

FOUNDATION FOR DONATION

REBUILDING TOGETHER: DC ALEXANDRIA

Gemma Abbott, Khushi Bhansali, Joseph
Gardemal, Nihar Majmudar & Jessica
Strongin



 Rebuilding
Together
DC • Alexandria

MEET THE TEAM



Gemma Abbott
Finance



Khushi Bhansali
Computer
Science



Joseph Gardemal
Accounting &
Finance



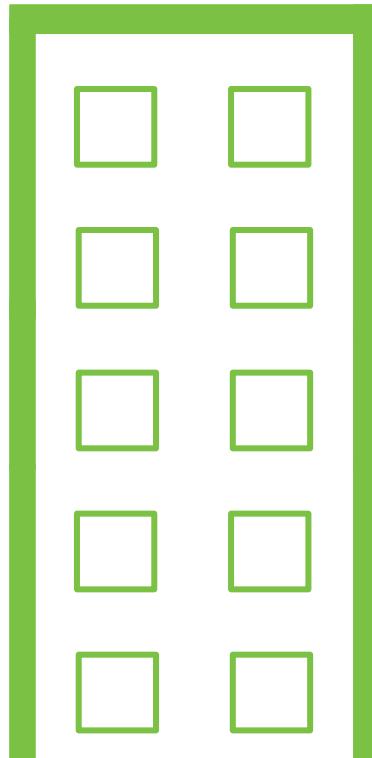
Nihar Majmudar
Computer Science



Jessica Strongin
Chemical
Engineering



AGENDA



- 1** Introduction
- 2** Data Overview
- 3** Analysis
- 4** Recommendations
- 5** Impact

INTRODUCTION



MEET REBUILDING TOGETHER: DC-ALEXANDRIA

Local nonprofit providing critical home repair

Goal of restoring dignity to local communities

DC and Alexandria localities recently merged into one



OPPORTUNITY

Opportunity: Understand Rebuilding DC-A's Individual Donor Bases

Goal: Help Shape Rebuilding DC-A's Strategy Moving Forward, Especially Given Recent Office Move



HYPOTHESES



Donors who gave once are more likely to give again



Donors tend to be within a 15 mi. radius of DC/Alexandria



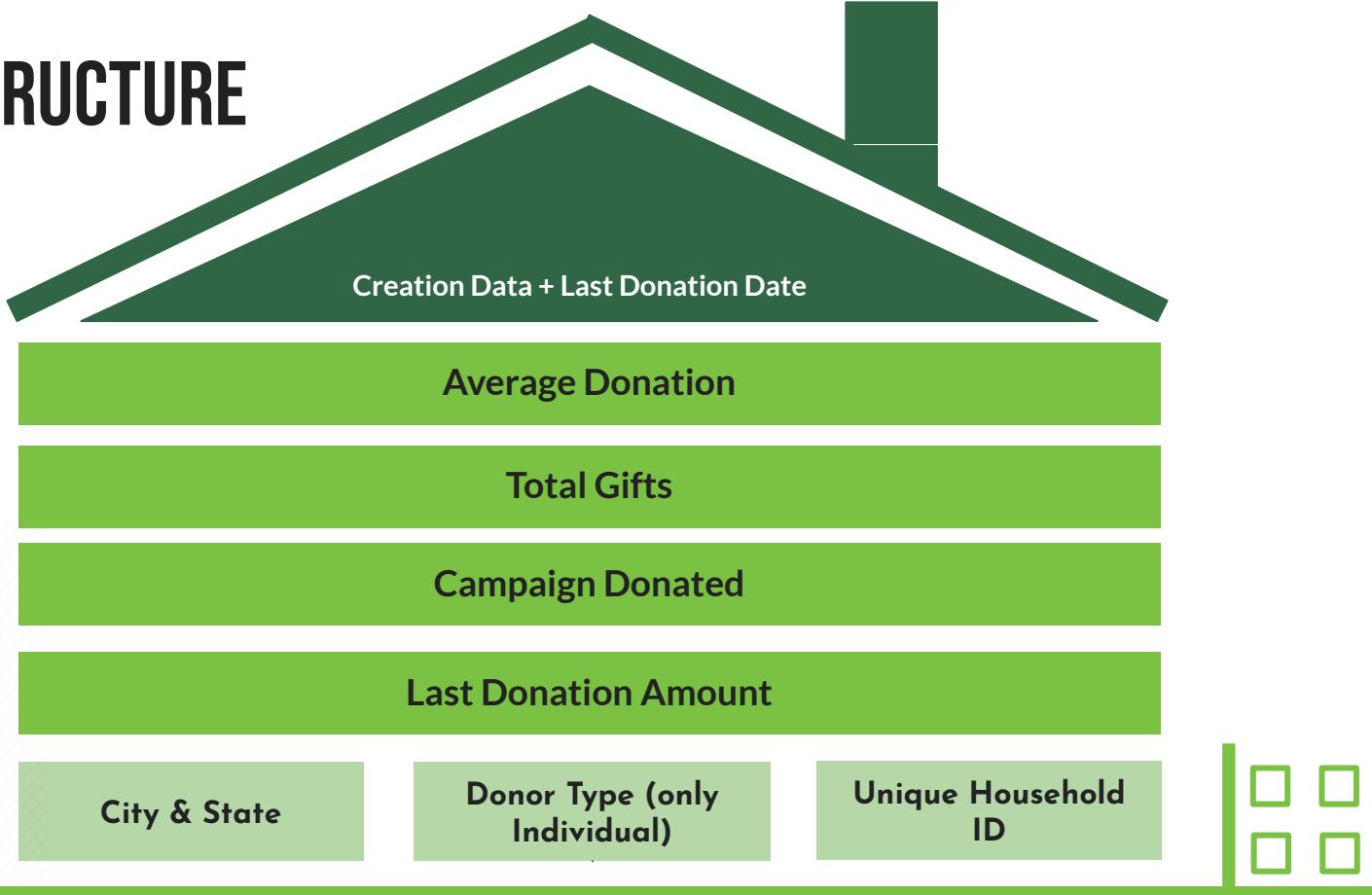
Resurgence in donations as the pandemic ends



