# Appendix 1: Sources used to extract the variables data

| *VARIABLE* | *SOURCE* |
| --- | --- |
| Education level | *Ayto. de Madrid, Open Data Portal. Information panel per dsitrict and neighborhood*: <https://datos.madrid.es/portal/site/egob/menuitem.c05c1f754a33a9fbe4b2e4b284f1a5a0/?vgnextoid=71359583a773a510VgnVCM2000001f4a900aRCRD&vgnextchannel=374512b9ace9f310VgnVCM100000171f5a0aRCRD&vgnextfmt=default> |
| Immigration | *Ayto. de Madrid, Banco de datos. Population per district, neighborhood and nationality*:  Source (2019): <https://www-s.madrid.es/CSEBD_WBINTER/seleccionSerie.html?numSerie=0307010000012>  Source (2015): <https://www-s.madrid.es/CSEBD_WBINTER/seleccionSerie.html?numSerie=0307010000011> |
| Real Estate prices | *Ayto. de Madrid, Banco de datos. Evolution of Real Estate prices of pre-owned housings*: https://www-s.madrid.es/CSEBD\_WBINTER/seleccionSerie.html?numSerie=0504030000200 |
| Airbnb data | *Aggregated by Inside Airbnb, the following webpage, web-scraping public information in airbnb.com*: <http://insideairbnb.com/get-the-data> |
| Unemployment | *Ayto. de Madrid, Banco de datos. Registered unemployment per neighborhood*:  Source (2019): <https://www-s.madrid.es/CSEBD_WBINTER/seleccionSerie.html?numSerie=0904040000013>  Source (2015): <https://www-s.madrid.es/CSEBD_WBINTER/seleccionSerie.html?numSerie=0904040000011> |
| Loss of population | Immigration data also contains the population per neighborhood for each year. |
| Population aging | <https://www-s.madrid.es/CSEBD_WBINTER/seleccionSerie.html?numSerie=0301000000001> |

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# Appendix 2: Dataset

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# Appendix 3: Variables codebook

# 

# Appendix 4: Clusters centers

|  | **C1** | **C2** | **C3** | **C4** | **C5** |
| --- | --- | --- | --- | --- | --- |
| **prop\_foreign** | 0.2296 | 0.1492 | 0.1213 | 0.1393 | 0.1284 |
| **foreign\_incr\_last\_4\_years** | 0.0242 | 0.0249 | 0.0249 | 0.0343 | 0.0310 |
| **house\_price\_2019** | 5148 | 3760.9907 | 3209.6524 | 3226.5714 | 2594.1667 |
| **house\_price\_incr\_last\_4\_years** | 0.4145 | 0.4058 | 0.3206 | 0.3424 | 0.2774 |
| **n\_airbnbs** | 659.1667 | 51.8704 | 15.6286 | 0.0000 | 4.5556 |
| **mean\_airbnb\_price** | 116.4903 | 84.8615 | 70.8708 | 0.0000 | 69.3557 |
| **n\_airbnb\_incr\_last\_4\_years** | 531.6667 | 46 | 13.2 | 0.0000 | 4.5556 |
| **airbnb\_price\_incr\_last\_4\_years** | 10.6286 | 29.6938 | -10.2087 | 0.0000 | 69.3557 |
| **unem\_prop\_2019** | 0.0484 | 0.0378 | 0.0435 | 0.0440 | 0.0508 |
| **population\_incr\_last\_4\_years** | 1078.1667 | 1175.7222 | -347.4 | 3728.5 | 601.5 |
| **unem\_incr\_last\_4\_years** | -0.0189 | -0.0214 | -0.0158 | -0.0150 | -0.0172 |
| **Unknown\_studies** | 0.0007 | 0.0016 | 0.0012 | 0.0015 | 0.0008 |
| **Non\_literate** | 0.0257 | 0.0380 | 0.0461 | 0.0507 | 0.0695 |
| **Incomplete\_elementary** | 0.0713 | 0.1026 | 0.1041 | 0.1128 | 0.1349 |
| **Compulsory\_educ** | 0.1797 | 0.2421 | 0.2461 | 0.2592 | 0.2893 |
| **FP\_or\_pre\_college** | 0.1868 | 0.1891 | 0.1951 | 0.1925 | 0.1800 |
| **College\_graduate** | 0.0984 | 0.0981 | 0.1028 | 0.0908 | 0.0863 |
| **Post\_graduate** | 0.4374 | 0.3285 | 0.3047 | 0.2925 | 0.2392 |
| **Aging\_index\_2019** | 0.1642 | 0.2175 | 0.1955 | 0.2084 | 0.1839 |
| **aging\_index\_incr** | -0.0054 | -0.0033 | 0.0093 | -0.0024 | -0.0044 |

