Tenant Satisfaction and Commercial Building Performance

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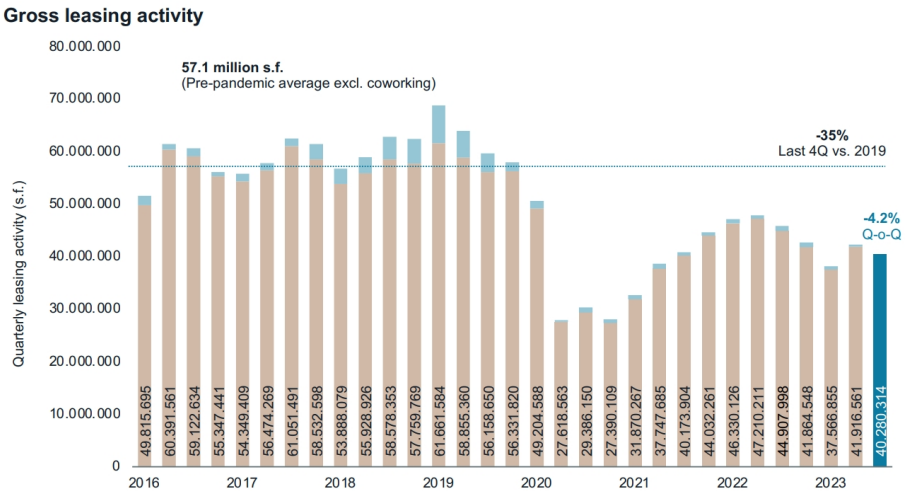
Information Asymmetry in Office Market

Tenant satisfaction is opaque to the landlord

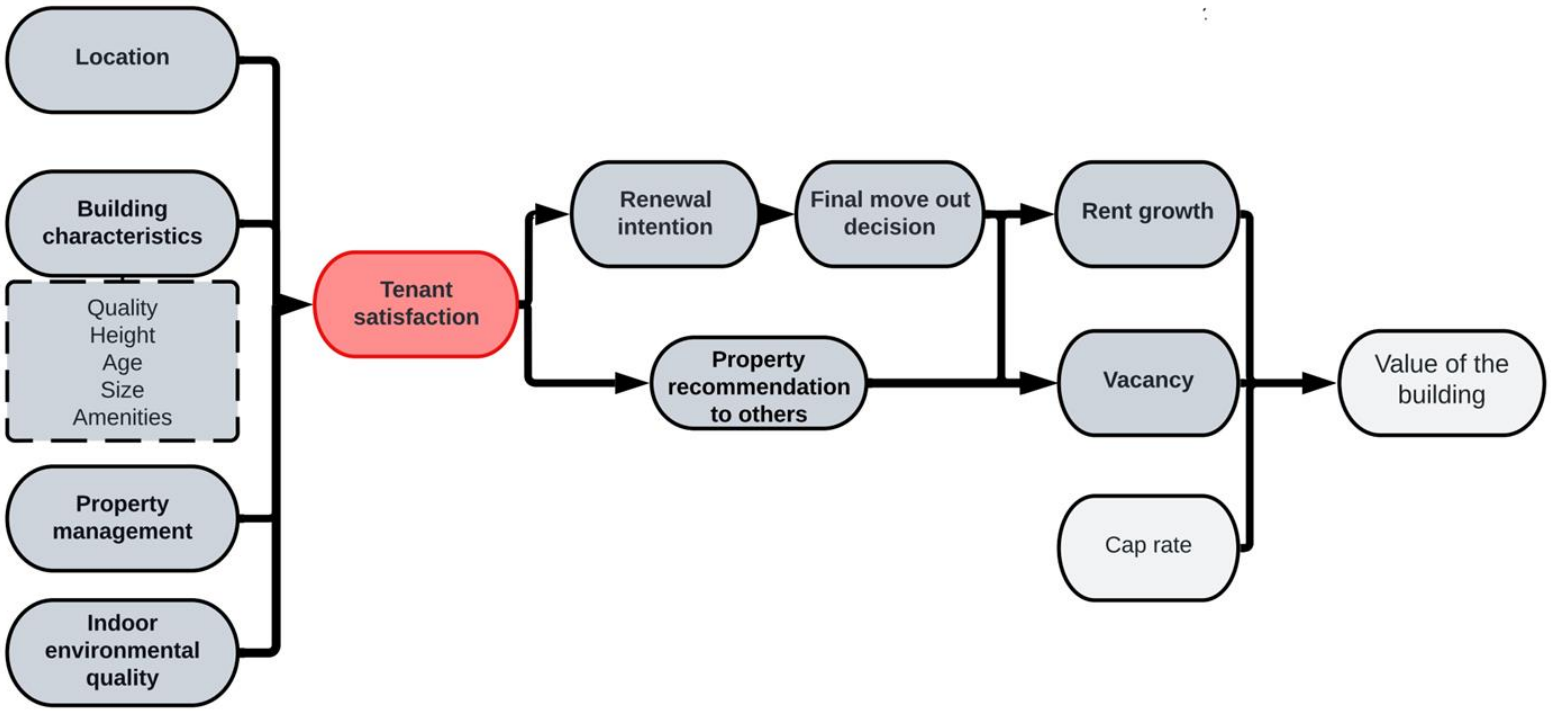
- Tenant satisfaction may contain valuable information about their willingness to pay and demand for office space.
- There are very few studies evaluating the economic importance of tenant satisfaction.



- COVID-19 pandemic and remote work policies are disrupting commercial real estate markets across the U.S., Europe, and Asia[Aksoy et al., 2022].
- Information on tenant willingness to stay is critical for investors (and lenders).

This paper

Figure 1: Research Framework



- Quantifying the impact of corporate tenant satisfaction.
- Hypothesis: Tenant's satisfaction level will affect their leasing decision and vacancy level of the building (intensive margin), and the changes in rent level (intensive margin).

Literature Review

We know very little about corporate occupiers...

