

COUNTRY EXPOSURE MODEL

Review main statistic of a exposure model and create summaries for a given Country.

```
/home/risk/venvs/py38w/lib/python3.8/site-packages/geopandas/_compat.py:111: UserWarning: The Shapely GEOS version (3.9.1-CAPI-1.14.2) is incompatible with the GEOS version PyGEOS was compiled with (3.10.1-CAPI-1.16.0). Conversions between both will be slow.
  warnings.warn(
```

```
# Parameters
country = "Colombia"
```

```
/tmp/ipykernel_1044/1537960877.py:7: DtypeWarning: Columns (22) have mixed types.Specify dtype option on import or set low_memory=False.
  dfs = [pd.read_csv(file_path) for file_path in files.File_Path]

Exposure files:
  Exposure_Com_Colombia.csv
  Exposure_Ind_Colombia.csv
  Exposure_Res_Colombia.csv
```

Sanity checks and formats

Exposure at National level

Summary by occupancy type

	OCCUPANTS	BUILDINGS	COST_USD	BUILDINGS_%	COST_USD_%
OCCUPANCY					
Res	45.0M	6,532.6K	\$728.8B	91.59%	79.66%
Ind	0.0M	261.6K	\$69.8B	3.67%	7.63%
Com	0.0M	338.1K	\$116.3B	4.74%	12.71%

Other metrics to consider

	AREA_SQM	COST_BUILDING_USD	AVG_BUILDING_AREA_SQM	AVG_COST_PER_AREA_USD
OCCUPANCY				
Total	1,187.5M	\$680.4B	166	\$770
Res	987.0M	\$566.8B	151	\$738
Ind	74.9M	\$36.9B	286	\$932
Com	125.6M	\$76.6B	371	\$926

Exposure summary at Admin level 1

	COST_USD	BUILDINGS	OCCUPANTS	COST_USD_%	BUILDINGS_%	OCCUPANTS_%
NAME_1						
Bogotá, D.C.	\$222,888.8M	962,289	7,965.4K	24.36%	13.49%	17.69%
Antioquia	\$131,229.1M	852,027	6,031.6K	14.34%	11.95%	13.40%
Valle del Cauca	\$95,001.7M	794,088	4,364.8K	10.38%	11.13%	9.69%
Atlántico	\$54,888.5M	425,384	2,324.4K	6.00%	5.96%	5.16%
Cundinamarca	\$45,648.8M	404,410	2,764.5K	4.99%	5.67%	6.14%
Bolívar	\$36,560.0M	319,878	1,877.5K	4.00%	4.48%	4.17%
Santander	\$36,517.7M	293,452	1,987.2K	3.99%	4.11%	4.41%
Norte de Santander	\$28,321.6M	286,455	1,326.0K	3.10%	4.02%	2.94%
Tolima	\$23,498.7M	235,910	1,211.5K	2.57%	3.31%	2.69%
Meta	\$22,893.7M	217,267	898.2K	2.50%	3.05%	1.99%
Risaralda	\$21,516.2M	159,194	827.6K	2.35%	2.23%	1.84%
Caldas	\$18,750.5M	149,964	912.1K	2.05%	2.10%	2.03%
Boyacá	\$18,748.8M	178,336	1,123.0K	2.05%	2.50%	2.49%
Magdalena	\$17,693.3M	211,600	1,232.8K	1.93%	2.97%	2.74%
Huila	\$17,683.4M	185,207	992.7K	1.93%	2.60%	2.20%
Córdoba	\$16,308.8M	210,997	1,513.9K	1.78%	2.96%	3.36%
Nariño	\$16,261.5M	166,638	1,321.1K	1.78%	2.34%	2.93%
Cesar	\$16,120.7M	193,802	1,067.7K	1.76%	2.72%	2.37%
Cauca	\$13,211.3M	150,179	1,220.7K	1.44%	2.11%	2.71%
Quindío	\$12,920.2M	111,404	500.5K	1.41%	1.56%	1.11%
Sucre	\$10,983.6M	137,367	840.5K	1.20%	1.93%	1.87%
Casanare	\$7,725.6M	81,402	364.5K	0.84%	1.14%	0.81%
La Guajirá	\$6,707.5M	90,861	729.3K	0.73%	1.27%	1.62%
Caquetá	\$6,078.0M	81,800	353.2K	0.66%	1.15%	0.78%
Chocó	\$5,180.9M	77,162	448.8K	0.57%	1.08%	1.00%
Putumayo	\$3,866.3M	54,023	279.3K	0.42%	0.76%	0.62%
Arauca	\$3,471.6M	46,530	217.6K	0.38%	0.65%	0.48%
Archipiélago de San Andrés, Providencia y Santa Catalina	\$1,206.4M	9,391	47.9K	0.13%	0.13%	0.11%
Guaviare	\$1,130.0M	16,103	70.9K	0.12%	0.23%	0.16%
Amazonas	\$706.5M	9,281	64.7K	0.08%	0.13%	0.14%
Vichada	\$596.5M	9,835	68.3K	0.07%	0.14%	0.15%
Guainía	\$367.4M	6,286	42.0K	0.04%	0.09%	0.09%
Vaupés	\$217.4M	3,827	34.9K	0.02%	0.05%	0.08%

