

Explaining Customer Churn



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Managerial Goals

- Understand profile of disconnected customers and analyze churn rates in different geographic regions
 - Do the amount of services a customer have create a lock-in effect and reduce churn?
 - Are certain geographic areas more likely to churn than other areas?
- Develop marketing programs to attract new customers and add services for existing customers

Variables

CATEGORICAL

- **Status – Active or Disconnected (Oct'05)**
- **Type of Service**
 - Basic Cable
 - Digital Cable
 - Cable + Broadband Access
- **Dwelling (own or apartment)**
- **Location**
 - 3 States (Virginia, Maryland, DC)
 - 7 Counties, 166 Zip codes

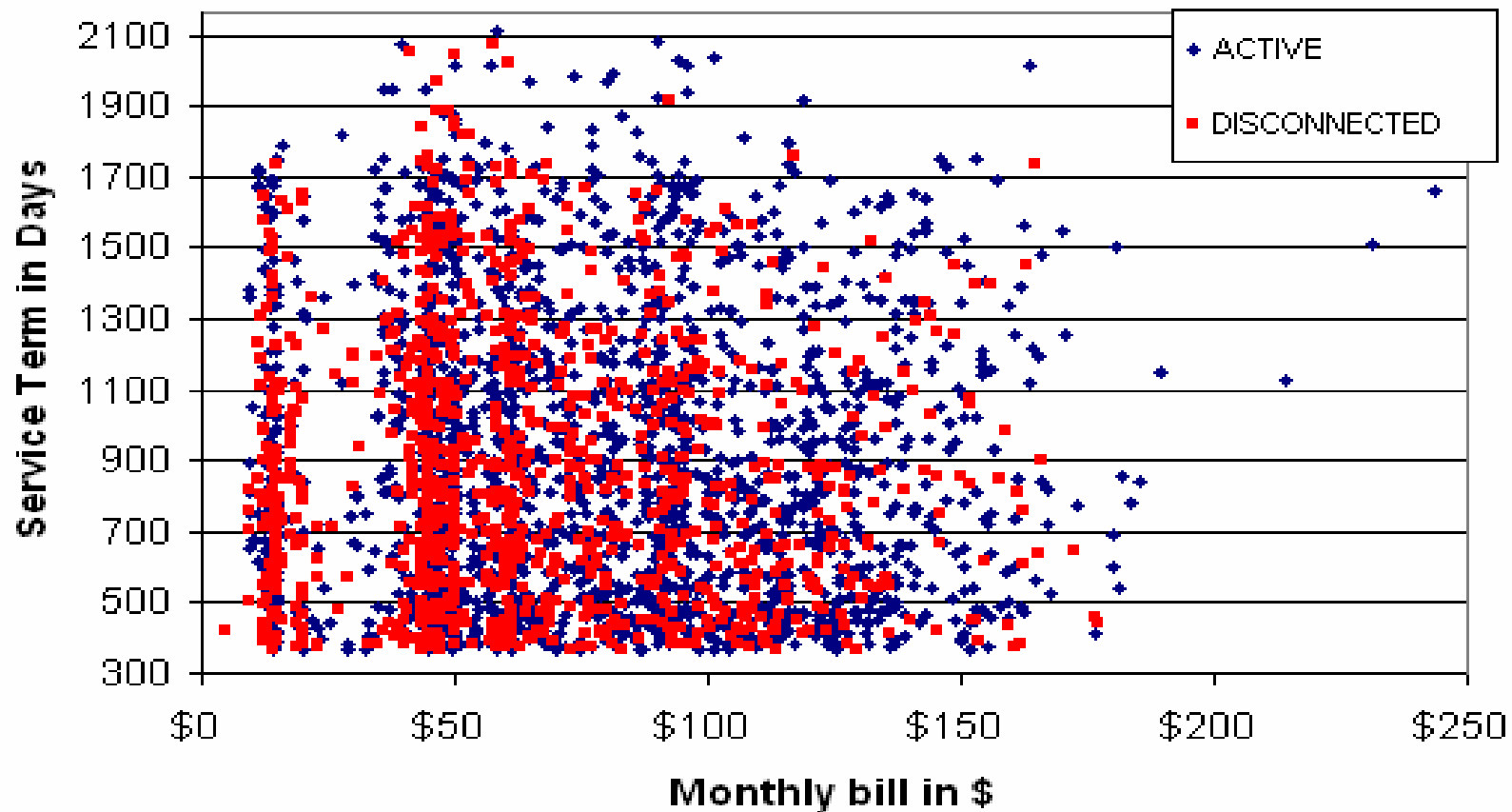
NUMERICAL

- **Monthly price**
- **Installation/Disconnect Dates**
- **Service Duration**
- **Average Household income by zip code**



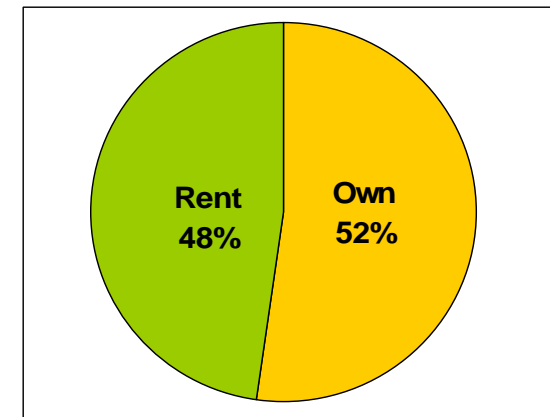
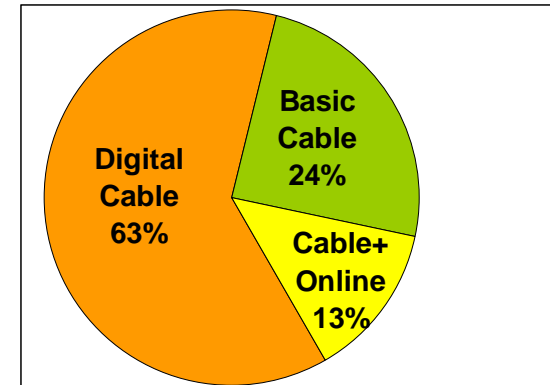
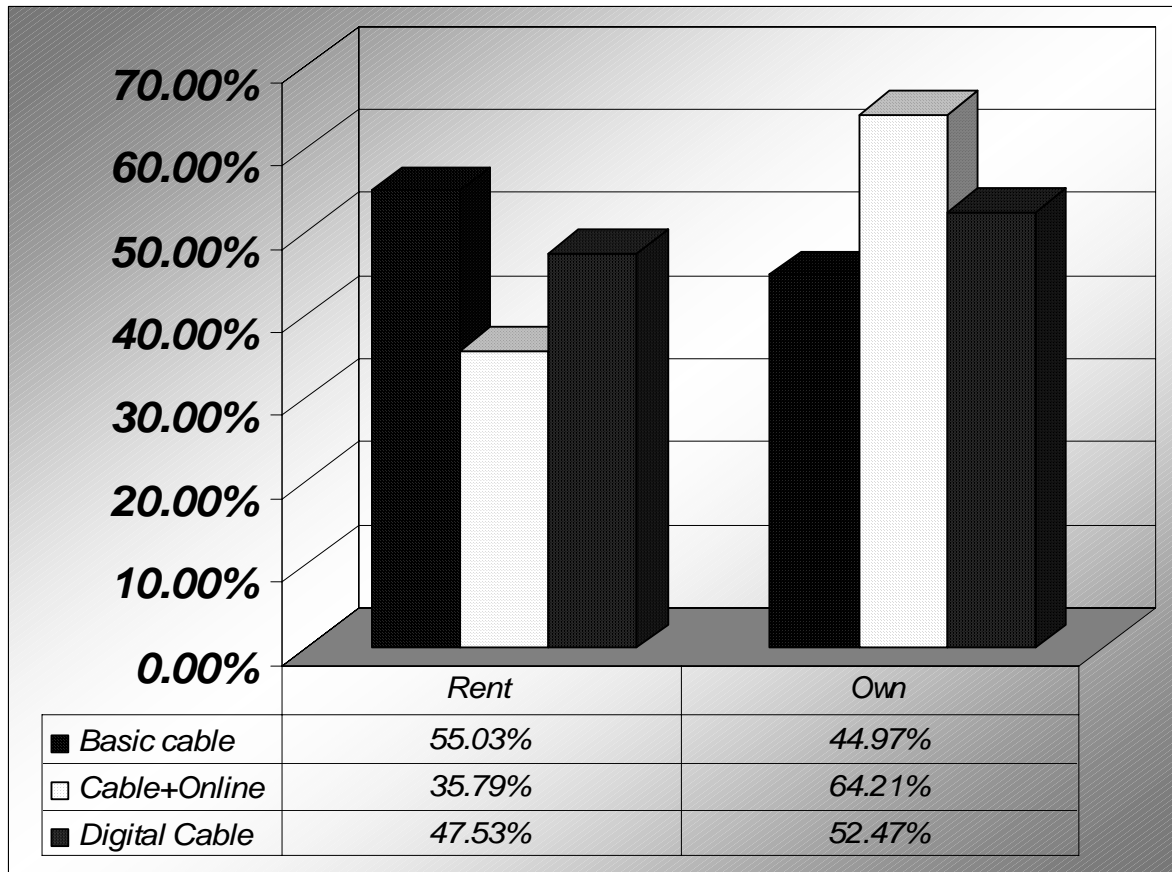
Data Exploration