DATA OVERVIEW



DATA STRUCTURE



ADDITIONAL DATA

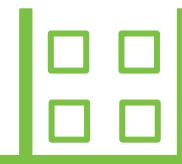
Donor Lifetime Value

Distance from
Rebuilding HQ

Donor Frequency

Length of Donorship

Income



ANALYSIS



OVERALL FUNDRAISING REPORT CARD



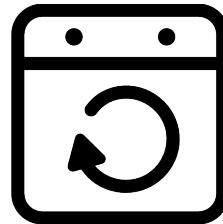
\$138

Average
Donation
Amount



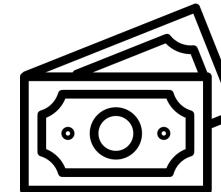
\$717

Donor Lifetime
Value



6.8 gifts
per year

Donation
Frequency



0.337

Ratio of One-Time to
Recurring Donors



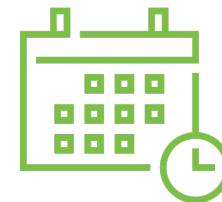
INDIVIDUAL DONOR BREAKDOWN



Year-End



Miscellaneous



Annual Event

Avg Donation

\$203

\$113

\$151

Donor Lifetime

1.67

1.46

1.21

Lifetime Value

\$571

\$599

\$752

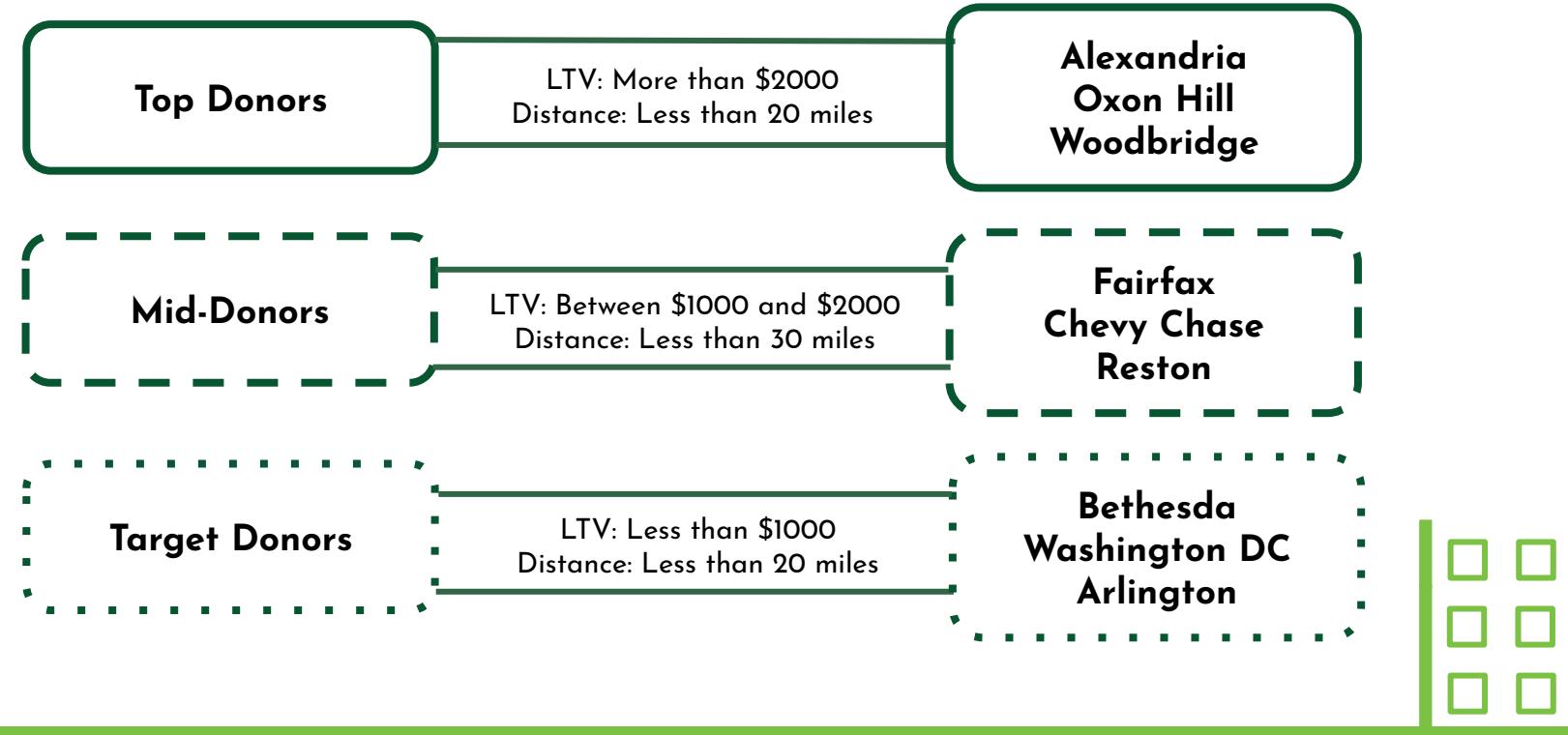


LOCATION BREAKDOWN

Fundraising Stat	DC	Virginia
Donor LTV	\$834	\$827
Donation Frequency	0.629	0.527
Ratio of One Time to Recurring	0.598	0.164
Avg. Donation Amount	\$181	\$140



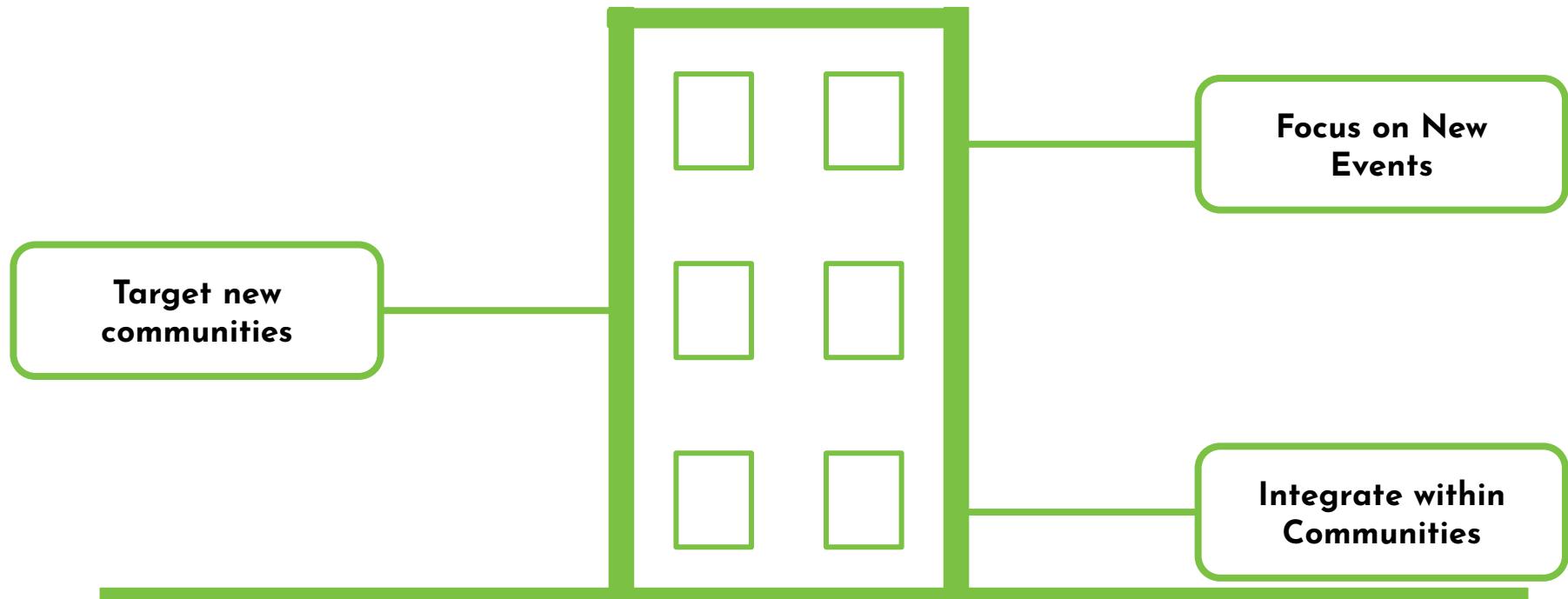
DISTANCE EFFECTS



RECOMMENDATIONS



RECOMMENDATION SUMMARY



FOCUS ON NEW EVENTS



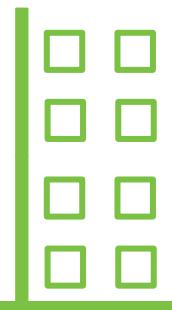
MLK Week of Service community fundraising event
(January 16 - 24)