Exposure by simplified taxonomy

Adding `MACRO_TAXO` column						
	COST_USD	BUILDINGS	OCCUPANTS	COST_USD_%	BUILDINGS_%	OCCUPANTS_%
MACRO_TAXO						
RC	\$320.8B	675.3K	4,726.8K	35.06%	9.47%	10.50%
MUR	\$240.9B	3,970.6K	24,903.6K	26.33%	55.67%	55.31%
MCF	\$230.0B	1,383.3K	8,211.9K	25.14%	19.40%	18.24%
MR	\$72.2B	345.7K	2,770.9K	7.89%	4.85%	6.15%
S	\$23.8B	110.6K	0.0K	2.60%	1.55%	0.00%
W	\$13.9B	324.2K	2,167.5K	1.52%	4.54%	4.81%
ADO/E	\$7.8B	188.9K	1,488.6K	0.85%	2.65%	3.31%
OT	\$5.6B	133.8K	755.6K	0.61%	1.88%	1.68%

Exposure by taxonomy

Showing only taxonomies that represent 90% of the total `COST_USD`

RC	CR/LFINF+DNO/HBET:6-10/IL:B/RES	\$11,139.3M	12,542	1.35%	0.18%
MCF	CR/LFINF+DNO/H:3/IL:B/RES	\$10,334.5M	31,029	1.26%	0.46%
	MCF/LWAL+DNO/H:2/IL:M/RES	\$9,772.3M	41,408	1.19%	0.61%
	MCF/LWAL+DUH/H:2/RES	\$9,203.6M	109,231	1.12%	1.60%
	MCF/LWAL+DNO/H:3/IL:B/RES	\$8,882.9M	25,093	1.08%	0.37%
MUR	MUR/LWAL+DNO/H:3/IL:B/RES	\$8,846.4M	85,375	1.07%	1.25%
	MUR/LWAL+DNO/H:4/RES	\$8,342.7M	23,132	1.01%	0.34%
RC	CR/LFINF+DUL/HBET:4-6/COM6	\$7,865.9M	14,096	0.96%	0.21%
MR	MR/LWAL+DUM/H:4/RES	\$7,777.8M	17,766	0.94%	0.26%
MUR	MUR/LWAL+DNO/H:1/IL:M/RES	\$7,772.0M	225,019	0.94%	3.30%
RC	CR/LFINF+DNO/H:4/RES	\$7,592.5M	10,000	0.92%	0.15%
	CR/LWAL+DUM/HBET:7-10/COM6	\$7,536.6M	8,441	0.92%	0.12%
	CR/LFINF+DNO/H:5/RES	\$7,251.5M	5,181	0.88%	0.08%
MCF	MCF/LWAL+DNO/H:3/RES	\$7,185.0M	89,635	0.87%	1.31%
RC	CR/LFINF+DNO/H:3/RES	\$6,925.8M	36,192	0.84%	0.53%
MCF	MCF/LWAL+DNO/H:4/RES	\$6,386.8M	17,532	0.78%	0.26%
ADO/E	MUR+ADO/LWAL+DNO/H:1/RES	\$5,969.9M	170,881	0.73%	2.51%
MCF	MCF/LWAL+DUM/H:3/RES	\$5,440.1M	28,292	0.66%	0.41%
	MCF/LWAL+DUH/H:2/IL:M/RES	\$5,402.0M	40,515	0.66%	0.59%
RC	CR/LFINF+DUM/H:6/RES	\$5,305.4M	2,388	0.64%	0.04%
	CR/LFINF+DUL/HBET:1-3/IND3	\$5,188.6M	14,970	0.63%	0.22%
MCF	MCF/LWAL+DUH/H:1/IL:B/RES	\$5,106.6M	43,276	0.62%	0.63%
