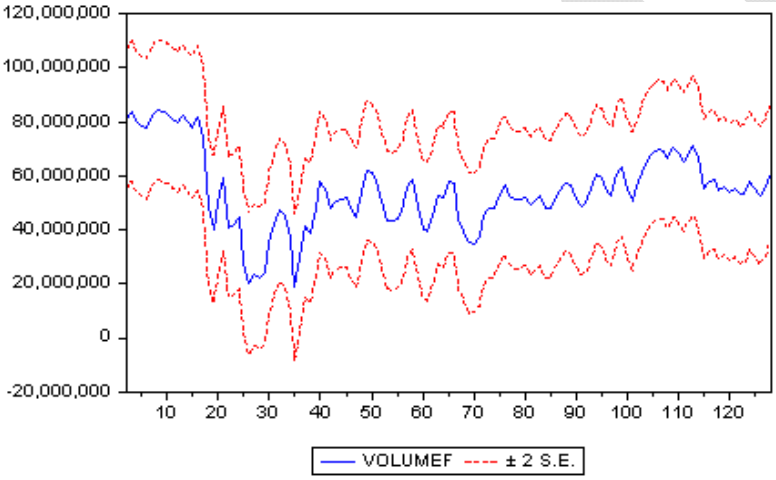
Appendix

I. Single variable regression forecasts



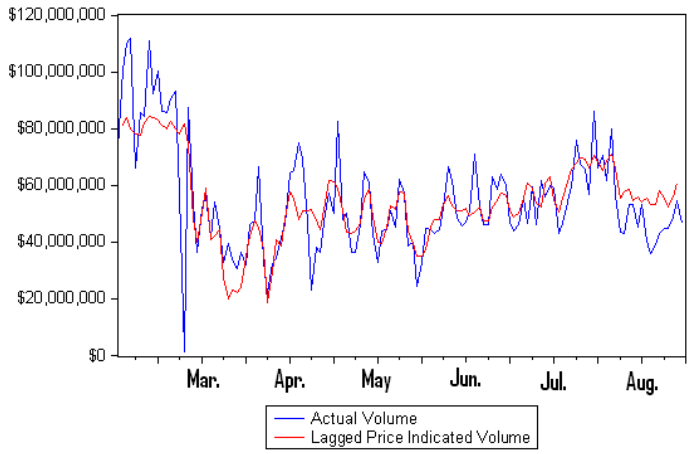
Forecast: VOLUMEF	
Actual: VOLUME	
Forecast sample: 1 130	
Included observations: 129	
Root Mean Squared Error	13735912
Mean Absolute Error	10251623
Mean Abs. Percent Error	56.40799
Theil Inequality Coefficient	0.120654
Bias Proportion	0.000000
Variance Proportion	0.187806
Covariance Proportion	0.812194

Auto regressed forecast



Forecast: VOLUMEF	
Actual: VOLUME	
Forecast sample: 1 130	
Adjusted sample: 2 128	
Included observations: 127	
Root Mean Squared Error	12433370
Mean Absolute Error	8392748.
Mean Abs. Percent Error	56.38289
Theil Inequality Coefficient	0.109036
Bias Proportion	0.000000
Variance Proportion	0.141049
Covariance Proportion	0.858951

II. Auto Regressed model, used to indicate volume



III. Results for regressions

Dependent Variable: VOLUME
Method: Least Squares
Date: 02/04/10 Time: 09:41
Sample (adjusted): 1 129
Included observations: 129 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RATE	-65776659	6228660.	-10.56032	0.0000
C	4.02E+08	32897355	12.21270	0.0000

R-squared	0.467551	Mean dependent var	54597418
Adjusted R-squared	0.463358	S.D. dependent var	18897671
S.E. of regression	13843646	Akaike info criterion	35.73993
Sum squared resid	2.43E+16	Schwarz criterion	35.78427
Log likelihood	-2303.226	Hannan-Quinn criter.	35.75795
F-statistic	111.5204	Durbin-Watson stat	1.390967
Prob(F-statistic)	0.000000		