Virtual community roundtable to spread awareness
about Rebuilding Together's mission (July-August)

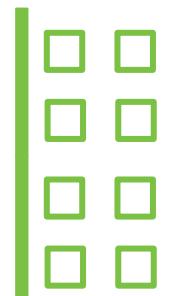


Valentine's Day giving event (Week of February 14th)



TARGET NEW COMMUNITIES

Criteria	Bethesda	DC	Arlington
Low LTV	✓	✓	✓
Low Donation Frequency	✓	✓	✓
Proximity to HQ and DC	✓	✓	✓
Large Donation Potential	✓	✓	✓

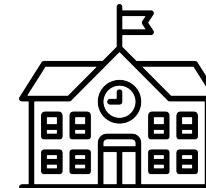


INTEGRATE WITHIN COMMUNITIES

Opportunity: Increase awareness of Rebuilding and the communities they serve



Connect with local
businesses



Connect with local
schools



IMPACT



SHORT TERM IMPACT

Donor Retention

Limited DC Donor Base

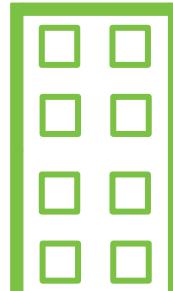
Focus on New Events

Target New Communities

**Integrate within
Communities**

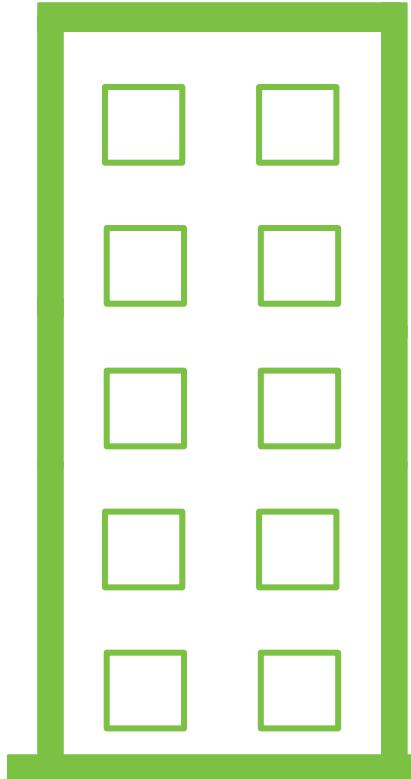
COVID Bounceback

**Low LTV of Existing
Donors**



LONG TERM IMPACT





THANK YOU!

Questions?

LTV AND DONOR FREQUENCY CALCULATION

Donor Frequency = Total Number of Gifts/Donation Length

Attrition Rate = Donors Retained / Total Amount of Last Year's
Donors

Donor Lifetime = 1/Attrition Rate

LTV = Average Donation Amount per Year * Donor Lifetime

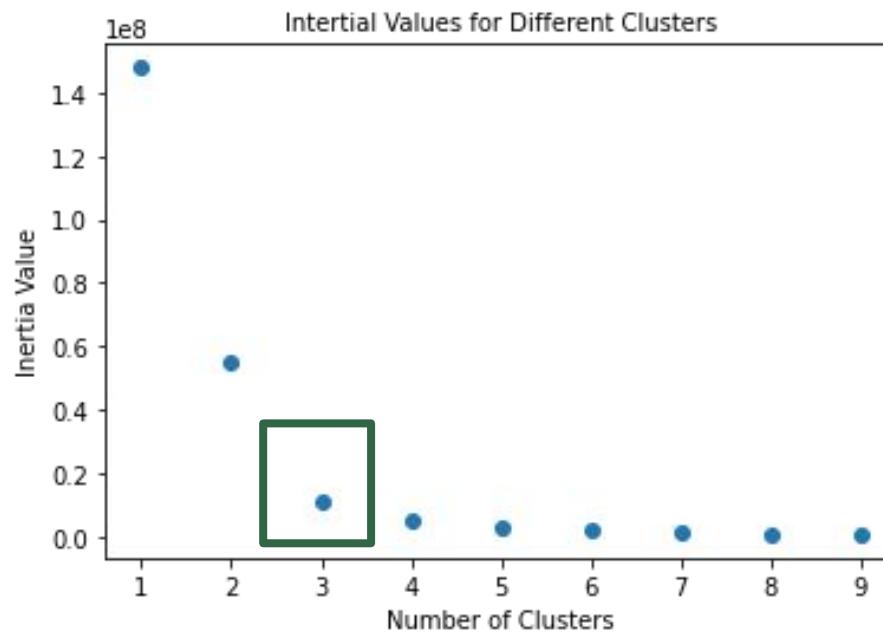
NEW TARGET COMMUNITIES

Criteria	Bethesda	DC	Arlington
Low LTV	\$495.30	\$791.18	\$422.76
Low Donation Frequency	4x/year	7.5x/year	5.3x/year
Proximity to HQ and DC	14.4, 7.1 mi	7.5, 0 mi.	9.0, 16.3 mi.
Large Donation Potential	\$500	\$3500	\$500

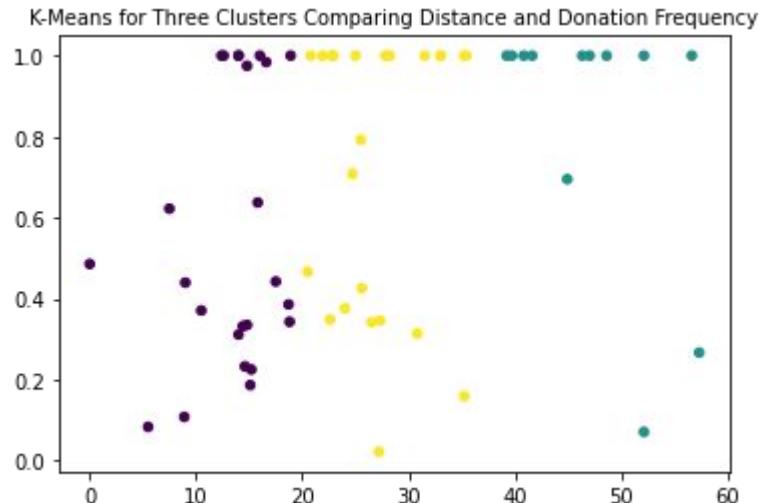
INCOME EFFECTS



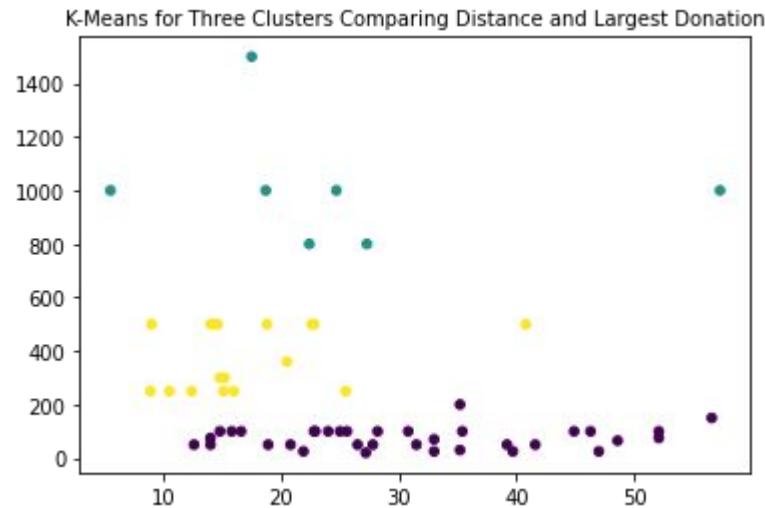
ELBOW ANALYSIS: DISTANCE AND LTV



K MEANS: DISTANCE AND DONATION FREQUENCY



K MEANS: DISTANCE AND LARGEST DONATION



CANDIDATES FOR TARGET COMMUNITIES (LTV)

```
ind_city_target = ind_city[((ind_city['LTV'] < 1000) & (ind_city['Distance'] <= 20))]
```