RC	CR/LFINF+DUL/HBET:1-3/COM01	\$5,089.2M	13,028	0.62%	0.19%
MCF	MCF/LWAL+DUL/H:2/IL:B/RES	\$5,012.4M	21,239	0.61%	0.31%
RC	CR/LFINF+DUL/HBET:1-3/COM6	\$4,963.3M	25,412	0.60%	0.37%
MR	MR/LWAL+DUM/H:2/RES	\$4,794.1M	56,332	0.58%	0.83%
	MR/LWAL+DUH/H:3/IL:B/RES	\$4,727.0M	13,353	0.57%	0.20%
MCF	MCF/LWAL+DUH/H:3/IL:B/RES	\$4,710.7M	13,307	0.57%	0.20%
RC	CR/LFINF+DUM/HBET:4-6/COM6	\$4,676.7M	8,381	0.57%	0.12%
MUR	MUR/LWAL+DNO/H:3/IL:M/RES	\$4,613.8M	44,527	0.56%	0.65%
RC	CR/LFINF+DUL/HBET:1-3/COM5	\$4,586.1M	9,784	0.56%	0.14%
MUR	MUR/LWAL+DNO/H:2/COM02	\$4,531.5M	15,288	0.55%	0.22%
MCF	MCF/LWAL+DNO/H:1/IL:M/RES	\$4,466.9M	37,855	0.54%	0.56%
RC	CR/LWAL+DUH/HBET:7-10/COM6	\$4,398.7M	4,927	0.53%	0.07%
MR	MR/LWAL+DUH/H:3/IL:M/RES	\$4,371.6M	21,858	0.53%	0.32%
MCF	MCF/LWAL+DUM/H:2/RES	\$4,318.9M	41,804	0.52%	0.61%
	CR/LFINF+DUM/H:7/RES	\$4,162.4M	940	0.51%	0.01%
RC	CR/LFINF+DUM/HBET:1-3/COM6	\$4,116.9M	21,079	0.50%	0.31%
	CR/LFINF+DUM/H:3/RES	\$4,088.4M	19,412	0.50%	0.28%
MCF	CR/LFINF+DUH/H:5/IL:M/RES	\$4,083.8M	4,676	0.50%	0.07%
	CR/LFINF+DUM/H:4/RES	\$4,040.6M	6,193	0.49%	0.09%
	MCF/LWAL+DUL/H:2/COM01	\$3,879.3M	9,358	0.47%	0.14%
	CR/LFINF+DNO/H:3/IL:M/RES	\$3,867.5M	11,612	0.47%	0.17%
OT	UNK/RES	\$3,865.6M	112,993	0.47%	1.66%
MCF	MCF/LWAL+DUL/H:2/COM02	\$3,737.0M	12,608	0.45%	0.18%
	MCF/LWAL+DNO/H:3/IL:M/RES	\$3,602.7M	10,177	0.44%	0.15%
RC	CR/LFINF+DUM/H:5/RES	\$3,519.2M	2,613	0.43%	0.04%
MCF	MCF/LWAL+DUL/H:1/IL:B/RES	\$3,498.2M	29,646	0.42%	0.43%
RC	CR+PC/LWAL+DUL/H:1/RES	\$3,434.2M	30,933	0.42%	0.45%
MR	MR/LWAL+DUL/H:3/IL:B/RES	\$3,383.9M	9,559	0.41%	0.14%
RC	CR/LFINF+DUH/H:4/IL:M/RES	\$3,307.6M	4,734	0.40%	0.07%
	CR/LWAL+DUM/H:6/RES	\$3,290.3M	2,498	0.40%	0.04%
MUR	MUR/LWAL+DNO/H:1/COM02	\$3,184.3M	21,487	0.39%	0.32%
MCF	MCF/LWAL+DUH/H:3/RES	\$3,133.4M	28,215	0.38%	0.41%
MR	MR/LWAL+DUH/H:2/IL:B/RES	\$3,123.0M	13,233	0.38%	0.19%