Dependent Variable: VOLUME
Method: Least Squares
Date: 02/04/10 Time: 09:44
Sample (adjusted): 1 129
Included observations: 129 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RATE(-1)	-71512635	5824138.	-12.27866	0.0000
C	4.32E+08	30770110	14.04476	0.0000

R-squared	0.542780	Mean dependent var	54597418
Adjusted R-squared	0.539180	S.D. dependent var	18897671
S.E. of regression	12828445	Akaike info criterion	35.58761
Sum squared resid	2.09E+16	Schwarz criterion	35.63195
Log likelihood	-2293.401	Hannan-Quinn criter.	35.60563
F-statistic	150.7656	Durbin-Watson stat	1.499799
Prob(F-statistic)	0.000000		

Dependent Variable: VOLUME
Method: Least Squares
Date: 02/04/10 Time: 09:42
Sample (adjusted): 2 129
Included observations: 128 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RATE(-2)	-55177498	6984168.	-7.900368	0.0000
C	3.46E+08	36891118	9.370949	0.0000

R-squared	0.331266	Mean dependent var	54452884
Adjusted R-squared	0.325959	S.D. dependent var	18900209
S.E. of regression	15517073	Akaike info criterion	35.96828
Sum squared resid	3.03E+16	Schwarz criterion	36.01284
Log likelihood	-2299.970	Hannan-Quinn criter.	35.98639
F-statistic	62.41581	Durbin-Watson stat	1.235265
Prob(F-statistic)	0.000000		

Dependent Variable: VOLUME
Method: Least Squares
Date: 02/04/10 Time: 09:43
Sample (adjusted): 3 129
Included observations: 127 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RATE(-3)	-46632755	7253766.	-6.428764	0.0000
C	3.00E+08	38316038	7.835906	0.0000

R-squared	0.248477	Mean dependent var	54087714
Adjusted R-squared	0.242465	S.D. dependent var	18516178
S.E. of regression	16115828	Akaike info criterion	36.04412
Sum squared resid	3.25E+16	Schwarz criterion	36.08892
Log likelihood	-2286.802	Hannan-Quinn criter.	36.06232
F-statistic	41.32901	Durbin-Watson stat	1.087339
Prob(F-statistic)	0.000000		

Dependent Variable: VOLUME
Method: Least Squares
Date: 02/04/10 Time: 09:43
Sample (adjusted): 4 129
Included observations: 126 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RATE(-4)	-39002600	7292925.	-5.348005	0.0000
C	2.60E+08	38521857	6.736829	0.0000

R-squared	0.187424	Mean dependent var	53644737
Adjusted R-squared	0.180871	S.D. dependent var	17901709
S.E. of regression	16202073	Akaike info criterion	36.05492
Sum squared resid	3.26E+16	Schwarz criterion	36.09994
Log likelihood	-2269.460	Hannan-Quinn criter.	36.07321
F-statistic	28.60116	Durbin-Watson stat	1.063688
Prob(F-statistic)	0.000000		

Dependent Variable: VOLUME
Method: Least Squares
Date: 02/04/10 Time: 09:43
Sample (adjusted): 5 129
Included observations: 125 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RATE(-5)	-32640758	7192151.	-4.538386	0.0000
C	2.25E+08	37989541	5.935039	0.0000

R-squared	0.143436	Mean dependent var	53180229
Adjusted R-squared	0.136472	S.D. dependent var	17194465
S.E. of regression	15978165	Akaike info criterion	36.02722
Sum squared resid	3.14E+16	Schwarz criterion	36.07247
Log likelihood	-2249.701	Hannan-Quinn criter.	36.04560
F-statistic	20.59695	Durbin-Watson stat	1.040107
Prob(F-statistic)	0.000013		

IV. 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 measure" 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.*