- Information asymmetry and landlord-tenant bargaining
  - Tenant and landlord have different views about the property status.[Myers, 2020, Phillips, 2012];
  - The Landlord don't know the view of the tenant will lower the rent to avoid risk.[Dröes et al., 2017]
  - Good relationship with a tenant will lower the rent[Bryan et al., 2015, Larsen and Sommervoll, 2009].
- Occupier's role in the property's financial performance
  - Tenant credit quality [Liu et al., 2019], financial health [Lu-Andrews, 2017], industry resilience[Wang and Zhou, 2021], Tenant concentration [Zheng and Zhu, 2021].
  - Satisfaction with property management [Sanderson and Devaney, 2017].
- Customer relationship management and business performance
  - Propensity to recommend [Bolton and Drew, 1991], willingness to pay [Homburg et al., 2005].
  - Profitability [Anderson et al., 1994, Lim et al., 2020, Gruca and Rego, 2005].
  - Market share [Rego et al., 2013], stock market valuations [Aksoy et al., 2008].

Data sources

Grace Hill Kingsley survey

- Building address, survey date, tenant name, survey questions, survey response.

Costar database

- Building characteristics: building address, property type, building class, vintage, renovated year, size, number of stories, amenities.
- Financial performance: quarter, listing rents, vacancy.
- Current tenant: tenant name, tenant industry, SF occupied.
- Management: property management company, property owner.
- Leasing contract: sign date, lease size, rents/SF, tenant name, lease term, free rent, months on market.

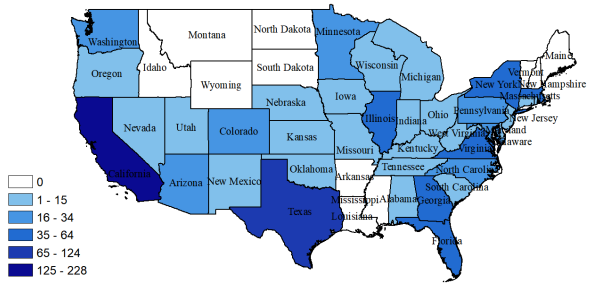
Data sources

The Grace Hill Kingsley Survey, an unexplored goldmine

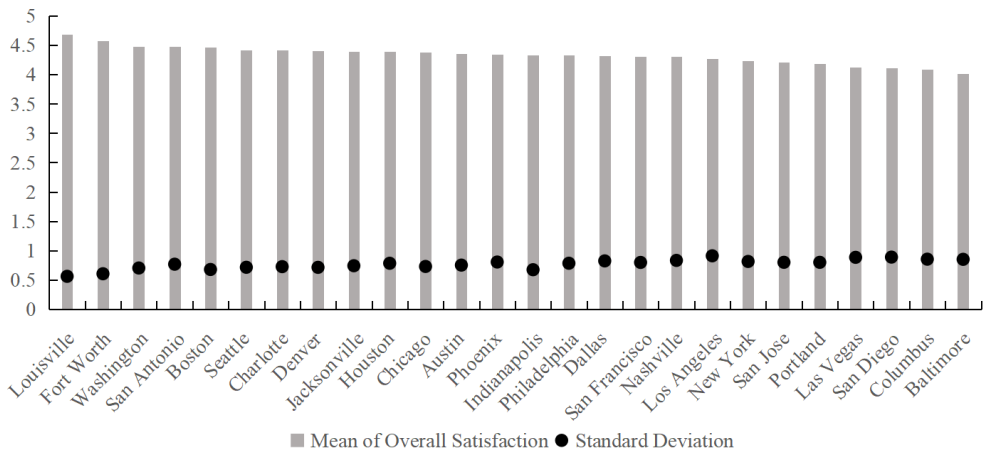
1. **Survey method**
   - Facilities/office manager or leasing decision maker
   - Online questionnaire, via email, annually
   - Response rate is about 70%
2. **Key themes in the standard questionnaire**
   - Overall satisfaction
   - Perceptions of property features
   - Management, leasing, and maintenance service
   - Current needs and priorities
   - Renewal intention, property recommendation
3. **Answers**
   - Likert scale from 1 to 5
4. **Observations**
   - 2,906 office buildings
   - 46,075 corporate tenants
   - From 2009 to 2023
   - 123,396 survey observations
   - 116 survey questions

Descriptive Statistics

Figure 2: Geographic distribution of observations and satisfaction



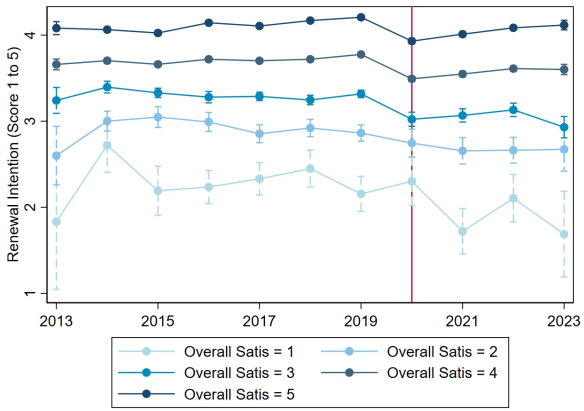
- Buildings in the sample are primarily concentrated in California and Texas, followed by New York, Washington D.C., Illinois, and Florida.



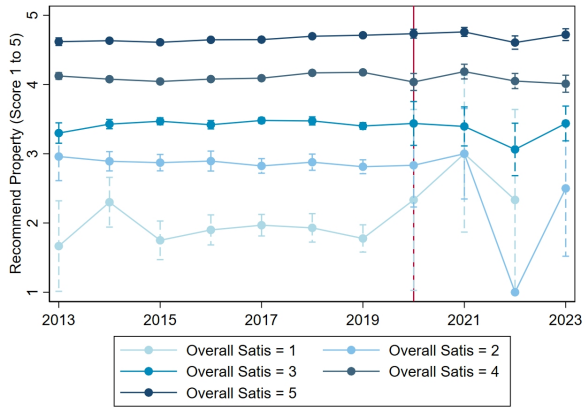
- 85% of the responses in the top-30 cities have average overall satisfaction values between 4.00 to 5.00, but with meaningful heterogeneity.