Mailing City	Amount	Last Gift Amount	Total Number of Gifts	Average Gift	type_mapping	donation_length	LTV	ln_LTV	ln_avg	freq	ln_freq	Distance
Annandale	15.454545	15.454545	47.060606	14.757576	1.272727	47.358261	477.393939	6.130151	2.434216	0.974797	-0.053530	14.8
Arlington	137.086957	139.478261	3.608696	134.650217	1.956522	28.864798	422.762391	5.557663	4.512834	0.439595	-1.491862	9.0
Bethesda	157.878788	166.212121	3.303030	157.999697	1.515152	20.851958	495.302121	5.818671	4.772526	0.331909	-1.511379	14.4
Bryans Road	50.000000	50.000000	1.000000	50.000000	1.000000	1.000000	50.000000	3.912023	3.912023	1.000000	0.000000	18.9
Cabin John	250.000000	250.000000	1.000000	250.000000	1.000000	1.000000	250.000000	5.521461	5.521461	1.000000	0.000000	16.0
Fairfax Station	262.500000	387.500000	2.500000	262.497500	2.000000	18.435178	762.492500	6.158815	5.334855	0.342795	-1.567258	18.8
Forest Hill	50.000000	50.000000	1.000000	50.000000	1.000000	1.000000	50.000000	3.912023	3.912023	1.000000	0.000000	14.0
Fort Washington	119.000000	119.000000	1.000000	119.000000	1.000000	1.000000	119.000000	4.492178	4.492178	1.000000	0.000000	12.4
Hyattsville	34.375000	31.250000	9.625000	34.375625	1.562500	12.093548	307.814375	5.595020	3.525350	0.983994	-0.255352	16.6
Lorton	121.428571	92.857143	5.571429	94.385714	1.285714	78.694191	489.271429	6.069442	4.522562	0.224980	-2.149911	15.2
McLean	140.625000	128.125000	2.875000	137.500000	1.750000	23.917837	465.625000	5.718505	4.786665	0.335051	-1.635942	14.8
Mount Rainier	50.000000	50.000000	1.000000	50.000000	1.000000	1.000000	50.000000	3.912023	3.912023	1.000000	0.000000	12.6
Silver Spring	71.000000	76.000000	1.800000	72.668000	1.800000	13.452831	146.004000	4.630401	4.190956	0.637346	-0.948497	15.8
Springfield	85.769231	110.384615	3.076923	83.783077	1.307692	32.611625	316.541538	5.047010	4.134563	0.370678	-1.677963	10.5
Takoma Park	62.500000	62.500000	1.000000	62.500000	1.000000	1.000000	62.500000	4.114756	4.114756	1.000000	0.000000	14.0
Washington	230.028736	216.120690	4.701149	228.831322	1.787356	15.024847	791.177414	5.539641	4.557231	0.622120	-0.903718	7.5

CANDIDATES FOR TARGET COMMUNITIES (FREQUENCY)

```
ind_freq = ind_city[ind_city['freq'] >= 1]
ind_freq
```

Mailing City	Amount	Last Gift Amount	Total Number of Gifts	Average Gift	type_mapping	donation_length	LTV	ln_LTV	ln_avg	freq	ln_freq	Distance
Aldie	87.500000	87.500000	1.0	87.500000	1.500000	1.0	87.500000	4.461329	4.461329	1.0	0.0	46.3
Annapolis	37.500000	37.500000	1.0	37.500000	1.000000	1.0	37.500000	3.565449	3.565449	1.0	0.0	41.6
Ashburn	25.000000	25.000000	1.0	25.000000	1.000000	1.0	25.000000	3.218876	3.218876	1.0	0.0	39.7
Baltimore	50.000000	50.000000	1.0	50.000000	1.000000	1.0	50.000000	3.626223	3.626223	1.0	0.0	56.6
Bealeton	25.000000	25.000000	1.0	25.000000	1.000000	1.0	25.000000	3.218876	3.218876	1.0	0.0	60.9
Beltsville	375.000000	375.000000	1.0	375.000000	1.000000	1.0	375.000000	5.868035	5.868035	1.0	0.0	22.8
Bowie	41.666667	41.666667	1.0	41.666667	1.333333	1.0	41.666667	3.680974	3.680974	1.0	0.0	27.8
Bryans Road	50.000000	50.000000	1.0	50.000000	1.000000	1.0	50.000000	3.912023	3.912023	1.0	0.0	18.9
Cabin John	250.000000	250.000000	1.0	250.000000	1.000000	1.0	250.000000	5.521461	5.521461	1.0	0.0	16.0
Chantilly	200.000000	200.000000	1.0	200.000000	1.000000	1.0	200.000000	5.298317	5.298317	1.0	0.0	35.2
Chesapeake	108.333333	108.333333	1.0	108.333333	1.000000	1.0	108.333333	4.217453	4.217453	1.0	0.0	202.0
Clinton	25.000000	25.000000	1.0	25.000000	1.000000	1.0	25.000000	3.218876	3.218876	1.0	0.0	21.9
College Park	37.500000	37.500000	1.0	37.500000	1.000000	1.0	37.500000	3.565449	3.565449	1.0	0.0	NaN
Ellicott City	100.000000	100.000000	1.0	100.000000	1.000000	1.0	100.000000	4.605170	4.605170	1.0	0.0	52.1
Forest Hill	50.000000	50.000000	1.0	50.000000	1.000000	1.0	50.000000	3.912023	3.912023	1.0	0.0	14.0
Fort Washington	119.000000	119.000000	1.0	119.000000	1.000000	1.0	119.000000	4.492178	4.492178	1.0	0.0	12.4
Fredericksburg	37.500000	37.500000	1.0	37.500000	1.500000	1.0	37.500000	3.238486	3.238486	1.0	0.0	48.6
Gainesville	100.000000	100.000000	1.0	100.000000	2.000000	1.0	100.000000	4.605170	4.605170	1.0	0.0	35.4
Glen Allen	50.000000	50.000000	1.0	50.000000	1.000000	1.0	50.000000	3.912023	3.912023	1.0	0.0	97.7
Glenn Dale	100.000000	100.000000	1.0	100.000000	1.000000	1.0	100.000000	4.605170	4.605170	1.0	0.0	25.0
Great Falls	100.000000	100.000000	1.0	100.000000	1.000000	1.0	100.000000	4.605170	4.605170	1.0	0.0	22.0

