Data Sources and Preparation for
Welcome to the FAR Dome: By How Much is New York City Allowed to Grow?

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I. Data Sets

1961 Zoning Map

The 1961 zoning map was digitized and converted into a shapefile by Yilin Wu. I am grateful that she shared the map. It contains all the zones in New York,, which give use and the maximum allowable FAR for each zone (see Statistics Section below). Note that each zone also comes with additional rules, such as open space requirements, but these were not used in the analysis for this blog post.

Next, I took the 1961 shapefile and performed the "intersection" operation with the New York City tax block shapefile. This then gave me the various zones at the tax block level. The tax block shape file is available here.

Next, using other shapefiles (a parks shapefile and the PLUTO 2021 shapefile available here), I removed parks, cemeteries, and airports from the 1961 block level zoning map. This was the final shapefile I used to perform the analysis for the blog.

Finally, I joined the Community District (CD) (here) shapefile to the 1961 block level zoning map, so that each block was placed within its respective CD.

Residential FARs used were the maximum allowable FARs for the residential districts. Residential floor areas were calculated by taking for each residential polygon (at the block level), the polygon area (in ft^2) x maximum floor area ratio.

For the entire city, I added up total allowable floor area and the total residential space allowed under the rules. I also added up total floor area and residential floor area for each CD.

2021 Zoning Maps

The 2021 zoning maps came from the 2021v2. PLUTO file, which is a data set containing information about every tax lot in NYC and comes in CSV and shapefile formats. The PLUTO file gives maximum residential FARs, as well as the zone designations (see below). Similar to the 1961 map, I removed parks, cemeteries, and airports from the analysis.

The PLUTO file only gives residential, commercial, and facilities (e.g., churches and community centers) FARs. Using the zoning designation for manufacturing, I then input the maximum manufacturing district FARs, available from the current zoning Handbook. The maximum allowable FAR for a property was the maximum of the commercial, resident, or manufacturing FAR. I ignored facilities FARs for this analysis.

The PLUTO file has a column that gives the maximum allowable residential FAR (which ranges from 0 to 10) for each property. I calculated the maximum allowable residential floor area by taking maximum residential FAR x lot area (in ft^2).

For zoning use, the variable in PLUTO, *ZoneDist1,* gives the zoning designation (e.g., R1-1, C6-1, M1-1/R5) (see table below). From these designations, I calculated a mixed-used variable that takes on the value of 1 if the zoning designation had two uses (e.g. M1-1/R5, M1-1/R7D), 0 otherwise.

The PLUTO file designates if the property is a historic district. If so, I assigned the maximum residential FAR as 0 since these buildings cannot torn down. I did not do the same for buildings that are landmarked. For simplicity, I ignored them for the analysis.

The PLUTO file also designates if a particular tax lot is in one or more zones. Since this is relatively rare, I ignored multiple zone designations and just calculated floor are values for the largest part of the zoning lot (properties in two zones comprise 2% of all lots, and being in three or more zones is a negligible number relative to the total number of lots.)

Analysis of use and floor areas were done by adding up total allowable floor areafor the city as a whole and for each community district.

Changes in floor areas were calculated by comparing for the city and each community district the allowable residential floor area in 1961 and 2021.

The PLUTO file also gives the current building FAR and this was compared to allowable residential FARs for residential buildings, which here were defined as those that have at least one residential unit, have allowable residential FAR greater than zero, and devote at least 100 square feet to residential space (88% of buildings in NYC).

II.   Notes

The NYC Zoning Resolution allows for FAR bonus in some districts if amenities are provided. For example, a maximum FAR of 10 for a high-rise residential building can become 12 if a plaza is provided. I ignored the possibility of FAR bonuses in my analysis for simplicity.

Also, since 1987, the city has created contextual zoning rules, which require buildings to have certain shapes and sizes to be within the historical architectural context of the neighborhood. The rules in this district may make obtaining the maximum allowable FAR impossible for new construction. For simplicity, I ignore this and assigned all the properties in the contextual districts their maximum values.

Given some districts have bonuses and some have restrictions, I would guess that these FAR allowances would offset each other on average across the city. But further work on this is needed.

Again, since the primary focus on the blog is on residential floor area, for simplicity, I ignore the allowable FAR for the "facilities" category.

Also note that statistics in the post about total current floor areas and uses are also derived from the 2021v.2 PLUTO file.