Service Term and Price

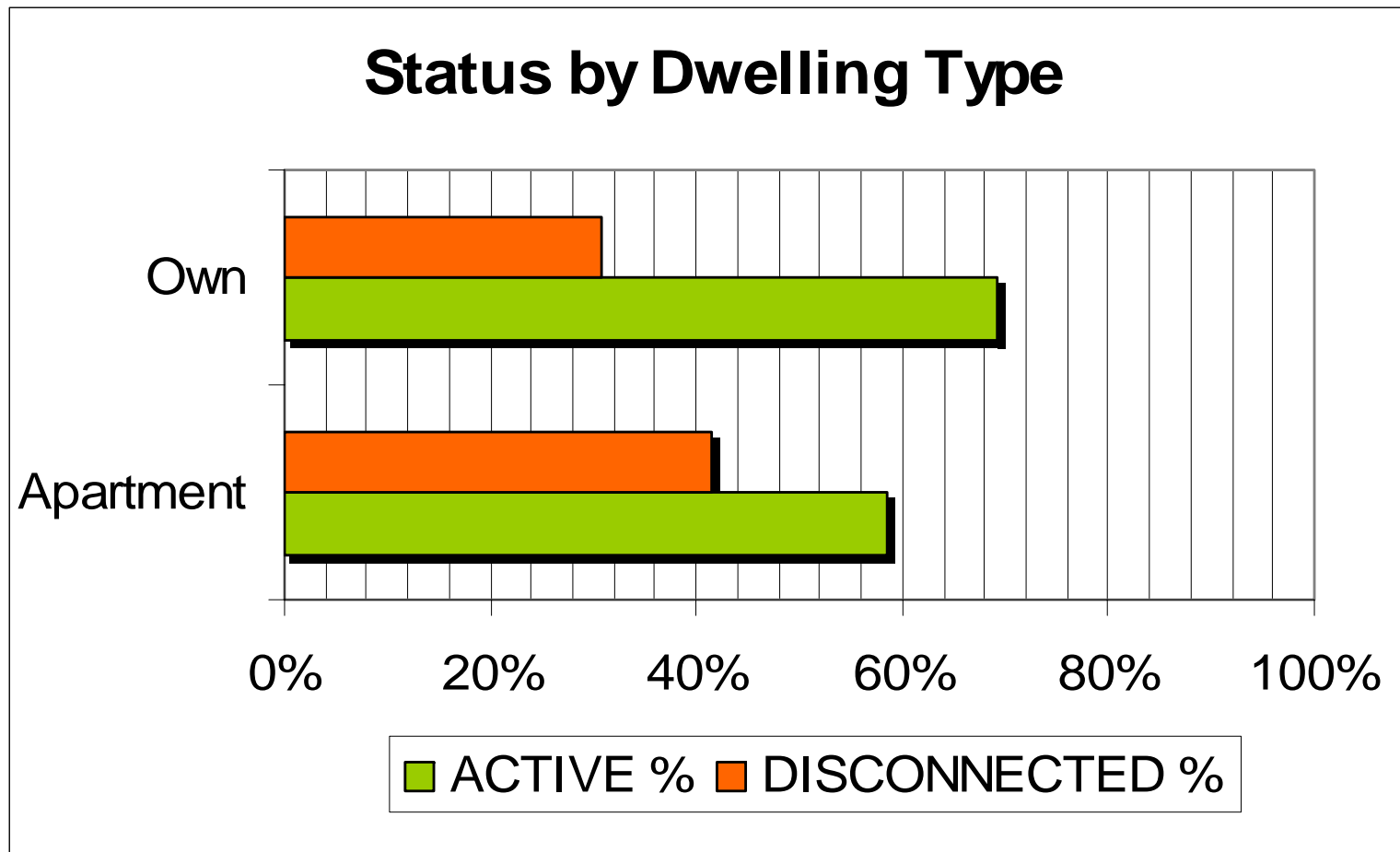


Price and Service Duration alone are poor predictors!