	MR/LWAL+DUM/H:5/RES	\$3,092.6M	3,227	0.38%	0.05%
MCF	MCF/LWAL+DUL/H:2/IND3	\$3,043.8M	9,221	0.37%	0.14%
RC	CR/LFINF+DUL/HBET:1-3/IND5	\$3,010.6M	8,686	0.37%	0.13%
MCF	MCF/LWAL+DUM/H:2/IL:B/RES	\$3,006.4M	12,739	0.37%	0.19%
MR	MR/LWAL+DUH/H:2/IL:M/RES	\$2,970.4M	22,278	0.36%	0.33%
RC	CR+PC/LFM+DUM/H:1/IND4	\$2,869.0M	14,486	0.35%	0.21%
	CR/LFINF+DNO/H:2/RES	\$2,847.1M	20,265	0.35%	0.30%
RC	CR/LFINF+DUH/HBET:4-6/COM6	\$2,767.3M	4,959	0.34%	0.07%
	CR/LWAL+DUM/H:5/RES	\$2,662.5M	2,605	0.32%	0.04%
S	CR/LFINF+DUM/H:8/RES	\$2,644.8M	674	0.32%	0.01%
	SR/LFM+DUM/H:1/IND4	\$2,603.2M	14,458	0.32%	0.21%
	SL/LFM+DUM/H:1/IND4	\$2,600.1M	14,441	0.32%	0.21%
	CR/LWAL+DUM/H:7/RES	\$2,543.2M	684	0.31%	0.01%
RC	CR/LFINF+DUM/HBET:1-3/IND4	\$2,536.1M	7,317	0.31%	0.11%
	MCF/LWAL+DUL/H:2/COM5	\$2,457.9M	4,941	0.30%	0.07%
RC	CR/LDUAL+DUM/H:12/RES	\$2,429.3M	394	0.30%	0.01%
MCF	MCF/LWAL+DUM/H:2/IND3	\$2,408.0M	7,295	0.29%	0.11%
RC	CR/LFINF+DUH/HBET:1-3/COM6	\$2,386.0M	12,217	0.29%	0.18%
MCF	MCF/LWAL+DUL/H:3/IL:B/RES	\$2,356.2M	6,656	0.29%	0.10%
RC	CR/LFINF+DUM/H:9/RES	\$2,349.8M	511	0.29%	0.01%
	CR/LFINF+DUM/H:5/IL:M/RES	\$2,337.1M	2,676	0.28%	0.04%
RC	CR/LFINF+DUH/HBET:6-10/IL:A/RES	\$2,315.1M	1,020	0.28%	0.01%
	CR/LWAL+DUM/H:12/RES	\$2,309.1M	865	0.28%	0.01%
MCF	CR/LFINF+DUM/HBET:6-10/IL:M/RES	\$2,302.9M	1,648	0.28%	0.02%
	MCF/LWAL+DUM/H:4/RES	\$2,261.0M	5,105	0.27%	0.07%
	MCF/LWAL+DUH/H:3/IL:M/RES	\$2,234.8M	11,174	0.27%	0.16%
	MR/LWAL+DUL/H:2/IL:B/RES	\$2,233.0M	9,462	0.27%	0.14%
RC	CR/LFINF+DUH/HBET:6-10/IL:M/RES	\$2,209.7M	2,488	0.27%	0.04%
	CR+PC/LFM+DUM/HBET:1-3/COM01	\$2,185.6M	5,595	0.27%	0.08%
MCF	CR/LFINF+DUM/HBET:1-3/COM01	\$2,184.9M	5,594	0.27%	0.08%
	MCF/LWAL+DUM/H:2/IL:M/RES	\$2,091.6M	15,687	0.25%	0.23%
RC	CR/LFINF+DUL/HBET:6-10/IL:M/RES	\$2,089.1M	1,495	0.25%	0.02%
	CR/LWAL+DUL/HBET:7-10/COM6	\$2,062.7M	2,310	0.25%	0.03%