III. Statistics

Here is the zoning districts statistics for each tax lot as mid-2021. Note those with "/" are mixed use. Those with letters at the end are contextual districts. This is main zoning designation. In NYC 19,868 of 857, 353 (2.3%) lots have multiple zoning designations. These were ignored in the analysis.

```
   zonedist1 |      Freq.      Percent         Cum.
------------+-----------------------------------
       BPC |        43        0.01          0.01
      C1-6 |       454        0.05          0.06
     C1-6A |       371        0.04          0.10
      C1-7 |        74        0.01          0.11
     C1-7A |       102        0.01          0.12
      C1-8 |        12        0.00          0.12
     C1-8A |       195        0.02          0.15
     C1-8X |       305        0.04          0.18
      C1-9 |       903        0.11          0.29
     C1-9A |       113        0.01          0.30
      C2-6 |       155        0.02          0.32
     C2-6A |        46        0.01          0.32
      C2-7 |        30        0.00          0.33
     C2-7A |       131        0.02          0.34
      C2-8 |       372        0.04          0.39
     C2-8A |       109        0.01          0.40
        C3 |       277        0.03          0.43
       C3A |       910        0.11          0.54
      C4-1 |       385        0.04          0.58
      C4-2 |     1,579        0.18          0.77
     C4-2A |       884        0.10          0.87
     C4-2F |         8        0.00          0.87
      C4-3 |     1,738        0.20          1.07
     C4-3A |       747        0.09          1.16
      C4-4 |       882        0.10          1.26
     C4-4A |     1,180        0.14          1.40
     C4-4D |       321        0.04          1.44
     C4-4L |       329        0.04          1.48
      C4-5 |       103        0.01          1.49
     C4-5A |        56        0.01          1.49
     C4-5D |       215        0.03          1.52
     C4-5X |       419        0.05          1.57
      C4-6 |       127        0.01          1.58
     C4-6A |       200        0.02          1.61
      C4-7 |       130        0.02          1.62
      C5-1 |       275        0.03          1.65
     C5-1A |        12        0.00          1.66
      C5-2 |       369        0.04          1.70
     C5-2.5 |       190        0.02          1.72
     C5-2A |        61        0.01          1.73
      C5-3 |       564        0.07          1.79
      C5-4 |        41        0.00          1.80
      C5-5 |       290        0.03          1.83
      C5-P |        72        0.01          1.84
      C6-1 |       511        0.06          1.90
     C6-1A |        11        0.00          1.90
     C6-1G |       388        0.05          1.95
      C6-2 |       746        0.09          2.03
     C6-2A |     1,382        0.16          2.19
     C6-2G |       226        0.03          2.22
     C6-2M |        63        0.01          2.23
      C6-3 |       276        0.03          2.26
     C6-3A |       276        0.03          2.29
     C6-3D |        13        0.00          2.29
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   C6-3X |        79        0.01        2.30
    C6-4 |       743        0.09        2.39
  C6-4.5 |       267        0.03        2.42
   C6-4A |       260        0.03        2.45
   C6-4M |       171        0.02        2.47
   C6-4X |        74        0.01        2.48
    C6-5 |        69        0.01        2.49
  C6-5.5 |        51        0.01        2.49
    C6-6 |       220        0.03        2.52
  C6-6.5 |        23        0.00        2.52
    C6-7 |        48        0.01        2.53
   C6-7T |        56        0.01        2.53
    C6-9 |        51        0.01        2.54
      C7 |        74        0.01        2.55
    C8-1 |     1,868        0.22        2.77
    C8-2 |       965        0.11        2.88
    C8-3 |       311        0.04        2.92
    C8-4 |       106        0.01        2.93
    M1-1 |    12,905        1.51        4.43
 M1-1/R5 |        64        0.01        4.44
M1-1/R6A |         5        0.00        4.44
M1-1/R7-2|       173        0.02        4.46
M1-1/R7D |        22        0.00        4.46
   M1-1D |       372        0.04        4.51
    M1-2 |     3,328        0.39        4.90
M1-2/R5B |       169        0.02        4.92
M1-2/R5D |       161        0.02        4.93
 M1-2/R6 |       246        0.03        4.96
M1-2/R6A |     1,360        0.16        5.12
M1-2/R6B |       293        0.03        5.16
M1-2/R7-1|         4        0.00        5.16
M1-2/R7-2|         4        0.00        5.16
M1-2/R7A |         3        0.00        5.16
 M1-2/R8 |         3        0.00        5.16
M1-2/R8A |        16        0.00        5.16
   M1-2D |     1,005        0.12        5.28
    M1-3 |       358        0.04        5.32
M1-3/R7X |        48        0.01        5.32
 M1-3/R8 |        19        0.00        5.33
    M1-4 |     1,273        0.15        5.47
M1-4/R6A |       209        0.02        5.50
M1-4/R6B |       308        0.04        5.54
M1-4/R7-2|         4        0.00        5.54
M1-4/R7A |       261        0.03        5.57
M1-4/R7D |         7        0.00        5.57
M1-4/R7X |        33        0.00        5.57
M1-4/R8A |        58        0.01        5.58
M1-4/R9A |         3        0.00        5.58
   M1-4D |       298        0.03        5.61
    M1-5 |       365        0.04        5.66
M1-5/R10 |         5        0.00        5.66
M1-5/R7-2|        33        0.00        5.66
M1-5/R7-3|       138        0.02        5.68
M1-5/R7D |         7        0.00        5.68
M1-5/R7X |        34        0.00        5.68
M1-5/R8A |        34        0.00        5.68
 M1-5/R9 |        70        0.01        5.69
M1-5/R9-1|         8        0.00        5.69
   M1-5A |       264        0.03        5.72
   M1-5B |       588        0.07        5.79
   M1-5M |       119        0.01        5.81
    M1-6 |       704        0.08        5.89
M1-6/R10 |        74        0.01        5.90
M1-6/R8X |         2        0.00        5.90
 M1-6/R9 |        15        0.00        5.90
   M1-6D |        41        0.00        5.90
    M2-1 |     1,718        0.20        6.10
    M2-2 |         5        0.00        6.11
    M2-3 |        80        0.01        6.11
    M2-4 |        81        0.01        6.12
    M3-1 |     2,453        0.29        6.41
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      M3-2 |        169         0.02        6.43
      PARK |      2,616         0.31        6.73
      R1-1 |      1,620         0.19        6.92
      R1-2 |     14,203         1.66        8.58
     R1-2A |      1,552         0.18        8.76
       R10 |      1,007         0.12        8.88
      R10A |        834         0.10        8.98
      R10H |         18         0.00        8.98
        R2 |     39,777         4.64       13.62
       R2A |     38,001         4.43       18.05
       R2X |      1,340         0.16       18.21
      R3-1 |     50,167         5.85       24.06
      R3-2 |     62,215         7.26       31.31
       R3A |     54,195         6.32       37.64
       R3X |     52,118         6.08       43.71
        R4 |     73,462         8.57       52.28
      R4-1 |     51,525         6.01       58.29
       R4A |     25,860         3.02       61.31
       R4B |     15,452         1.80       63.11
        R5 |     90,084        10.51       73.62
       R5A |      4,110         0.48       74.10
       R5B |     30,810         3.59       77.69
       R5D |      5,104         0.60       78.29
        R6 |     68,031         7.94       86.22
       R6A |     15,189         1.77       87.99
       R6B |     50,711         5.91       93.91
      R7-1 |     14,119         1.65       95.56
      R7-2 |      7,874         0.92       96.47
      R7-3 |         31         0.00       96.48
       R7A |     10,787         1.26       97.74
       R7B |      3,443         0.40       98.14
       R7D |        883         0.10       98.24
       R7X |        424         0.05       98.29
        R8 |      4,915         0.57       98.86
       R8A |      1,576         0.18       99.05
       R8B |      7,332         0.86       99.90
       R8X |        157         0.02       99.92
        R9 |        262         0.03       99.95
      R9-1 |          5         0.00       99.95
       R9A |        364         0.04       99.99
       R9X |         54         0.01      100.00
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     Total |    857,353       100.00
```