# 

# Appendix 5: Neighborhoods in risk of gentrification in Cluster 2

|  | **h**  **o**  **u**  **s**  **e**  **p**  **r**  **i**  **c**  **e** | **nº**  **a**  **i**  **r**  **b**  **n**  **b**  **s** | **nº**  **a**  **i**  **r**  **b**  **n**  **b**  **s**  **i**  **n**  **c**  **r** | **a**  **i**  **r**  **b**  **n**  **b**  **p**  **r**  **i**  **c**  **e** | **u**  **n**  **e**  **m**  **p**  **l**  **o**  **y**  **m**  **e**  **n**  **t** | **p**  **o**  **s**  **t**  **g**  **r**  **a**  **d**  **u**  **a**  **t**  **e** | **c**  **o**  **m**  **p**  **u**  **l**  **s**  **o**  **r**  **y**  **e**  **d**  **u**  **c** | **n**  **o**  **e**  **l**  **e**  **m**  **e**  **n**  **t**  **a**  **r**  **y** | **a**  **g**  **i**  **n**  **g**  **i**  **n**  **d.**  **i**  **n**  **c**  **r** | **h**  **o**  **u**  **s**  **e**  **p**  **r**  **i**  **c**  **e**  **i**  **n**  **c**  **r** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **San Diego** | 1.92 | 82 | 71 | 703.780 | 0.0729 | 0.1021 | 0.4089 | 0.1769 | -0.0231 | 0.4399 |
| **Puerta Bonita** | 1.94 | 22 | 20 | 607.727 | 0.0658 | 0.1121 | 0.3841 | 0.1761 | -0.0205 | 0.4103 |
| **Almendrales** | 2.18 | 25 | 25 | 436.400 | 0.0616 | 0.1149 | 0.3963 | 0.1880 | -0.0203 | 0.4418 |
| **Numancia** | 2.08 | 59 | 53 | 528.305 | 0.0712 | 0.1156 | 0.3709 | 0.1843 | -0.0076 | 0.4260 |
| **Vista Alegre** | 2.04 | 40 | 34 | 452.250 | 0.0055 | 0.1230 | 0.3748 | 0.1717 | -0.0139 | 0.3801 |
| **Palomeras Bajas** | 2.10 | 23 | 22 | 894.348 | 0.0639 | 0.1260 | 0.3640 | 0.1599 | 0.0018 | 0.5036 |
| **San Isidro** | 2.30 | 53 | 49 | 599.811 | 0.0072 | 0.1428 | 0.3539 | 0.1727 | -0.0112 | 0.4295 |
| **Canillejas** | 2.36 | 20 | 19 | 643.500 | 0.0052 | 0.1490 | 0.3479 | 0.1686 | 0.0047 | 0.4595 |
| **Aluche** | 2.21 | 29 | 27 | 381.724 | 0.0446 | 0.1494 | 0.3256 | 0.1730 | -0.0053 | 0.3991 |
| **Opañel** | 2.33 | 40 | 36 | 821.500 | 0.0540 | 0.1591 | 0.3553 | 0.1533 | -0.0110 | 0.4099 |
| **Buenavista** | 2.50 | 25 | 25 | 487.200 | 0.0507 | 0.1629 | 0.3364 | 0.1241 | -0.0052 | 0.2727 |
| **Pueblo Nuevo** | 2.49 | 46 | 41 | 685.435 | 0.0475 | 0.1640 | 0.3372 | 0.1502 | -0.0076 | 0.4403 |
| **Lucero** | 2.38 | 31 | 26 | 544.194 | 0.0529 | 0.1697 | 0.3191 | 0.1571 | -0.0147 | 0.4294 |
| **Ventas** | 2.66 | 54 | 49 | 650.185 | 0.0499 | 0.1755 | 0.3279 | 0.1503 | -0.0167 | 0.4595 |
| **Comillas** | 2.70 | 46 | 44 | 896.739 | 0.0575 | 0.1805 | 0.3242 | 0.1485 | -0.0076 | 0.5538 |