Descriptive Statistics

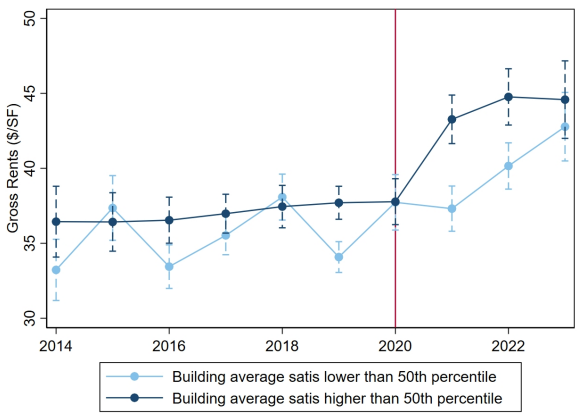
Figure 3: Time trend of main research variables by satisfaction level



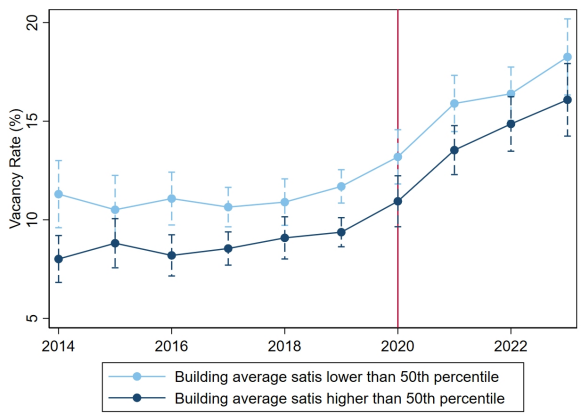
(a) Renewal intention



(b) Recommend property



(c) Gross rent



(d) Vacancy

- Higher satisfaction is associated with higher renewal intention, a higher propensity of property recommendation, higher gross rents and a lower vacancy rate.

Methodology I

Leasing Contracts and Recommendations

$$Lease_{i,b,t} = \alpha + \beta Satisfaction_{i,b,t} + \gamma X_b + \mu_t * \lambda_c + \tau_i + \varepsilon_{i,b,t} \quad (1)$$

- $Lease_{i,b,t}$: Corporate tenant *i*'s leasing decision in building *b* in year *t*, including:
  - (1) Likelihood of tenant renewing their lease.
  - (2) Willingness to recommend the property to a third party.
  - (3) Likelihood of tenant has left the building.
- $Satisfaction_{i,b,t}$: Corporate tenant *i*'s overall satisfaction level in building *b* in year *t*.
- X_b: Including building class, construction year, number of floors, renovation, building size, and on-site amenities.
- $\mu_t * \lambda_c$: Time * City fixed effects.
- τ_i: Tenant fixed effects.

Empirical Results (I): Tenant Decision

Strong predictor of self-reported commitment and actual leasing behaviour

Table 1: Satisfaction, Leasing Decision, and Building Recommendation

	Renewal Intention$_{i,b,t}$ (Score 1-5)			Building Recommend$_{i,b,t}$ (Score 1-5)			Move Out Property$_{i,b,t+1}$ (YES=1)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Overall Satisfaction$_{i,b,t}$	0.432***	0.433***	0.329***	0.598***	0.594***	0.473***	-0.208***	-0.158***
	(0.005)	(0.005)	(0.008)	(0.005)	(0.005)	(0.008)	(0.016)	(0.034)
Constant	2.016***	1.804***	2.266***	1.315***	1.220***	2.132***	0.445	2.236
	(0.113)	(0.125)	(0.219)	(0.085)	(0.093)	(0.175)	(0.641)	(2.212)
Control$_b$	YES	YES	YES	YES	YES	YES	YES	YES
Time * City FE	NO	YES	YES	NO	YES	YES	NO	YES
Tenant FE	NO	NO	YES	NO	NO	YES	NO	NO
Observations	100,305	100,178	79,474	64,607	64,544	49,394	45,586	27,664
# Buildings	2,796	2,762	2,439	2,134	2,112	1,898	2,628	2,633
R-squared	0.123	0.157	0.554	0.374	0.394	0.670	0.014	0.194

Results in Columns (1) - (6) are OLS regressions, and Columns (7) - (8) are Logit regressions.
Robust standard errors, clustered by building, in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$
Full table with all estimates are in Appendix (I).

Methodology II

Financial Performance: Rents and Vacancy Rates changes

$$\Delta Log(Performance_{b,t+1,t}) = \alpha + \beta Log(Satisfaction_{b,t}) + \theta Log(Performance_{b,t}) + \gamma X_b + \mu_t * \lambda_c + \varepsilon_{b,t} \quad (2)$$

- $\Delta Log(Performance_{b,t+1,t})$: change in financial performance in building b between year $t+1$ and year t, including:
  (1) Change in the logarithm of gross rent.
  (2) Change in the logarithm of effective gross rent.
  (2) Change in the vacancy rate.
- $Log(Satisfaction_{b,t})$: Logarithm of the arithmetic average of overall satisfaction level of building j in year t.
- $Log(Performance_{b,t})$: Lagged financial performance of the building of building j in year t. Including:
  (1) The logarithm of gross rent
  (2) The vacancy rate.
- X_b: Including building class, construction year, number of floors, renovation, building size, and on-site amenities.
- $\mu_t * \lambda_c$: Time FE*City FE

Empirical results (II): Building Performance

Faster gross rent growth and slower increase in vacancy rate

Table 2: Tenant Satisfaction and Building Financial Performance

	$\Delta Log(Rent_{b,t+1,t})$ ($/SF)			$\Delta Log(EffectiveRent_{b,t+1,t})$ ($/SF)			$\Delta VacancyRate_{b,t+1,t}$ (%)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log(Overall Satis$_{b,t}$)	0.006	0.005	0.018**	0.063***	0.053**	0.086***	-3.345***	-2.936***	-3.434***
(Score 1-5)	(0.007)	(0.007)	(0.009)	(0.020)	(0.021)	(0.025)	(0.755)	(0.770)	(0.839)
Constant	0.053***	0.060***	0.144***	-0.092***	-0.132**	-0.140*	7.880***	11.162***	12.993***
	(0.013)	(0.022)	(0.037)	(0.034)	(0.057)	(0.075)	(1.311)	(2.839)	(3.051)
Lagged Level$_{b,t}$	YES	YES	YES	YES	YES	YES	YES	YES	YES
Control$_b$	NO	YES	YES	NO	YES	YES	NO	YES	YES
Time * City FE	NO	NO	YES	NO	NO	YES	NO	NO	YES
Observations	5,156	5,156	4,477	5,155	5,155	4,476	9,079	9,079	8,226
# Buildings	1,690	1,690	1,515	1,598	1,598	1,427	2,166	2,166	1,997
R-squared	0.006	0.009	0.236	0.050	0.055	0.273	0.067	0.071	0.237

Explained variables are winsorised at their respective 1st and 99th percentiles to reduce the influence of outliers.
Robust standard errors, clustered by building, in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Full table with all estimates are in Appendix (I).

