Research Results: Improving Response Model Results With Economic and Geographic Data

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Current Situation

- Response rates continue to fall: 2bp 50bp for pre-approved Home Equity
- Mailings and competition increasing
- Home equity becoming "the new card"
- Low delinquency, rising property values, high approval rates, increasing activation
- KS in low 20's considered good
- Doubling of response rates considered good
 - Desire to drive down COCA (cost of customer acquisition)



The Population

- Frequent, sizable mailings
- Large populations, with controls
- Consistent, high quality mail offers
- Results within 12-16 weeks
- Clients open to testing new data sources and variables
 - **Flexible/capable implementation**
 - Risk and marketing work together



Data Issues

- Typical models rely heavily on demographic and CB variables
- There are few new sources of data or variables (most of what is available are generic lists of variables, vary by provider, but similar)

We sought to explore possible value in economic and geographic data



Working Hypotheses

- Borrowing decision driven by a purpose or need (education, home improvement, cash out, etc.)
- Need to feel comfortable with borrowing decision
- Are there surrogate measures of employment stability, personal wealth that we can use?
 - Is there an affinity based on branch presence/distance?



Economic and Geographic Data

- Commonly available from governmental sources
- Available with sufficient detail (at MSA levels)
- Large historical databases
- Relatively simple to generate more complex variables
 - Updated regularly (Monthly and Quarterly Updates)



Types of Variables

- Historical employment and unemployment rates
- Historical income levels
- Housing Price Index (OFHEO)
- Construction Statistics (Census)
 - New Residential Construction
 - New Residential Sales
 - Construction Price Index
 - Residential Improvements
 - Construction Spending
 - Characteristics of New Housing
- Home Ownership and Housing Vacancy
- Population density/growth
- Distance computed from Latitude and Longitude



Variable Generation

- We did not know which (or if any) would be predictive
- Looked at leading and lagging variables
- Created state and national indices
- Created mean, median, max, min, and range changes over time
- Generated and tested many alternative variables



Example Variable Families

- Minimum change in HPI over past two years
- Range of change one unit housing permits issued over 24 months
- Total one unit housing permits issued over the past year
- State index of labor force in last quarter
- National index of unemployment rate in last 4 quarters
- Average change in HPI over past year
- Distance from mailing address to nearest center



How to Evaluate Results

- Univariate predictive power
 - Information Values typically ranged from 0.001 (insignificant) to 0.250+ (very significant)

Marginal predictive power

- The economic variables tend to be highly correlated among themselves but not with CB variables
- Model improvement Deciles
- Model improvement KS
- Model improvement Lift



Example 1- Prospecting List

- Purchased external list of current home owners to offer a home equity offer.
- Original model 7 bureau variables.
- Updated model adding Average HPI over 24 months and Distance

| Example 1: External List | | | | | | | | | |
|--------------------------|----------------------------|-------------------|-----------------------------|----------------|----------------|--|--|--|--|
| Decile | Econ/Geo Added Model | Original Model | Total Cum. % Response | Econ/Geo KS | Original KS | | | | |
| 1 | 100% | 100% | 100% | 0% | 0% | | | | |
| 2 | 98% | 97% | 90% | 8% | 7% | | | | |
| 3 | 95% | 91% | 80% | 15% | 11% | | | | |
| 4 | 90% | 85% | 70% | 22% | 16% | | | | |
| 5 | 85% | 78% | 60% | 27% | 18% | | | | |
| 6 | 78% | 71% | 50% | 30% | 22% | | | | |
| 7 | 70% | 64% | 40% | 31% | 24% | | | | |
| 8 | 59% | 54% | 30% | 31% | 24% | | | | |
| 9 | 48% | 43% | 20% | 30% | 23% | | | | |
| 10 | 28% | 27% | 10% | 18% | 17% | | | | |



Example 1- Prospecting List

- Almost 50% of Goods (responders) identified in the top 20%
- KS Improvement to 31% from 24%





Example 2- Cross-Selling

- Cross sold home equity offer to existing customers with mortgage.
- Original model 9 bureau variables.
- Updated model adding State Index of One Unit Housing Permits, State Unemployment Total, and Distance

| Example 2: Cross Selling | | | | | | | | |
|--------------------------|----------------------------|-------------------|-----------------------------|----------------|----------------|--|--|--|
| Decile | Econ/Geo Added Model | Original Model | Total Cum. % Response | Econ/Geo KS | Original KS | | | |
| 1 | 100% | 100% | 100.0% | 0% | 0% | | | |
| 2 | 97% | 95% | 90.0% | 7% | 7% | | | |
| 3 | 93% | 90% | 80.0% | 13% | 11% | | | |
| 4 | 88% | 82% | 70.0% | 18% | 16% | | | |
| 5 | 82% | 75% | 59.8% | 22% | 17% | | | |
| 6 | 74% | 68% | 50.0% | 24% | 18% | | | |
| 7 | 64% | 58% | 39.7% | 25% | 19% | | | |
| 8 | 53% | 47% | 29.9% | 24% | 19% | | | |
| 9 | 40% | 35% | 20.0% | 20% | 16% | | | |
| 10 | 24% | 22% | 10.0% | 14% | 13% | | | |



Example 2- Cross-Selling

- Almost 40% of Goods (responders) identified in the top 20%
- KS Improvement to 24% from 19%





Other Possible Uses of Data

- Select MSA's for business expansion, branch location
- Target select auto lenders, or mortgage brokers for volume growth
- Portfolio "stress testing"



Considerations

- Test and ensure stability of results by testing with hold-out sample and tracking results over time (response models have a short shelf life)
- Test long term validation and availability of new data sources



Conclusions

- It is possible to double or even triple response rates
- KS values in mid 30's achievable
- New variables can be readily generated, tested, implemented
- Data is not expensive or hard to acquire
- Are your current models optimizing available data?