MCF	MCF/LWAL+DUM/H:1/IL:B/RES	\$2,037.3M	17,265	0.25%	0.25%
RC	CR/LFINF+DUM/H:2/RES	\$2,036.8M	15,105	0.25%	0.22%
MCF	MCF/LWAL+DUL/H:1/COM01	\$1,973.8M	9,523	0.24%	0.14%
	MCF/LWAL+DUH/H:1/IL:M/RES	\$1,939.5M	29,093	0.24%	0.43%
RC	CR+PC/LFM+DUH/H:1/IND4	\$1,922.9M	9,709	0.23%	0.14%
	CR/LFINF+DUM/H:4/IL:M/RES	\$1,916.5M	2,743	0.23%	0.04%
MR	CR/LFINF+DUH/H:5/IL:A/RES	\$1,900.9M	1,340	0.23%	0.02%
	MR/LWAL+DUM/H:3/IL:B/RES	\$1,889.3M	5,337	0.23%	0.08%
RC	CR/LDUAL+DUM/H:10/RES	\$1,884.1M	366	0.23%	0.01%
	CR/LFINF+DUM/HBET:1-3/IND5	\$1,863.3M	5,376	0.23%	0.08%
S	SR/LFM+DUM/HBET:1-3/COM01	\$1,777.8M	4,201	0.22%	0.06%
RC	CR/LFINF+DNO/HBET:6-10/IL:M/RES	\$1,761.2M	1,983	0.21%	0.03%
S	SL/LFM+DUH/H:1/IND4	\$1,745.1M	9,692	0.21%	0.14%
	SR/LFM+DUH/H:1/IND4	\$1,726.9M	9,591	0.21%	0.14%
RC	CR/LFINF+DUH/HBET:1-3/IND4	\$1,718.4M	4,958	0.21%	0.07%
MCF	MCF/LWAL+DUL/H:2/COM2	\$1,716.6M	4,141	0.21%	0.06%
RC	CR/LFINF+DUM/HBET:1-3/COM5	\$1,642.3M	3,504	0.20%	0.05%
MR	MR/LWAL+DUM/H:3/IL:M/RES	\$1,636.2M	8,181	0.20%	0.12%
RC	CR/LFINF+DUL/HBET:1-3/COM2	\$1,624.2M	4,158	0.20%	0.06%
MCF	MCF/LWAL+DNO/H:5/RES	\$1,608.1M	2,293	0.20%	0.03%
RC	CR+PC/LFM+DUM/HBET:1-3/COM5	\$1,595.9M	3,405	0.19%	0.05%
MCF	MCF/LWAL+DUL/H:2/IND5	\$1,582.5M	4,794	0.19%	0.07%
RC	CR/LDUAL+DUM/H:11/RES	\$1,564.7M	163	0.19%	0.00%
	CR+PC/LWAL+DUL/H:2/RES	\$1,497.0M	6,742	0.18%	0.10%
MCF	MCF/LWAL+DUL/H:1/COM02	\$1,492.0M	10,067	0.18%	0.15%
RC	CR/LFINF+DNO/H:5/IL:M/RES	\$1,485.4M	2,676	0.18%	0.04%
	CR/LFINF+DUL/HBET:1-3/COM02	\$1,468.5M	5,258	0.18%	0.08%
MUR	CR/LFINF+DUL/H:3/IL:M/RES	\$1,466.7M	2,799	0.18%	0.04%
	MUR/LWAL+DNO/H:5/RES	\$1,439.3M	2,306	0.17%	0.03%
MR	MR/LWAL+DUH/H:2/RES	\$1,425.9M	15,978	0.17%	0.23%
RC	CR/LFINF+DUH/H:4/IL:A/RES	\$1,416.3M	1,248	0.17%	0.02%
S	SL/LFM+DUM/H:1/IND3	\$1,412.9M	7,847	0.17%	0.12%
MR	MR/LWAL+DUL/H:3/IL:M/RES	\$1,365.0M	6,825	0.17%	0.10%
