

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 = "Hungary"
```

Exposure files:
Exposure_Com_Hungary.csv
Exposure_Ind_Hungary.csv
Exposure_Res_Hungary.csv

Sanity checks and formats

Exposure at National level

Summary by occupancy type

| | OCCUPANTS | BUILDINGS | COST_USD | BUILDINGS_% | COST_USD_% |
|-----------|-----------|-----------|----------|-------------|------------|
| OCCUPANCY | | | | | |
| Res | 9,770.0K | 2,681.3K | \$356.1B | 94.94% | 59.10% |
| Ind | 3,908.0K | 62.1K | \$120.3B | 2.20% | 19.97% |
| Com | 3,908.0K | 80.7K | \$126.1B | 2.86% | 20.93% |

Other metrics to consider

| | AREA_SQM | COST_BUILDING_USD | AVG_BUILDING_AREA_SQM | AVG_COST_PER_AREA_USD |
|-----------|----------|-------------------|-----------------------|-----------------------|
| OCCUPANCY | | | | |
| Total | 333.1M | \$396.0B | 118 | \$1,809 |
| Res | 269.9M | \$284.8B | 101 | \$1,319 |
| Ind | 32.9M | \$48.1B | 530 | \$3,652 |
| Com | 30.3M | \$63.0B | 375 | \$4,166 |

Exposure summary at Admin level 1

| | COST_USD | BUILDINGS | OCCUPANTS | COST_USD_% | BUILDINGS_% | OCCUPANTS_% |
|------------------------|----------|-----------|-----------|------------|-------------|-------------|
| NAME_1 | | | | | | |
| Budapest | \$110.2B | 544.5K | 2,859.5K | 18.30% | 19.28% | 16.26% |
| Pest | \$64.8B | 341.7K | 2,132.6K | 10.75% | 12.10% | 12.13% |
| Borsod-Abaúj-Zemplen | \$39.1B | 179.3K | 1,256.0K | 6.48% | 6.35% | 7.14% |
| Fejer | \$33.6B | 115.7K | 753.2K | 5.58% | 4.10% | 4.28% |
| Hajdu-Bihar | \$31.4B | 141.1K | 971.3K | 5.21% | 5.00% | 5.52% |
| Bacs-Kiskun | \$31.1B | 171.1K | 938.9K | 5.16% | 6.06% | 5.34% |
| Gyor-Moson-Sopron | \$30.3B | 105.2K | 779.8K | 5.03% | 3.72% | 4.43% |
| Szabolcs-Szatmar-Bereg | \$28.9B | 155.0K | 1,030.5K | 4.80% | 5.49% | 5.86% |
| Csongrad | \$25.8B | 113.4K | 726.7K | 4.29% | 4.01% | 4.13% |
| Jasz-Nagykun-Szolnok | \$24.1B | 127.0K | 709.8K | 4.00% | 4.50% | 4.04% |
| Baranya | \$23.7B | 96.9K | 683.2K | 3.93% | 3.43% | 3.89% |
| Bekes | \$22.4B | 120.7K | 661.6K | 3.72% | 4.28% | 3.76% |
| Komarom-Esztergom | \$21.7B | 82.4K | 543.3K | 3.59% | 2.92% | 3.09% |
| Veszprem | \$21.3B | 93.1K | 638.0K | 3.54% | 3.29% | 3.63% |
| Heves | \$18.3B | 92.4K | 558.1K | 3.04% | 3.27% | 3.17% |
| Zala | \$17.9B | 68.8K | 511.5K | 2.96% | 2.44% | 2.91% |
| Somogy | \$17.3B | 83.5K | 578.7K | 2.87% | 2.96% | 3.29% |
| Vas | \$15.2B | 61.1K | 461.3K | 2.53% | 2.16% | 2.62% |
| Tolna | \$14.9B | 71.6K | 420.8K | 2.48% | 2.53% | 2.39% |
| Nograd | \$10.6B | 59.6K | 370.9K | 1.75% | 2.11% | 2.11% |

Exposure by simplified taxonomy

Adding `MACRO_TAXO` column

| | COST_USD | BUILDINGS | OCCUPANTS | COST_USD_% | BUILDINGS_% | OCCUPANTS_% |
|------------|--------------|-----------|-----------|------------|-------------|-------------|
| MACRO_TAXO | | | | | | |
| RC | \$278,320.6M | 658.1K | 7,618.3K | 46.20% | 23.30% | 43.32% |
| MUR | \$172,128.9M | 1,176.9K | 5,208.0K | 28.57% | 41.67% | 29.61% |
| S | \$58,684.0M | 31.1K | 1,954.0K | 9.74% | 1.10% | 11.11% |
| ADO/E | \$47,899.7M | 653.7K | 1,528.1K | 7.95% | 23.15% | 8.69% |
| MCF | \$43,376.2M | 286.1K | 1,212.8K | 7.20% | 10.13% | 6.90% |
| W | \$2,037.5M | 18.3K | 64.8K | 0.34% | 0.65% | 0.37% |

Exposure by taxonomy

| Showing only taxonomies that represent 90% of the total | | `COST_USD` | | | |