Relationship between Service Type and House Ownership

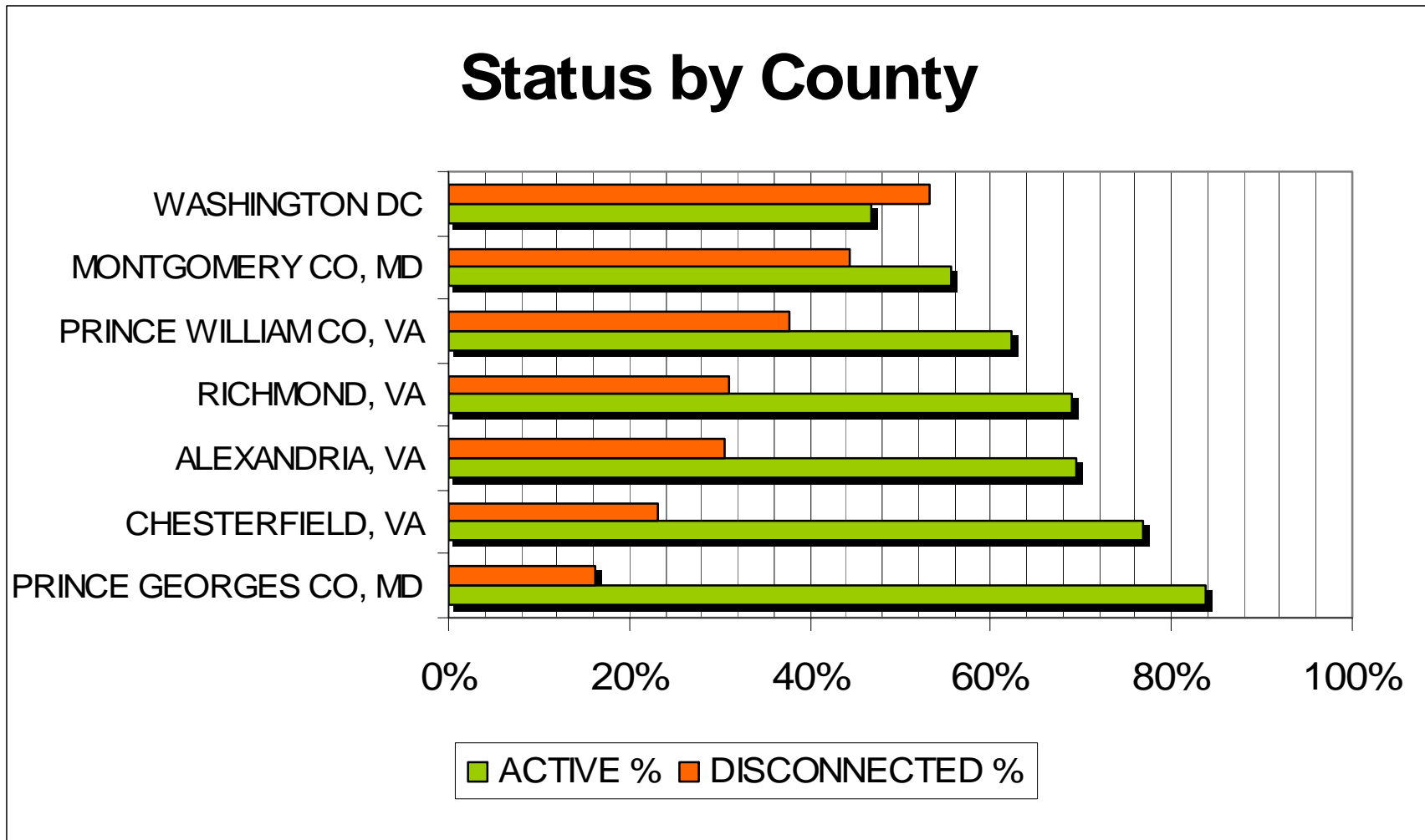


Home Ownership



Chi-squared test: At a 5% significance level we can say that the data indicate that customer churn depends on whether customers own or rent their house.

Churn by County/City



Chi-squared test: At a 5% significance level we can say that the data indicate that customer churn depends on the county the customer lives in.

Logistic Regression Models

Input variables	Coefficient	Std. Error	p-value	Odds
Constant term	0.68877268	0.1648957	0.00002954	*
Cust Cable Est Monthly Rev ID	-0.0053184	0.00210472	0.01150773	0.99469572
Duration	-0.00000138	0.00010287	0.98931015	0.99999863
Corp Desc ID_ALEXANDRIA VA (5613)	-0.84253299	0.13554157	0	0.43061841
Corp Desc ID_CHESTERFIELD VA (9562)	-1.16269374	0.21700417	0.00000008	0.31264287
Corp Desc ID_MONTGOMERY CO MD (9569)	-0.8613326	0.13220178	0	0.42259857
Corp Desc ID_PRINCE GEORGES CO MD	-0.30286229	0.13107149	0.02085138	0.73870081
Corp Desc ID_PRINCE WILLIAM CO VA	-0.43433678	0.140894	0.00205118	0.64769411
Corp Desc ID_RICHMOND VA (9592)	-1.60497594	0.18578444	0	0.20089439
Service type_Cable+Online	-0.69637138	0.2803753	0.01300211	0.4983905
Service type_Digital Cable	-0.10110566	0.13488297	0.4535073	0.9038375