RC	CR/LFINF+DUL/HBET:6-10/IL:A/RES	\$1,355.0M	597	0.16%	0.01%
	CR/LWAL+DUM/H:8/RES	\$1,351.0M	481	0.16%	0.01%
MCF	MCF/LWAL+DUL/H:2/IL:M/RES	\$1,344.8M	10,086	0.16%	0.15%
	CR/LFINF+DUM/HBET:1-3/IND3	\$1,332.7M	3,845	0.16%	0.06%
RC	CR/LFINF+DNO/H:4/IL:M/RES	\$1,294.5M	2,915	0.16%	0.04%
MR	CR+PC/LFM+DUM/HBET:1-3/COM2	\$1,282.5M	3,283	0.16%	0.05%
	MR/LWAL+DUM/H:2/IL:B/RES	\$1,258.6M	5,333	0.15%	0.08%
RC	MR/LWAL+DUH/H:3/IL:A/RES	\$1,244.3M	2,828	0.15%	0.04%
	CR/LFINF+DUL/H:5/IL:M/RES	\$1,199.1M	1,373	0.15%	0.02%
MCF	MCF/LWAL+DUM/H:3/IL:B/RES	\$1,180.9M	3,336	0.14%	0.05%
RC	CR/LFINF+DUH/H:5/IL:B/RES	\$1,161.8M	2,093	0.14%	0.03%
ADO/E	MUR+ADO/LWAL+DNO/H:1/COM02	\$1,125.3M	7,593	0.14%	0.11%
RC	CR/LWAL+DUM/HBET:7-10/COM3	\$1,117.8M	1,252	0.14%	0.02%
	CR/LWAL+DUM/H:13/RES	\$1,091.6M	355	0.13%	0.01%
MR	MR/LWAL+DUM/H:2/IL:M/RES	\$1,072.4M	8,043	0.13%	0.12%
S	SR/LFM+DUM/H:1/COM2	\$1,063.3M	4,397	0.13%	0.06%
MCF	MCF/LWAL+DUL/H:1/COM5	\$1,060.6M	4,264	0.13%	0.06%
RC	CR/LFINF+DUH/HBET:1-3/COM01	\$1,056.1M	2,704	0.13%	0.04%
MR	MR/LWAL+DUM/H:6/RES	\$1,049.5M	740	0.13%	0.01%
RC	CR+PC/LFM+DUH/HBET:1-3/COM01	\$1,048.3M	2,684	0.13%	0.04%
	CR/LFINF+DUL/H:4/IL:M/RES	\$1,025.7M	1,468	0.12%	0.02%
MCF	MCF/LWAL+DUL/H:2/IL:A/RES	\$1,016.2M	4,306	0.12%	0.06%
RC	CR/LFINF+DNO/HBET:1-3/IND2	\$1,004.4M	1,656	0.12%	0.02%
	CR/LWAL+DUM/H:9/RES	\$992.6M	301	0.12%	0.00%
MCF	MCF/LWAL+DUM/H:1/RES	\$985.7M	11,636	0.12%	0.17%
RC	CR/LFINF+DUL/HBET:6-10/IL:B/RES	\$967.2M	1,089	0.12%	0.02%
S	SR/LFM+DUM/HBET:1-3/COM5	\$967.1M	1,904	0.12%	0.03%
	CR/LDUAL+DUM/H:16/RES	\$964.0M	75	0.12%	0.00%
RC	CR/LFINF+DUL/HBET:4-6/COM3	\$962.8M	1,725	0.12%	0.03%
	CR/LWAL+DUM/H:10/RES	\$959.8M	307	0.12%	0.00%
S	CR/LFINF+DUH/H:3/IL:B/RES	\$958.9M	2,879	0.12%	0.04%
	SR/LFM+DUM/H:1/IND3	\$955.2M	5,305	0.12%	0.08%
RC	CR/LFINF+DUH/H:4/IL:B/RES	\$950.8M	2,141	0.12%	0.03%