# 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> |

# Appendix 2: Dataset

# 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 |