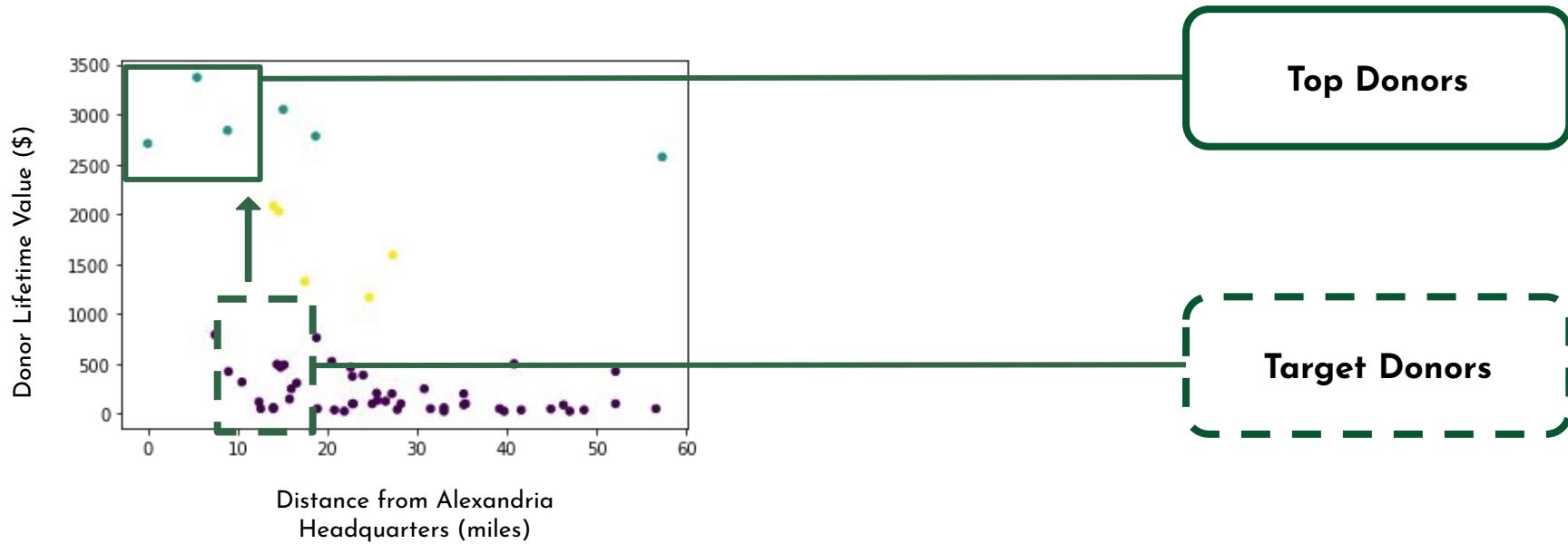
CANDIDATES FOR TARGET COMMUNITIES (FREQUENCY)

Glenn Dale	100.000000	100.000000		1.0	100.000000	1.000000		1.0	100.000000	4.605170	4.605170	1.0	0.0	25.0
Great Falls	100.000000	100.000000		1.0	100.000000	4.000000		1.0	100.000000	4.605170	4.605170	1.0	0.0	22.9
Hampstead	100.000000	100.000000		1.0	100.000000	1.000000		1.0	100.000000	4.605170	4.605170	1.0	0.0	79.8
Lanham	100.000000	100.000000		1.0	100.000000	1.000000		1.0	100.000000	4.605170	4.605170	1.0	0.0	22.8
Laurel	60.000000	60.000000		1.0	60.000000	1.000000		1.0	60.000000	4.080259	4.080259	1.0	0.0	33.0
Mount Rainier	50.000000	50.000000		1.0	50.000000	1.000000		1.0	50.000000	3.912023	3.912023	1.0	0.0	12.6
Owings	50.000000	50.000000		1.0	50.000000	1.000000		1.0	50.000000	3.912023	3.912023	1.0	0.0	31.5
Owings Mills	37.500000	37.500000		1.0	37.500000	1.000000		1.0	37.500000	3.565449	3.565449	1.0	0.0	65.8
Parkville	25.000000	25.000000		1.0	25.000000	1.000000		1.0	25.000000	3.218876	3.218876	1.0	0.0	63.5
Reisterstown	100.000000	100.000000		1.0	100.000000	1.000000		1.0	100.000000	4.605170	4.605170	1.0	0.0	70.6
Riva	25.000000	25.000000		1.0	25.000000	1.000000		1.0	25.000000	3.218876	3.218876	1.0	0.0	33.0
Severn	500.000000	500.000000		1.0	500.000000	3.000000		1.0	500.000000	6.214608	6.214608	1.0	0.0	40.8
Severna Park	25.000000	25.000000		1.0	25.000000	1.000000		1.0	25.000000	3.218876	3.218876	1.0	0.0	47.0
Stafford	50.000000	50.000000		1.0	50.000000	1.000000		1.0	50.000000	3.912023	3.912023	1.0	0.0	39.2
Sykesville	50.000000	50.000000		1.0	50.000000	1.000000		1.0	50.000000	3.912023	3.912023	1.0	0.0	61.9
Takoma Park	62.500000	62.500000		1.0	62.500000	1.000000		1.0	62.500000	4.114756	4.114756	1.0	0.0	14.0
Towson	50.000000	50.000000		1.0	50.000000	1.000000		1.0	50.000000	3.912023	3.912023	1.0	0.0	61.5
Upper Marlboro	37.500000	37.500000		1.0	37.500000	1.000000		1.0	37.500000	3.565449	3.565449	1.0	0.0	20.8
Virginia Beach	37.500000	37.500000		1.0	37.500000	1.000000		1.0	37.500000	3.565449	3.565449	1.0	0.0	204.0
Westminster	25.000000	25.000000		1.0	25.000000	1.000000		1.0	25.000000	3.218876	3.218876	1.0	0.0	65.9
Wheaton	100.000000	100.000000		1.0	100.000000	3.000000		1.0	100.000000	4.605170	4.605170	1.0	0.0	28.2

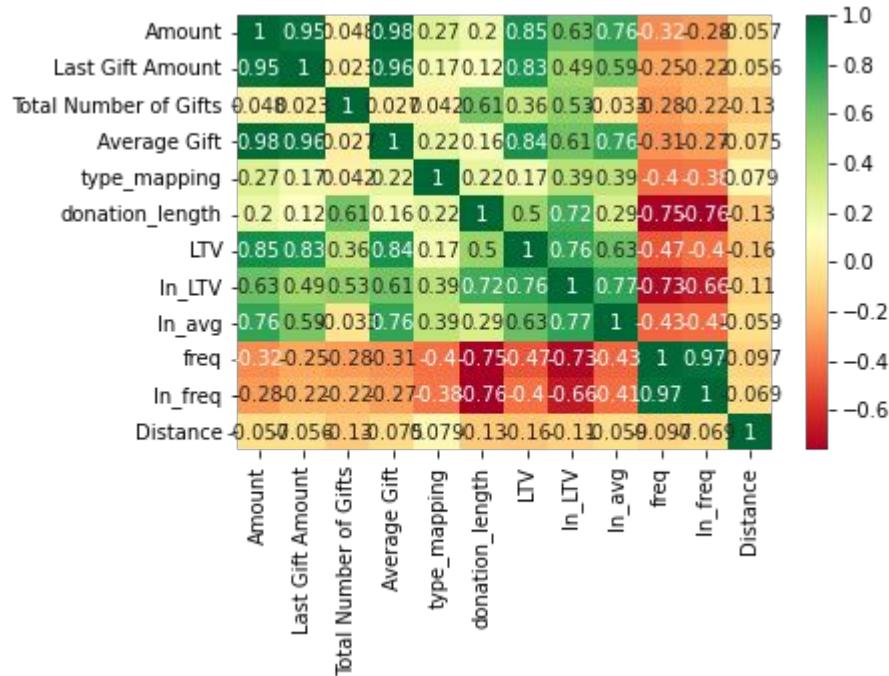
CANDIDATES FOR TARGET COMMUNITIES (MAX GIFT AMOUNT)