House Dwelling	Input variables	Coefficient	Std. Error	p-value	Odds
	Constant term	0.69088924	0.1298449	0.0000001	*
	Cust Cable Est Monthly Rev ID	-0.00645544	0.00146032	0.00000984	0.99356538
	Corp Desc ID_ALEXANDRIA VA (5613)	-0.850254	0.13468784	0	0.42730638
	Corp Desc ID_CHESTERFIELD VA (9562)	-1.15628505	0.2166806	0.00000009	0.31465295
	Corp Desc ID_MONTGOMERY CO MD (9569)	-0.87042594	0.12953508	0	0.41877314
	Corp Desc ID_PRINCE GEORGES CO MD	-0.31219834	0.12988086	0.01622881	0.73183638
	Corp Desc ID_PRINCE WILLIAM CO VA	-0.44146794	0.14010592	0.00162735	0.64309168
	Corp Desc ID_RICHMOND VA (9592)	-1.58979857	0.18410049	0	0.20396671
	Service type_Cable+Online	-0.53638679	0.18199156	0.00320545	0.58485764
	House Dwelling ID_OWN	-0.27500519	0.08565363	0.00132428	0.75956815

No Duration
No Digital
Cable

Profiling objective ~ No partitioning
Success = Disconnect

Key Takeaways

Logistic Regression Models

- Customers with cable and Internet are less likely to disconnect compared to ones with only basic cable.
- Odds that homeowners disconnect are 0.76 times the odds than those of renters.
- Washington DC churn is 5 times that of Richmond customer.

Special Case 1: Washington DC

<i>Zip Code</i>	<i>ACTIVE</i>	<i>DISCONNECTED</i>	<i>Avg. Household Income</i>
20032	14.29%	85.71%	\$24,905
20037	28.57%	71.43%	\$42,487
20017	30.00%	70.00%	\$43,824
20019	35.71%	64.29%	\$27,317
20020	39.29%	60.71%	\$27,964
20002	43.59%	56.41%	\$35,313
20010	44.44%	55.56%	\$33,408
20011	46.15%	53.85%	\$39,757
20001	48.28%	51.72%	\$25,095
20018	50.00%	50.00%	\$37,277
20024	50.00%	50.00%	\$37,035
20036	50.00%	50.00%	\$51,847
20003	52.00%	48.00%	\$50,663
20005	54.17%	45.83%	\$31,352
20009	54.39%	45.61%	\$42,106
20015	54.55%	45.45%	\$97,091
20008	57.89%	42.11%	\$66,339
20016	62.50%	37.50%	\$80,651