|---|-------------------------------------|-------------|-----------|------------|-------------|
| | | COST_USD | BUILDINGS | COST_USD_% | BUILDINGS_% |
| MACRO_TAXO | TAXONOMY | | | | |
| MUR | MUR+CL/LWAL+CDN/H:1/RES | \$65,818.0M | 580,384 | 12.17% | 21.90% |
| | MUR+ST/LWAL+CDN/H:1/RES | \$61,084.2M | 546,260 | 11.30% | 20.61% |
| ADO/E | MUR+ADO/LWAL+CDN/H:1/RES | \$47,521.0M | 653,508 | 8.79% | 24.65% |
| RC | CR+PC/LFM+CDL/H:1/IND | \$46,829.8M | 23,598 | 8.66% | 0.89% |
| S | S/LFBR+CDH/H:1/IND | \$29,342.0M | 15,525 | 5.43% | 0.59% |
| | S/LFM+CDH/H:1/IND | \$28,168.3M | 14,904 | 5.21% | 0.56% |
| RC | CR+PC/LWAL+CDN/H:1/RES | \$18,614.4M | 191,695 | 3.44% | 7.23% |
| MCF | MCF/LWAL+CDN/H:1/RES | \$16,379.2M | 186,227 | 3.03% | 7.03% |
| MUR | MUR+CL/LWAL+CDN/HBET:3-5/RES | \$14,666.7M | 7,156 | 2.71% | 0.27% |
| RC | CR/LFINF+CDL+LFC:0.0/HBET:3-5/RES | \$12,651.0M | 5,665 | 2.34% | 0.21% |
| MUR | MUR+ST/LWAL+CDN/HBET:3-5/RES | \$11,804.3M | 5,725 | 2.18% | 0.22% |
| RC | CR+PC/LWAL+CDN/HBET:3-5/RES | \$10,302.4M | 4,392 | 1.91% | 0.17% |
| | CR+PC/LWAL+CDL+LFC:0.0/H:1/RES | \$9,874.0M | 103,401 | 1.83% | 3.90% |
| | CR/LFM+CDL/H:2/IND | \$9,858.9M | 4,968 | 1.82% | 0.19% |
| | CR/LFINF+CDL+LFC:0.0/HBET:3-5/COM | \$9,847.8M | 5,401 | 1.82% | 0.20% |
| | CR/LDUAL+CDL+LFC:0.0/HBET:3-5/COM | \$9,729.3M | 3,615 | 1.80% | 0.14% |
| | CR/LFINF+CDL+LFC:0.0/H:1/COM | \$9,551.8M | 6,600 | 1.77% | 0.25% |
| | CR+PC/LWAL+CDL+LFC:0.0/H:1/COM | \$8,677.3M | 6,025 | 1.60% | 0.23% |
| | CR/LFINF+CDN/H:1/RES | \$8,539.3M | 91,386 | 1.58% | 3.45% |
| MUR | MUR+CL/LWAL+CDN/H:1/COM | \$7,709.8M | 6,836 | 1.43% | 0.26% |
| RC | CR/LFINF+CDN/HBET:3-5/RES | \$7,468.4M | 3,072 | 1.38% | 0.12% |
| | CR/LFINF+CDN/HBET:3-5/COM | \$7,243.6M | 3,257 | 1.34% | 0.12% |
| MCF | MCF/LWAL+CDN/H:1/COM | \$6,756.5M | 5,495 | 1.25% | 0.21% |
| RC | CR/LFINF+CDL+LFC:0.0/H:1/RES | \$6,496.7M | 69,962 | 1.20% | 2.64% |
| MCF | MCF/LWAL+CDN/H:2/COM | \$6,269.3M | 4,728 | 1.16% | 0.18% |
| RC | CR/LFINF+CDL+LFC:0.0/HBET:6-/RES | \$6,205.2M | 1,757 | 1.15% | 0.07% |
| MCF | MCF/LWAL+CDL/H:1/RES | \$6,180.4M | 74,081 | 1.14% | 2.79% |
| MUR | MUR+ST/LWAL+CDN/H:1/COM | \$6,114.0M | 5,435 | 1.13% | 0.21% |
| RC | CR/LFINF+CDN/HBET:6-/RES | \$6,026.3M | 1,703 | 1.11% | 0.06% |
| | CR+PC/LWAL+CDL+LFC:0.0/HBET:3-5/COM | \$5,109.3M | 464 | 0.94% | 0.02% |
| | CR+PC/LWAL+CDL+LFC:0.0/HBET:3-5/RES | \$5,035.3M | 2,194 | 0.93% | 0.08% |
| | CR+PC/LWAL+CDN/HBET:6-/RES | \$4,836.5M | 1,300 | 0.89% | 0.05% |
| | CR/LDUAL+CDH+LFC:18.0/HBET:3-5/COM | \$3,968.4M | 1,222 | 0.73% | 0.05% |
| | CR/LDUAL+CDH+LFC:13.0/HBET:3-5/COM | \$3,698.6M | 1,139 | 0.68% | 0.04% |
| MCF | MCF/LWAL+CDN/HBET:3-5/RES | \$3,572.0M | 1,843 | 0.66% | 0.07% |
| RC | CR/LFINF+CDH+LFC:18.0/HBET:3-5/COM | \$2,936.2M | 1,512 | 0.54% | 0.06% |
| | CR/LFINF+CDL+LFC:6.0/HBET:3-5/RES | \$2,905.3M | 1,346 | 0.54% | 0.05% |
| | CR/LDUAL+CDL+LFC:0.0/H:1/COM | \$2,851.7M | 2,246 | 0.53% | 0.08% |
| | CR/LFINF+CDH+LFC:13.0/HBET:3-5/COM | \$2,736.5M | 1,409 | 0.51% | 0.05% |
| | CR+PC/LWAL+CDL+LFC:0.0/HBET:6-/RES | \$2,669.1M | 725 | 0.49% | 0.03% |
| | CR+PC/LFM+CDH/H:1/IND | \$2,464.7M | 1,242 | 0.46% | 0.05% |
| | CR/LFINF+CDL+LFC:6.0/HBET:3-5/COM | \$2,209.5M | 1,212 | 0.41% | 0.05% |

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