	Mailing City	Amount	Distance		
1	Alexandria	7000.0	0.01	31	Fort Belvoir
2	Annandale	100.0	14.80	32	Fort Washington
4	Arlington	500.0	9.00	42	Hyattsville
9	Bethesda	500.0	14.40	47	Lorton
11	Bryans Road	50.0	18.90	49	McLean
12	Burke	500.0	14.60	50	Mount Rainier
13	Cabin John	250.0	16.00	54	Oxon Hill
27	Fairfax	1500.0	17.50	65	Silver Spring
28	Fairfax Station	500.0	18.80	66	Springfield
29	Falls Church	500.0	14.00	70	Takoma Park
30	Forest Hill	50.0	14.00	71	Temple Hills
				76	Washington

DISTANCE EFFECTS



CORRELATION MATRIX WITH DISTANCE



FEATURE ANALYSIS: CHI-SQUARED UNIVARIATE

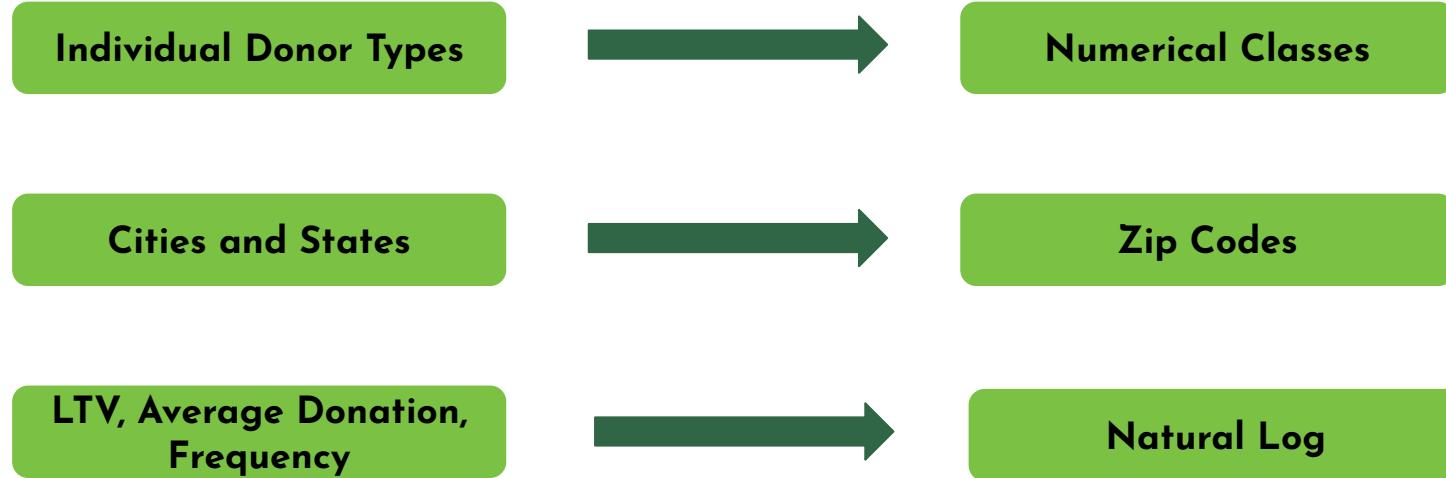
	Attributes	Score
0	Amount	20065.462300
1	Last Gift Amount	16105.497851
2	Total Number of Gifts	1654.857813
3	Average Gift	9315.769417
4	PCS_num	380.511562
5	city_num	588.911086
6	donation_length	711.132825
7	LTV	37545.905870
8	freq	49.964979

Most influential for predicting type:

1. LTV
2. Total Amount Given
3. Last Gift Amount

This gives us insight into which variables we can compare to see patterns that exist among individual donor types.

TRANSFORMATIONS



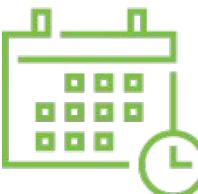
INSIGHTS - DONATIONS BY TYPE



Less than 2% of donations recorded have come from monthly newsletters



More than 20% of donations recorded have come from National Rebuilding Month (April)



Most individual donations come from annually hosted events

INITIAL CHALLENGES

Corporate Donor Data Included

<\$1 Donation Amounts

High Degree of Qualitative Data

Many Observed Dependencies

INSIGHTS - DONORS BY LOCATION

73%

Donors from Virginia

51%

Donors from Alexandria Area

10%

Donors from DC

DEVELOPING A FUNDRAISING REPORT CARD



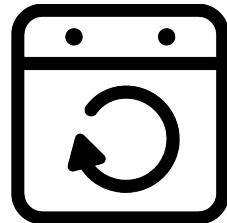
\$138

Average
Donation
Amount



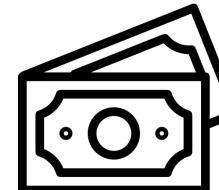
\$717

Donor Lifetime
Value



6.8 gifts
per year

Donation
Frequency



0.337

Ratio of One-Time to
Recurring Donors

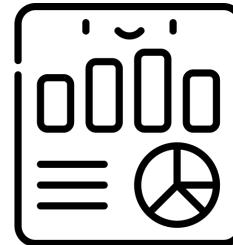
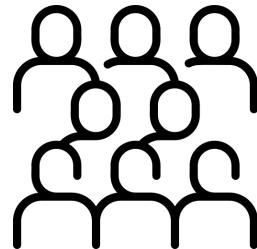
CLUSTERING