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# Appendix 6: Neighborhoods in risk of gentrification in Cluster 3

|  | **Real estate price** | **Real estate prices increase** | **Nº of airbnbs listings** | **Post graduate proportion** | **Unemployment rate** |
| --- | --- | --- | --- | --- | --- |
| **Casco Histórico de Vallecas** | 2356.5 | 0.6422 | 29 | 0.0768 | 0.0782 |
| **Arcos** | 2130.0 | 0.5720 | 16 | 0.1266 | 0.0622 |
| **Portazgo** | 1826.0 | 0.4738 | 10 | 0.0784 | 0.0750 |
| **Los Rosales** | 1869.0 | 0.4355 | 13 | 0.1041 | 0.0601 |
| **Moscardó** | 2209.0 | 0.4353 | 29 | 0.1268 | 0.0534 |
| **Palomeras Sureste** | 2012.0 | 0.2718 | 18 | 0.0995 | 0.0659 |
| **San Fermín** | 2041.0 | 0.2325 | 16 | 0.1078 | 0.0691 |
| **Casco Histórico de Barajas** | 3104.0 | 0.2327 | 16 | 0.1408 | 0.0494 |
| **Fontarrón** | 2207.0 | 0.3449 | 14 | 0.1424 | 0.0554 |

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# Appendix 7: Neighborhoods in risk of gentrification in Cluster 4.

|  | **Los Cármenes** | **San Cristóbal** |
| --- | --- | --- |
| **house\_price\_incr\_last\_4\_years** | 0.4376 | 0.5859 |
| **unem\_prop\_2019** | 0.0714 | 0.0896 |
| **Non\_literate** | 0.0755 | 0.1153 |
| **Incomplete\_elementary** | 0.1586 | 0.2035 |
| **Compulsory\_educ** | 0.3246 | 0.4613 |
| **FP\_or\_pre\_college** | 0.2002 | 0.1397 |
| **College\_graduate** | 0.0784 | 0.0284 |
| **Post\_graduate** | 0.1608 | 0.0510 |

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# Appendix 8: Privileged and Middle class social structure neighborhoods in Cluster 5.

|  | Valdemarín | El Plantío | El Goloso | Corralejos | Estrella | **Cluster 5 center** |
| --- | --- | --- | --- | --- | --- | --- |
| **house\_price\_2019** | 4404 | 2638 | 4575 | 3476 | 4155 | **2594.16** |
| **unem\_prop\_2019** | 0.0174 | 0.0169 | 0.0203 | 0.0268 | 0.0268 | **0.0508** |
| **Non\_literate** | 0.0122 | 0.0152 | 0.0231 | 0.0241 | 0.0163 | **0.0695** |
| **Incomplete\_elementary** | 0.0447 | 0.0425 | 0.0437 | 0.0439 | 0.0529 | **0.1349** |
| **Compulsory\_educ** | 0.0909 | 0.1189 | 0.1064 | 0.1013 | 0.1458 | **0.2893** |
| **FP\_or\_pre\_college** | 0.1182 | 0.1675 | 0.1463 | 0.1760 | 0.1900 | **0.1800** |
| **College\_graduate** | 0.1041 | 0.1078 | 0.1417 | 0.1631 | 0.1344 | **0.0863** |
| **Post\_graduate** | 0.6294 | 0.5476 | 0.5387 | 0.4916 | 0.4596 | **0.2392** |

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# Appendix 9: Neighborhoods in risk of gentrification in Cluster 5.

|  | Amposta | Pradolongo | Hellín | Entrevías | Zofío | **Cluster 5 center** |
| --- | --- | --- | --- | --- | --- | --- |
| house\_price\_incr\_last\_4\_years | 0.8105 | 0.5374 | 0.4376 | 0.4267 | 0.3951 | **0.2774** |
| unem\_prop\_2019 | 0.0823 | 0.0593 | 0.0708 | 0.0827 | 0.0614 | **0.0508** |
| Non\_literate | 0.1004 | 0.0780 | 0.1036 | 0.1590 | 0.0771 | **0.0695** |
| Incomplete\_elementary | 0.2093 | 0.2247 | 0.2049 | 0.2150 | 0.1926 | **0.1349** |
| Compulsory\_educ | 0.4197 | 0.4327 | 0.3918 | 0.4072 | 0.4161 | **0.2893** |
| FP\_or\_pre\_college | 0.1542 | 0.1495 | 0.1708 | 0.1314 | 0.1702 | **0.1800** |
| College\_graduate | 0.0433 | 0.0430 | 0.0460 | 0.0320 | 0.0491 | **0.0863** |
| Post\_graduate | 0.0717 | 0.0714 | 0.0808 | 0.0547 | 0.0944 | **0.2392** |