Robustness and Heterogeneity

Robustness **:**

- Using leasing contract data, consistent with main findings.
- Divide into groups with different satisfaction levels, results are more significant if the building/tenant has a lower original satisfaction level.
- Results from before and after the COVID samples are consistent with the main findings.
- Change in satisfaction is predictive of change in decision.

Heterogeneity **:**

- High-vacancy submarket (above median) and low-vacancy submarket(below median).
  - More significant if the submarket has a higher vacancy rate.
- Longer-staying tenant (above median) and short-stay (below median) tenant.
  - More significant if the tenant is in the building for a short time.

Conclusion

Tenant satisfaction (through stated preferences) matters!

- Tenant's satisfaction with the building is able to predict self-reported behaviour, such as renewal intention, the willingness of property recommendation, and the *actual* move-out decision.
- Higher tenant satisfaction is predictive of better financial performance, measured by rent growth and building occupancy.
- The beneficial effect of tenant satisfaction improvement is more significant when:
  - The building/tenant initially had a low satisfaction level.
  - The tenant stays in the building for a short time (i.e. lower barrier to move).
  - The submarket has a relatively high vacancy rate (i.e. more competition).

Thanks!

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Descriptive Statistics

Data cover of landmark buildings and anchor tenants

Figure 4: Sample office buildings

- Empire State Building, 30 Rockefeller Plaza, Greybar building etc.
- Among the S&P 500 companies, 71% of them have branches and subsidies in our research samples, and survey responses from S&P 500 companies constitute 4.7% (5,644 of 123,396) of our observations.
  - Apple, Morgan Stanley, Bank of America, Goldman Sachs, Prudential Financial, MetLife, Wells Fargo, CVS Health, Amazon, Google, Microsoft, IBM, etc.

Descriptive Statistics

Table 3: Descriptive statistics

Variable	Obs.	Mean	Std.	Min	Max
Panel A: Tenant Decision (Company Level)					
$RenewalIntention_{i,b,t}$ (Score 1-5)	94,151	3.825	0.94	1.00	5.00
$BuildingRecommendation_{i,b,t}$ (Score 1-5)	60,654	4.282	0.77	1.00	5.00
$FinalMoveOut_{i,b}$ (YES=1)	45,586	0.462	0.50	0.00	1.00
Panel B: Tenant Perception					
$OverallSatisfaction_{i,b,t}$ (Score 1-5)(Company Level)	123,396	4.338	0.77	1.00	5.00
$AverageOverallSatisfaction_{b,t}$ (Score 1-5)(Building Level)	8,305	4.312	0.47	1.00	5.00
Panel C: Building Characteristics (Building Level)					
$Green_{b,t}$ (YES=1)	9,368	0.401	0.49	0.00	1.00
$GMgmt_{b,t}$ (YES=1)	9,368	0.645	0.48	0.00	1.00
Building Class(percent):					
$ClassA_b$ (YES=1)	2,906	0.667	0.47	0.00	1.00
$ClassB_b$ (YES=1)	2,906	0.309	0.46	0.00	1.00
$ClassC_b$ (YES=1)	2,906	0.024	0.15	0.00	1.00
Age_b (Years)	2,906	38.17	25.67	1.00	165.00
Built Year (percent):					
$Before1970_b$ (YES=1)	2,906	0.156	0.36	0.00	1.00
$1970-1979_b$ (YES=1)	2,906	0.096	0.30	0.00	1.00
$1980-1989_b$ (YES=1)	2,906	0.327	0.47	0.00	1.00
$1990-1999_b$ (YES=1)	2,906	0.150	0.36	0.00	1.00
$After2000_b$ (YES=1)	2,906	0.270	0.44	0.00	1.00

Descriptive Statistics

Variable	Obs.	Mean	Std.	Min	Max
Stories (percent):					
Low_b (<10 floors) (YES=1)	2,906	0.612	0.49	0.00	1.00
$Medium_b$ (10<and<20 floors) (YES=1)	2,906	0.210	0.41	0.00	1.00
$High_b$ (>20 floors) (YES=1)	2,906	0.167	0.37	0.00	1.00
$Renovated_{b,t}$ (YES=1)	10,341	0.284	0.45	0.00	1.00
$TypicalFloorSize_b$(thousand SF)	2,906	28.187	19.15	2.70	356.75
$RentableBuildingArea_b$(thousand SF)	2,906	279.174	319.82	2.70	3235.53
$Amenities_b$ (YES=1)	2,906	0.596	0.49	0.00	1.00
Panel D: Financial Indicators (Building Level):					
Growth:					
$\Delta Rents_{b,t+1,t}$ (%)	5,964	1.72	6.07	-23.64	25.35
$\Delta EffectiveRents_{b,t+1,t}$ (%)	5,525	1.421	12.91	-44.53	47.34
$\Delta VacancyRate_{b,t+1,t}$(%)	7,874	2.523	64.89	-193.81	234.47
Level data:					
$Rents_{b,t}$ ($/SF yr)	6,490	36.49	14.66	8.00	121.69
$EffectiveRents_{b,t}$ ($/SF yr)	6,123	31.757	14.56	0.00	120.00
$VacancyRate$(%)	8,282	13.66	14.06	0.00	100.00
Panel E: Leasing Contract Characteristics (Contract Level):					
$Rents_{g,b,t}$($/SF yr)	6,211	33.814	21.30	1.70	758.12
$EffectiveRents_{g,b,t}$($/SF yr)	5,620	29.164	19.16	0.00	691.07
$MonthsonMarket_{g,b,t}$(Years)	6,211	2.182	2.52	0.00	20.42
$ContractLength_{g,b,t}$(Years)	6,211	4.592	3.85	0.08	65.00
$FreeRent_{g,b,t}$(Years)	6,211	0.017	0.11	0.00	2.17
$Log(SizeLeased_{g,b,t})$(SF)	6,211	8.439	1.09	5.13	13.11