Goal: Predict donor behaviors based on certain groupings

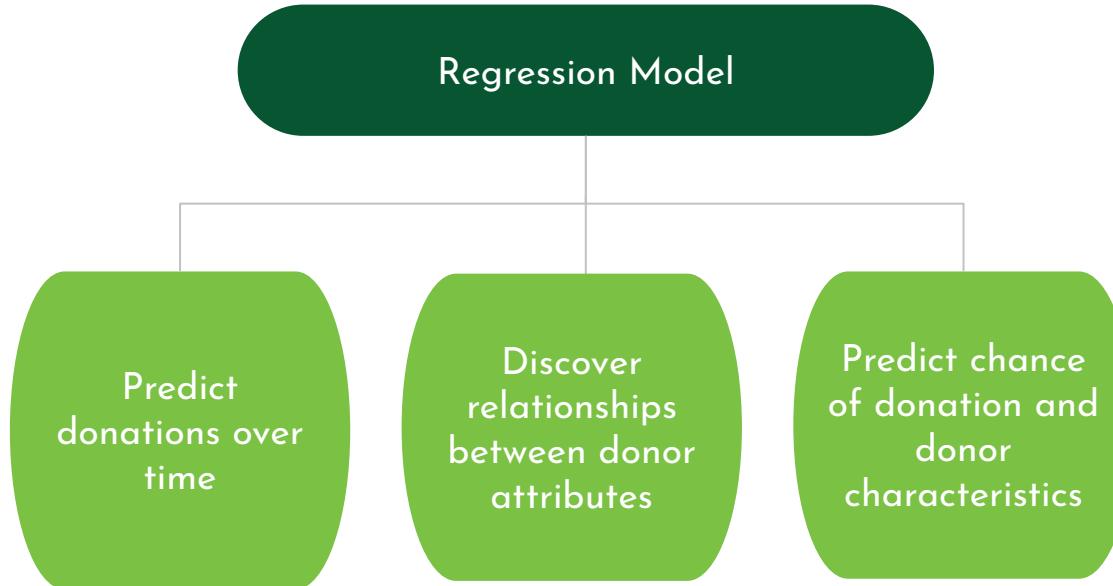
Determine Donor Groups

Discover defining
metrics

Create strategy to
target donors

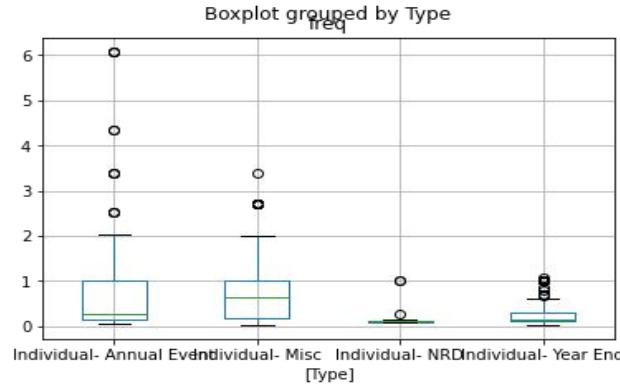


MODELING

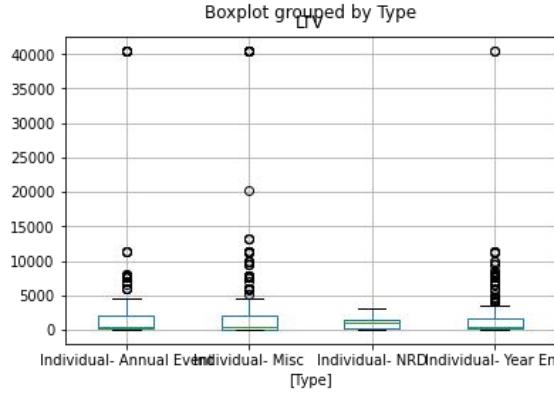


OUTLIER IDENTIFICATION

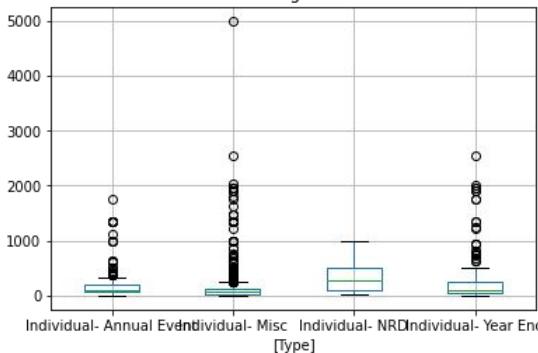
Frequency of Donation



Lifetime Value

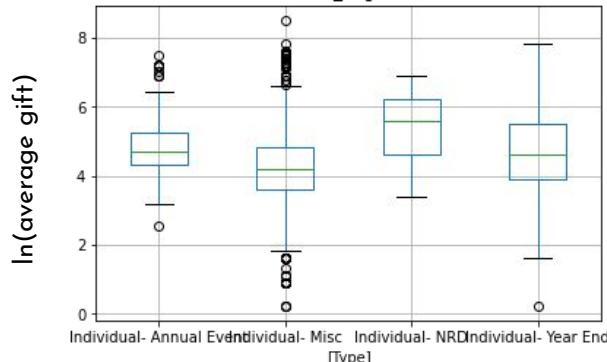
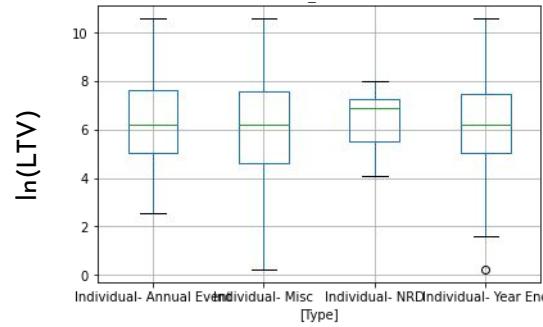
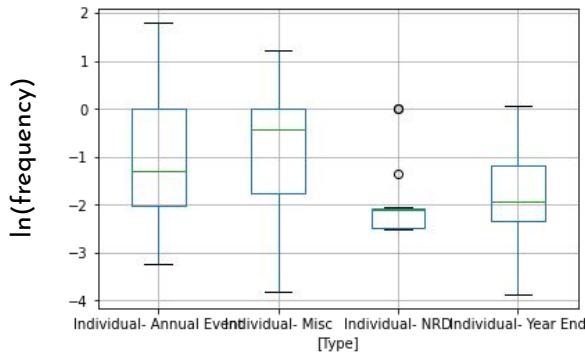


Average Gift



*note: a singular donation by a church for \$20K was not included in these calculations

POST NATURAL LOG TRANSFORMATION



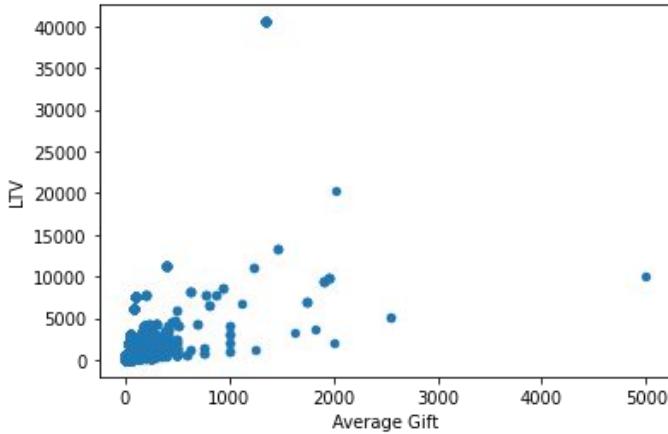
*note: a singular donation by a church for \$20K was not included in these calculations

REGRESSION ANALYSIS: LTV AND AVERAGE GIFT

OLS Regression Results

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Dep. Variable:	LTV	R-squared:	0.335			
Model:	OLS	Adj. R-squared:	0.335			
Method:	Least Squares	F-statistic:	917.0			
Date:	Sat, 06 Nov 2021	Prob (F-statistic):	1.92e-163			
Time:	04:19:08	Log-Likelihood:	-17500.			
No. Observations:	1820	AIC:	3.500e+04			
Df Residuals:	1818	BIC:	3.502e+04			
Df Model:	1					
Covariance Type:	nonrobust					
	coef	std err	t	P> t	[0.025	0.975]
const	373.2572	97.393	3.832	0.000	182.243	564.271
Average Gift	8.5786	0.283	30.282	0.000	8.023	9.134
Omnibus:	1731.805	Durbin-Watson:	1.840			
Prob(Omnibus):	0.000	Jarque-Bera (JB):	129298.788			
Skew:	4.280	Prob(JB):	0.00			
Kurtosis:	43.395	Cond. No.	393.			