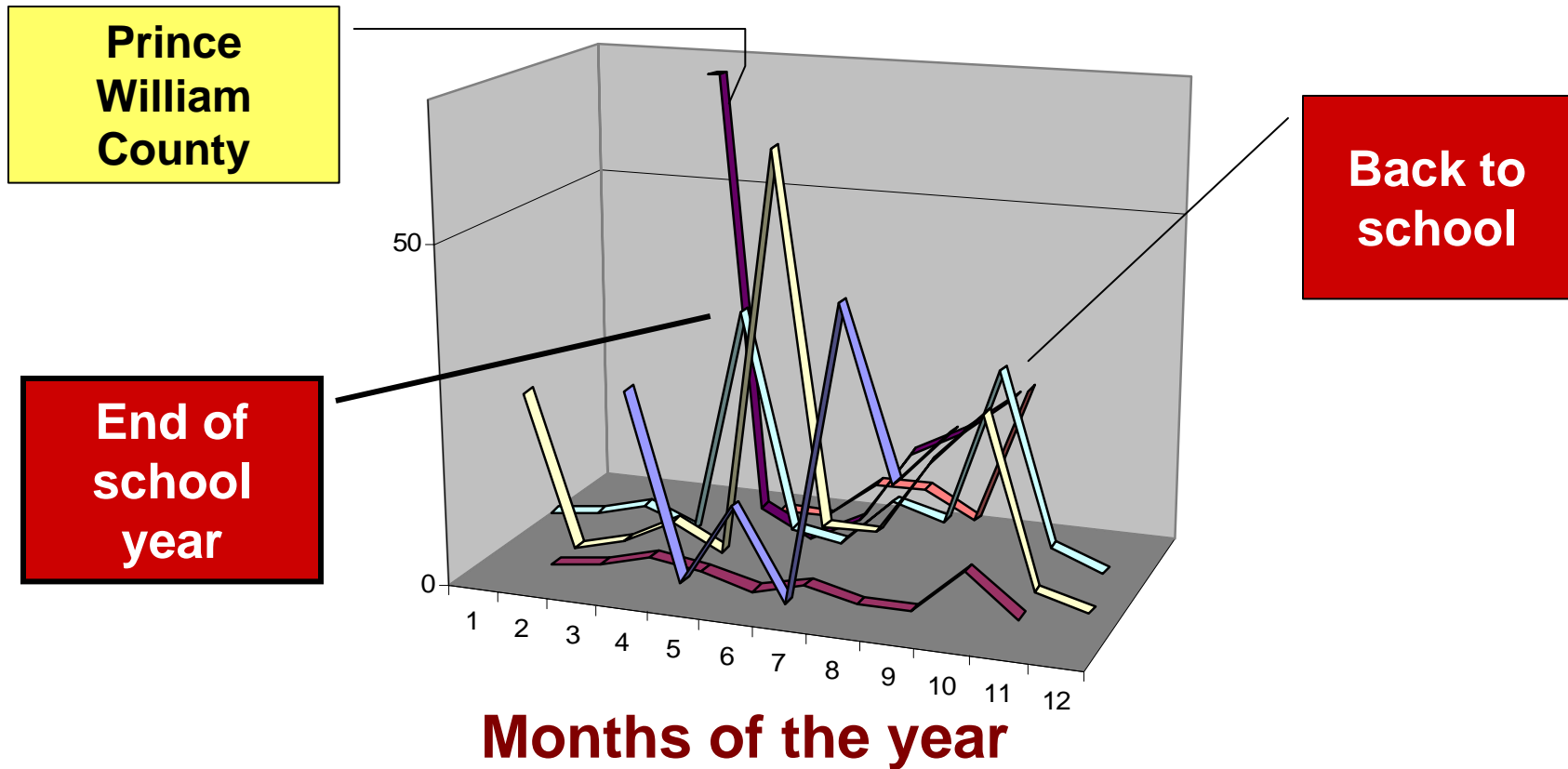
Bowling AFB

Fort
McNair

Adams
Morgan,
Kalorama and
Dupont Circle

American
University

Seasonality of Churn



- ALEXANDRIA VA (5613) - 1
- CHESTERFIELD VA (9562) - 1
- MONTGOMERY CO MD (9569) - 1
- PRINCE GEORGES CO MD (5014) - 1
- PRINCE WILLIAM CO VA (15011) - 1
- RICHMOND VA (9592) - 1
- WASHINGTON DC (9529) - 1

Special Case 2: Prince William County

Analysis of Prince William County



Cluster Analysis

- Hierarchical :
 - Euclidian distance
 - Complete linkage
- Dimensions :
 - Dwelling Type
 - Zipcodes
- Patterns :
 - Income, Duration

Special Case 2 – cont. Prince William County

Cluster 1

“settled”
home owners

avg. household
income
(~ \$72,000)

stay active for
longer durations
~42 months

average monthly
bill = \$80

Cluster 2

“movers”
home owners

avg. household
income
(~ \$61,000)

stay active for
medium
durations ~32
months

average monthly
bill = \$69

Cluster 3

“renters”
rent

avg. household
income
(~ \$60,000)

stay active for
shorter durations
~24 months

average monthly
bill = \$71

Recommended Marketing Strategies

1. Cluster 1: Intertwine services to lock in customers
2. Cluster 2: Offer huge incentives to new customers to draw them in
3. Cluster 3: Offer package deals to Multi-Dwelling Units

Key Takeaways

Significant Factors Influencing Cable Customer Churn

Strong factors

- Service bundles
- Home ownership
- Location (by zip code)

Weak factors

- Price (per individual service/bundle)
- Service duration
- Household income