Robustness (I): Achieved Rents

Table 4: Tenant Satisfaction and Contract Rents

	$\Delta Log(Rent_{b,t+1,t})$ ($/SF)	Log(Contract Rent$_{g,b,t+1}$)($/SF)		$\Delta Log(Effective$ Rent$_{b,t+1,t}$)($/SF)	Log(Effective Contract Rent$_{g,b,t+1}$)($/SF)	
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Overall Satis$_{b,t}$)	0.017*	0.055	0.058	0.086**	0.192**	0.202*
	(0.009)	(0.070)	(0.098)	(0.025)	(0.079)	(0.110)
Contract Characteristics:						
Time on Market$_{g,b,t+1}$			0.004			0.006***
(Years)			(0.003)			(0.002)
Contract Length$_{g,b,t+1}$			0.025***			0.026***
(Years)			(0.009)			(0.008)
Contract Length$^2_{g,b,t+1}$			-0.000***			-0.000***
(Years^2)			(0.000)			(0.000)
Log(Size Leased)$_{g,b,t+1}$			-0.017***			-0.010*
(SF)			(0.006)			(0.006)
Free Rent Period$_{g,b,t+1}$			-0.147***			-0.148***
(Years)			(0.055)			(0.048)
Constant	0.138***	2.528***	2.352***	-0.198*	2.372***	2.045***
	(0.042)	(0.251)	(0.359)	(0.118)	(0.273)	(0.371)
Lagged Level$_{b,t}$	YES	YES	YES	YES	YES	YES
Control	YES	YES	YES	YES	YES	YES
Time*City FE	YES	YES	YES	YES	YES	YES
Contract type FE	NO	YES	YES	NO	YES	YES
Observations	4,477	7,202	3,338	3,802	7,182	3,327
# Buildings	1,515	872	587	1,427	757	503
R-squared	0.236	0.759	0.764	0.266	0.772	0.771

Explained variables are winsorised at their respective 1st and 99th percentiles to reduce the influence of outliers.
Robust standard errors are clustered by building in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Robustness (II): Marginal Effect

Table 5: The Marginal Effect of Tenant Satisfaction Improvement

	Renewal Intention$_{i,b,t}$ (Score 1-5)		Building Recommend$_{i,b,t}$ (Score 1-5)		Finally Move Out$_{i,b,t+1}$ (YES=1)	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Tenant Satisfaction and Tenant Decision						
Overall Satisfaction$_{b,t}$ (Score 1 - 5)	0.329***		0.473***		-0.158***	
	(0.008)		(0.008)		(0.032)	
Overall Satisfaction Score 2$_{i,b,t}$ (YES=1)		0.477***		0.719***		-0.706***
		(0.071)		(0.093)		(0.271)
Overall Satisfaction Score 3$_{i,b,t}$ (YES=1)		0.824***		1.229***		-1.766***
		(0.068)		(0.089)		(0.271)
Overall Satisfaction Score 4$_{i,b,t}$ (YES=1)		1.181***		1.758***		-1.907***
		(0.067)		(0.087)		(0.272)
Overall Satisfaction Score 5$_{i,b,t}$ (YES=1)		1.484***		2.182***		-1.883***
		(0.068)		(0.088)		(0.275)
Constant	2.252***	2.399***	2.126***	2.281***	-1.631	-0.758
	(0.219)	(0.229)	(0.176)	(0.193)	(1.730)	(1.740)
Control	YES	YES	YES	YES	YES	YES
Time*City FE	YES	YES	YES	YES	YES	YES
Tenant FE	YES	YES	YES	YES	NO	NO
Observations	79,466	79,466	49,385	49,385	26,408	26,408
# Buildings	2,439	2,439	1,898	1,898	1,697	1,697
R-squared	0.594	0.594	0.695	0.696	0.313	0.313

Results in Columns (1) - (4) are OLS regressions, and Columns (5) - (6) are Logit regressions.
Robust standard errors are clustered by building in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Robustness (II): Marginal Effect

Panel B:Tenant Satisfaction and building Financial Performance						
	$\Delta Log(Rent_{b,t+1,t})$ ($/SF)		$\Delta Log(EffectiveRent_{b,t+1,t})$ ($/SF)		$\Delta VacancyRate_{b,t+1,t}$ (%)	
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Overall $Satis_{b,t}$)	0.018**		0.085***		-3.868***	
(Score 1 - 5)	(0.008)		(0.026)		(1.101)	
Log(Overall Satis) 20-40 $percentile_{b,t}$		0.004		0.022***		-1.127***
(YES=1)		(0.003)		(0.007)		(0.364)
Log(Overall Satis) 40-60 $percentile_{b,t}$		-0.000		0.014*		-1.292***
(YES=1)		(0.003)		(0.007)		(0.376)
Log(Overall Satis) 60-80 $percentile_{b,t}$		0.004		0.017**		-1.500***
(YES=1)		(0.003)		(0.008)		(0.384)
Log(Overall Satis) 80-100 $percentile_{b,t}$		0.003		0.027***		-1.807***
(YES=1)		(0.003)		(0.008)		(0.410)
Constant	0.161***	0.193***	-0.063	0.023	13.731***	8.739***
	(0.036)	(0.035)	(0.076)	(0.062)	(3.020)	(2.828)
Lagged $Level_{b,t}$	YES	YES	YES	YES	YES	YES
Control	YES	YES	YES	YES	YES	YES
Time*City FE	YES	YES	YES	YES	YES	YES
Observations	5,056	5,787	5,042	5,773	9,272	10,371
# Buildings	1,515	1,515	1,427	1,427	1,997	1,997
R-squared	0.260	0.278	0.278	0.284	0.243	0.251

Explained variables are winsorised at their respective 1st and 99th percentiles to reduce the influence of outliers.
Robust standard errors are clustered by building in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Robustness (III): COVID-19 Shock and Move-out Decision Making