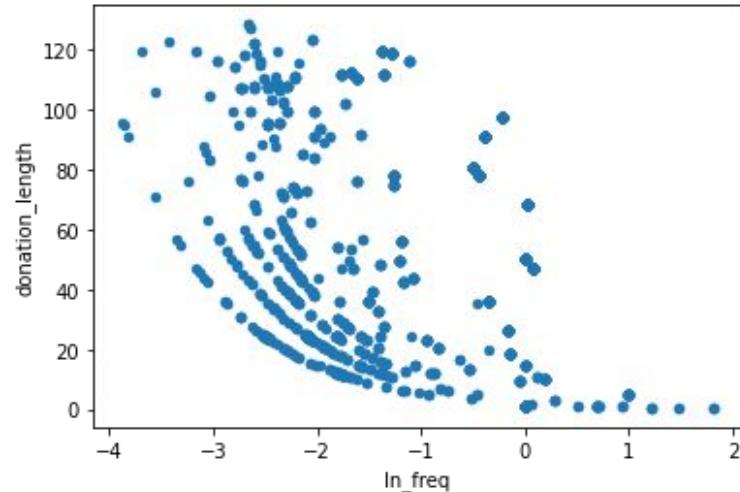


*note: a singular donation by a church for \$20K was not included in these calculations

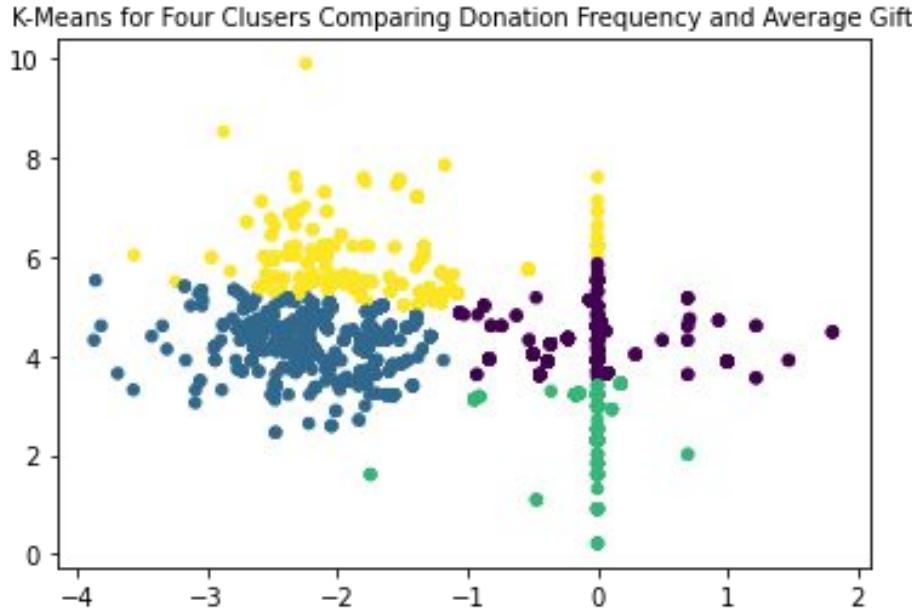
REGRESSION ANALYSIS: DONATION LENGTH AND TRANSFORMED FREQUENCY

OLS Regression Results

Dep. Variable:	donation_length	R-squared:	0.248			
Model:	OLS	Adj. R-squared:	0.247			
Method:	Least Squares	F-statistic:	598.0			
Date:	Sun, 07 Nov 2021	Prob (F-statistic):	2.03e-114			
Time:	18:13:42	Log-Likelihood:	-8965.7			
No. Observations:	1820	AIC:	1.794e+04			
Df Residuals:	1818	BIC:	1.795e+04			
Df Model:	1					
Covariance Type:	nonrobust					
	coef	std err	t	P> t	[0.025	0.975]
const	20.9753	1.103	19.015	0.000	18.812	23.139
ln_freq	-18.1875	0.744	-24.454	0.000	-19.646	-16.729
Omnibus:	229.552	Durbin-Watson:	1.876			
Prob(Omnibus):	0.000	Jarque-Bera (JB):	228.540			
Skew:	0.804	Prob(JB):	2.36e-50			
Kurtosis:	2.348	Cond. No.	2.67			

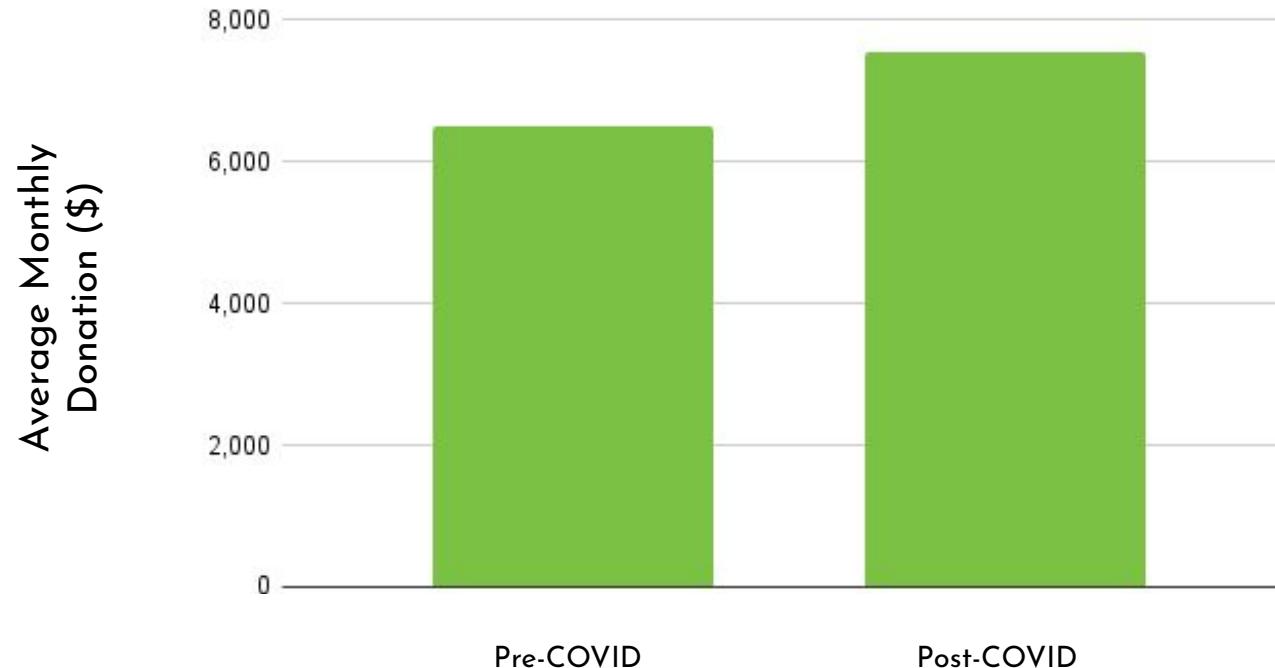


K-MEANS: TRANSFORMED AVG. GIFT AND DONATION LENGTH



PRE VS POST-COVID DONATION

Impact of COVID on Donation Amount



THANKS

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DATA STRUCTURE