Table 6: Move-out Decision Sensitivity to Covid Shock

	(1) Main Regress	(2) New identification	(3) After Covid	(4) Before Covid	(5) Pre Covid Satis
Move out probability	49.2%	48.6%	16.7%	42.1%	19.9%
Overall Satisfaction	-0.158***	-0.219***	-0.567***	-0.143***	-0.270***
(Score 1 - 5)	(0.034)	(0.032)	(0.054)	(0.032)	(0.044)
Constant	2.236	-3.177*	-1.410	0.856	-1.957
	(2.212)	(1.825)	(2.463)	(1.075)	(1.624)
Control	YES	YES	YES	YES	YES
Time * City FE	YES	YES	YES	YES	YES
Tenant FE	NO	NO	NO	NO	NO
Observations	26,432	26,432	12,045	18,884	9,336
#Buildings	2,633	2,633	1,717	2,528	1,190
R-squared	0.312	0.312	0.409	0.096	0.273

Robust standard errors are clustered by building in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Robustness (IV): Effect of Improving Satisfaction

Table 7: Effect of Improving Satisfaction

	$\Delta RenewalIntention_{i,b,t}$ (Score 1-5) (1)	$\Delta BuildingRecommend_{i,b,t}$ (Score 1-5) (2)	Finally Move Out$_{i,b,t+1}$ (YES=1) (3)
$\Delta Satisfaction_{i,b,t}$ (Score 1-5)	0.248***	0.358***	
	(0.016)	(0.017)	
Satisfaction Improving (YES=1)			-0.149***
			(0.055)
Constant	0.140***	1.158***	-0.200*
	(0.043)	(0.096)	(0.121)
Control$_b$	YES	YES	YES
City*Time FE	YES	YES	YES
Tenant FE	YES	YES	No
Observations	22,157	13,760	9,101
# Buildings	1,515	1,190	1,427
R-squared	0.388	0.414	0.310

Robust standard errors are clustered by building in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Heterogeneity (I): Different Submarket Vacancy

High vacancy market has a bigger impact on building performance

Table 8: Market Vacancy and the Effect of Tenant Satisfaction

	Tenant decision			Financial performance		
	(1) Renewal Intention$_{i,b,t}$ (Score 1-5)	(2) Building Recommend$_{i,b,t}$ (Score 1-5)	(3) Finally Move Out$_{i,b,t+1}$ (YES=1)	(4) $\Delta Log($ Rent$_{b,t+1})$ ($/SF)	(5) $\Delta Log($*Effective* Rent$_{b,t+1})$ ($/SF)	(6) Δ*Vacancy* Rate$_{b,t+1}$ (%)
Panel A: High vacancy submarket(Top 50% percentile)						
Overall Satisfaction$_{i,b,t}$	0.319***	0.454***	-0.124***			
(Score 1-5)	(0.010)	(0.011)	(0.043)			
Log(Overall Satis$_{b,t}$)				-0.001	0.055	-3.239**
(Score 1-5)				(0.010)	(0.034)	(1.557)
Constant	1.896***	1.680***	-0.057	0.156***	0.344**	12.405***
	(0.337)	(0.263)	(2.914)	(0.048)	(0.135)	(4.140)
Lagged Level$_{b,t}$	NO	NO	NO	YES	YES	YES
Control	YES	YES	YES	YES	YES	YES
Time*City FE	YES	YES	YES	YES	YES	YES
Tenant FE	YES	YES	YES	NO	NO	NO
Observations	45,536	27,586	16,375	2,690	2,687	4,747
# Buildings	1,034	1,034	1,034	841	803	1,083
R-squared	0.618	0.717	0.352	0.331	0.305	0.272

Explained variables are winsorised at their respective 1st and 99th percentiles to reduce the influence of outliers.
Robust standard errors are clustered by building in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Heterogeneity (I): Different Submarket Vacancy

High vacancy submarket has a bigger impact on tenant decision

	Tenant decision			Financial performance		
	(1) Renewal Intention$_{i,b,t}$ (Score 1-5)	(2) Building Recommend$_{i,b,t}$ (Score 1-5)	(3) Finally Move Out$_{i,b,t+1}$ (YES=1)	(4) $\Delta Log($ Rent$_{b,t+1})$ ($/SF)	(5) $\Delta Log($*Effective* Rent$_{b,t+1})$ ($/SF)	(6) Δ*Vacancy* Rate$_{b,t+1}$ (%)
Panel B: Low vacancy submarket(Bottom 50% percentile)						
Overall Satisfaction$_{i,b,t}$	0.335***	0.475***	-0.266***			
	(0.011)	(0.011)	(0.041)			
Log(Overall Satis$_{b,t}$)				0.013	0.074*	-4.326***
(Score 1-5)				(0.013)	(0.038)	(1.460)
Constant	1.468***	1.699***	1.158	0.185***	-0.209	12.396***
	(0.358)	(0.249)	(2.660)	(0.068)	(0.162)	(3.994)
Lagged Level$_{b,t}$	NO	NO	NO	YES	YES	YES
Control	YES	YES	YES	YES	YES	YES
Time*City FE	YES	YES	YES	YES	YES	YES
Tenant FE	YES	YES	YES	NO	NO	NO
Observations	37,423	24,167	15,268	2,608	2,599	5,120
# Buildings	1,019	759	702	851	795	1,159
R-squared	0.609	0.699	0.313	0.259	0.278	0.248

Results in Columns (1) - (4) are OLS regressions, and Columns (5) - (6) are Logit regressions.
Robust standard errors are clustered by building in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Heterogeneity (II): How long tenants have stayed

Longer the tenant have stayed, the less sensitive they are to their satisfaction

Table 9: Move Out Burden and Move Out Decision

	(1) Renewal Intention$_{i,b,t}$ (Score 1-5)	(2) Building Recommend$_{i,b,t}$ (Score 1-5)	(3) Finally Move Out$_{i,b,t+1}$ (YES=1)
Panel A: Stayed Long Tenants(Top 50% percentile)			
Overall Satisfaction$_{i,b,t}$	0.287***	0.498***	-0.306***
(Score 1-5)	(0.032)	(0.039)	(0.093)
Constant	1.821	0.412	2.911
	(1.336)	(1.990)	(3.140)
Control	YES	YES	YES
Time*City FE	YES	YES	YES
Tenant FE	YES	YES	NO
Observations	4,019	2,489	1,641
# Buildings	799	615	598
R-squared	0.606	0.688	0.271
Panel B: Stayed Short Tenants(Bottom 50% percentile)			
Overall Satisfaction$_{i,b,t}$	0.363***	0.476***	-0.210*
(Score 1-5)	(0.055)	(0.075)	(0.112)
Constant	4.389**	4.517*	-0.152
	(1.906)	(2.519)	(3.400)
Control	YES	YES	YES
Time*City FE	YES	YES	YES
Tenant FE	YES	YES	NO
Observations	2,185	1,216	977
# Buildings	760	542	617
R-squared	0.693	0.762	0.251

Explained variables are winsorised at their respective 1st and 99th percentiles to reduce the influence of outliers.
Robust standard errors are clustered by building in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Appendix (I): Full Table of Main Regression

Table 10: Satisfaction, Leasing Decision, and Building Recommendation

	Renewal Intention$_{i,b,t}$ (Score 1-5)			Building Recommend$_{i,b,t}$ (Score 1-5)			Finally Move Out$_{i,b,t+1}$ (YES=1)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Overall Satisfaction$_{i,b,t}$	0.432***	0.433***	0.329***	0.598***	0.594***	0.473***	-0.208***	-0.158***
(Score 1-5)	(0.005)	(0.005)	(0.008)	(0.005)	(0.005)	(0.008)	(0.016)	(0.034)
Building Class:								
Class A$_b$	-0.147***	-0.093*	0.074	0.007	0.025	-0.013	0.288	0.411
(YES=1)	(0.047)	(0.050)	(0.091)	(0.035)	(0.039)	(0.057)	(0.303)	(0.682)
Class B$_b$	-0.125***	-0.088*	0.033	-0.044	-0.006	-0.056	0.369	0.696
(YES=1)	(0.046)	(0.049)	(0.090)	(0.035)	(0.038)	(0.056)	(0.300)	(0.655)
Construction Year:								
1970_1980$_b$	0.024	0.008	-0.012	-0.018	-0.032**	-0.043	-0.071	-0.037
(YES=1)	(0.020)	(0.020)	(0.032)	(0.014)	(0.016)	(0.028)	(0.112)	(0.304)
1980_1990$_b$	0.001	-0.003	0.025	0.009	0.003	-0.009	-0.259**	-0.568*
(YES=1)	(0.017)	(0.019)	(0.032)	(0.012)	(0.015)	(0.026)	(0.101)	(0.304)
1990_2000$_b$	-0.026	-0.032	0.025	0.052***	0.034**	-0.007	-0.429***	-0.525
(YES=1)	(0.020)	(0.021)	(0.035)	(0.014)	(0.016)	(0.028)	(0.121)	(0.364)
After 2000$_b$	-0.012	-0.011	0.034	0.050***	0.045***	0.028	-0.467***	-0.395
(YES=1)	(0.021)	(0.023)	(0.036)	(0.014)	(0.016)	(0.029)	(0.121)	(0.355)

Appendix (I): Full Table of Main Regression

	Renewal Intention$_{i,b,t}$ (Score 1-5)			Building Recommend$_{i,b,t}$ (Score 1-5)			Finally Move Out$_{i,b,t+1}$ (YES=1)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Stories:								
High$_b$	-0.001	-0.018	-0.026	0.027***	0.030*	0.022	0.183***	0.016
(YES=1)	(0.013)	(0.018)	(0.030)	(0.010)	(0.015)	(0.028)	(0.071)	(0.280)
Medium$_b$	0.012	0.001	0.015	-0.004	-0.002	-0.006	0.126*	-0.158
(YES=1)	(0.013)	(0.015)	(0.021)	(0.010)	(0.012)	(0.019)	(0.067)	(0.221)
Renovated$_{b,t}$	0.005	0.011	0.035**	0.029***	0.012	-0.004	-0.348***	-0.342
(YES=1)	(0.012)	(0.012)	(0.018)	(0.010)	(0.010)	(0.015)	(0.076)	(0.219)
Log(RBA$_b$)	0.001	0.019	0.017	0.032***	0.041***	0.047***	0.011	-0.031
(SF)	(0.011)	(0.012)	(0.020)	(0.008)	(0.009)	(0.016)	(0.060)	(0.180)
Amenities$_b$	0.024*	0.019	0.039*	0.014	0.016	-0.001	0.205***	0.723***
(YES=1)	(0.013)	(0.015)	(0.021)	(0.009)	(0.010)	(0.017)	(0.072)	(0.232)
Constant	2.082***	1.861***	2.106***	1.326***	1.238***	1.699***	0.445	2.236
	(0.117)	(0.128)	(0.227)	(0.087)	(0.094)	(0.166)	(0.641)	(2.212)
Time * City FE	NO	YES	YES	NO	YES	YES	NO	YES
Tenant FE	NO	NO	YES	NO	NO	YES	NO	NO
Observations	100,305	100,178	79,474	64,607	64,544	49,394	45,586	27,664
# Buildings	2,796	2,762	2,439	2,134	2,112	1,898	2,628	1,697
R-squared	0.123	0.157	0.554	0.374	0.394	0.670	0.014	0.194

Results in Columns (1) - (6) are OLS regressions, and Columns (7) - (8) are Logit regressions.
Robust standard errors are clustered by building in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Appendix (I): Full Table of Main Regression

Table 11: Tenant satisfaction and building financial performance

	$\Delta Log(Rent_{b,t+1,t})$ ($/SF)			$\Delta Log(EffectiveRent_{b,t+1,t})$ ($/SF)			$\Delta VacancyRate_{b,t+1,t}$ (%)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log(Overall Satis$_{b,t}$) (Score 1-5)	0.006	0.005	0.017**	0.063***	0.053**	0.086***	-3.345***	-2.936***	-3.434***
	(0.007)	(0.007)	(0.009)	(0.020)	(0.021)	(0.025)	(0.755)	(0.770)	(0.839)
Lagged Level:									
Log(Rent$_{b,t}$) ($/SF)	-0.012***	-0.014***	-0.047***	-0.006	-0.013**	-0.032**			
	(0.003)	(0.003)	(0.008)	(0.006)	(0.006)	(0.014)			
Vacancy Rate$_{b,t}$ (%)					0.002***	0.003***	-0.140***	-0.145***	-0.170***
					(0.000)	(0.000)	(0.011)	(0.011)	(0.013)
Building Class:									
Building Class A$_b$ (YES=1)		0.008	0.015		0.014	-0.001		-1.125	-0.960
		(0.013)	(0.014)		(0.024)	(0.024)		(1.221)	(1.189)
Building Class B$_b$ (YES=1)		0.009	0.012		0.006	-0.007		-0.726	-0.578
		(0.013)	(0.014)		(0.024)	(0.024)		(1.224)	(1.170)
Construction Year:									
1970_1980$_b$ (YES=1)		-0.000	-0.002		-0.001	0.003		0.265	0.299
		(0.004)	(0.005)		(0.009)	(0.010)		(0.393)	(0.421)
1980_1990$_b$ (YES=1)		-0.003	-0.005		-0.004	0.004		0.575*	0.006
		(0.004)	(0.005)		(0.008)	(0.009)		(0.341)	(0.381)
1990_2000$_b$ (YES=1)		-0.005	-0.005		-0.002	0.002		0.339	0.024
		(0.004)	(0.005)		(0.010)	(0.011)		(0.405)	(0.490)
After 2000$_b$ (YES=1)		-0.005	-0.002		-0.001	0.011		-0.204	-1.052**
		(0.004)	(0.005)		(0.010)	(0.010)		(0.387)	(0.441)

Appendix (I): Full Table of Main Regression

	$\Delta Log(Rent_{b,t+1,t})$ ($/SF)			$\Delta Log(EffectiveRent_{b,t+1,t})$ ($/SF)			$\Delta VacancyRate_{b,t+1,t}$ (%)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Stories:									
$High_b$		0.004	0.008*		0.006	0.006		-0.206	0.076
(YES=1)		(0.004)	(0.005)		(0.007)	(0.009)		(0.378)	(0.427)
$Medium_b$		0.003	0.003		0.008*	0.007		0.035	0.100
(YES=1)		(0.002)	(0.003)		(0.005)	(0.006)		(0.273)	(0.316)
$Renovated_{b,t}$		-0.003	0.002		0.006	0.015***		-0.187	-0.612**
(YES=1)		(0.002)	(0.002)		(0.005)	(0.005)		(0.231)	(0.255)
$Log(RBA)_b$		-0.001	-0.000		0.006	0.008		-0.283	-0.317
(SF)		(0.002)	(0.002)		(0.004)	(0.005)		(0.202)	(0.224)
$Amenities_b$		0.004*	0.003		-0.010*	-0.009		0.799***	0.643**
(YES=1)		(0.002)	(0.003)		(0.005)	(0.006)		(0.248)	(0.294)
Constant	0.053***	0.060***	0.144***	-0.092***	-0.132**	-0.140*	7.880***	11.162***	12.993***
	(0.013)	(0.022)	(0.037)	(0.034)	(0.057)	(0.075)	(1.311)	(2.839)	(3.051)
Time * City FE	NO	NO	YES	NO	NO	YES	NO	NO	YES
Observations	5,156	5,156	4,477	5,155	5,155	4,476	9,079	9,079	8,226
# Buildings	1,690	1,690	1,515	1,598	1,598	1,427	2,166	2,166	1,997
R-squared	0.006	0.009	0.236	0.050	0.055	0.273	0.067	0.071	0.237

Explained variables are winsorised at their respective 1st and 99th percentiles to reduce the influence of outliers.
Robust standard errors are clustered by building in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Appendix (II): Example of Kingsley office survey

[Client Name] [Project Name]

[Office Property] - [Company Name]

IMPORTANT: Your responses are not anonymous and will be shared with the property management office in order to resolve any immediate concerns and improve service delivery. By completing this survey, you affirm that you are the proper party to complete this questionnaire. Clicking **Next** or **Back** will record your responses for a given page.

OVERALL QUESTIONS

Please rate your overall satisfaction as a tenant.

- Poor
- Fair
- Average
- Good
- Excellent

What do you enjoy most about the tenant experience at [Office Property]?

How could the tenant experience at [Office Property] be improved?

PROPERTY MANAGEMENT

Please rate your property management staff in the following areas.

	Poor	Fair	Average	Good	Excellent	N/A
Overall satisfaction with management						
Accessibility						
Communication						
Problem resolution						

How long does it typically take **management** to respond in non-emergency situations?

- Within 2 hours
- 2-24 hours
- 24-48 hours
- 48+ hours
- N/A

Other than for general announcements, how often does property management *proactively check in* with your company?

- Once a week
- Once a month
- Once a quarter
- Twice a year
- Never
- N/A

How often would you *prefer* property management to proactively check in with your company?

- Once a week
- Once a month
- Once a quarter
- Twice a year
- Never
- N/A

Is your company familiar with your property's emergency action plan?

- Yes

Appendix (II): Question Library

Table 12: Question Library

Interpretation of question	Answer Scale
A.Overall Questions	
Please rate your overall satisfaction as a tenant.	Poor to excellent
How likely would you be to recommend this property to others?	Definitely would not to definitely would
How likely would your company be to renew the lease?	Definitely would not to definitely would
B.Property Management	
Please rate your property management staff in the statement accuracy.	Poor to excellent
Please rate your property management staff in accessibility.	Poor to excellent
Please rate your property management staff in the accommodation of special requests.	Poor to excellent
Please rate your property management staff in the communication.	Poor to excellent
Please rate your property management staff in problem resolution	Poor to excellent
Please rate your property management staff in professionalism/courtesy	Poor to excellent
Please rate your property management staff in responsiveness.	Poor to excellent
C.General Property Features	
Please rate the building amenities of your property	Poor to excellent
Please rate the location of your property	Poor to excellent
Please rate the quality of your property	Poor to excellent
D.Interior Property Features	
Please rate the appearance of common areas of your property	Poor to excellent
Please rate the appearance of the lobby of your property	Poor to excellent
Please rate the appearance of restrooms of your property	Poor to excellent
Please rate the elevator appearance of your property	Poor to excellent
Please rate the elevator performance of your property	Poor to excellent
Please rate the heating and A/C of your property	Poor to excellent
Please rate the indoor air quality of your property	Poor to excellent
Please rate the workspace lighting of your property	Poor to excellent

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