Here is the similar table from 1961, but at the block level.

```
ZoningType |      Freq.      Percent      Cum.
-----------+-----------------------------------
      C1-6 |         49         0.12        0.12
      C1-7 |         37         0.09        0.21
      C1-8 |         95         0.23        0.45
      C1-9 |        207         0.51        0.96
      C2-6 |         32         0.08        1.04
      C2-7 |         50         0.12        1.16
      C2-8 |         91         0.22        1.39
        C3 |        142         0.35        1.74
      C4-1 |         45         0.11        1.85
      C4-2 |        320         0.79        2.64
      C4-3 |        207         0.51        3.15
      C4-4 |        168         0.41        3.56
      C4-5 |         14         0.03        3.60
      C4-6 |         53         0.13        3.73
      C4-7 |         47         0.12        3.85
      C5-1 |         58         0.14        3.99
      C5-2 |        104         0.26        4.25
      C5-3 |        217         0.54        4.78
      C5-4 |         13         0.03        4.81
      C6-1 |        258         0.64        5.45
      C6-2 |         67         0.17        5.62
      C6-3 |         42         0.10        5.72
      C6-4 |        267         0.66        6.38
```

```
      C6-5 |          13           0.03          6.41
      C6-6 |          85           0.21          6.62
      C6-7 |          37           0.09          6.71
        C7 |          35           0.09          6.80
        C8 |          36           0.09          6.89
      C8-1 |         598           1.48          8.36
      C8-2 |         287           0.71          9.07
      C8-3 |         160           0.40          9.47
      C8-4 |          46           0.11          9.58
      CI-9 |          36           0.09          9.67
      M1-1 |       2,614           6.46         16.13
      M1-2 |         382           0.94         17.07
      M1-3 |         102           0.25         17.32
      M1-4 |          37           0.09         17.41
      M1-5 |         267           0.66         18.07
      M1-6 |          79           0.20         18.27
      M2-1 |         399           0.99         19.25
      M2-2 |           8           0.02         19.27
      M2-3 |          59           0.15         19.42
      M2-4 |          25           0.06         19.48
      M3-1 |         791           1.95         21.43
      M3-2 |          39           0.10         21.53
       R-6 |          17           0.04         21.57
      R1-1 |          97           0.24         21.81
      R1-2 |         888           2.19         24.00
       R10 |         369           0.91         24.91
        R2 |       3,076           7.60         32.51
      R3-1 |       1,003           2.48         34.99
      R3-2 |       7,965          19.67         54.66
        R4 |       4,545          11.22         65.88
        R5 |       4,795          11.84         77.72
        R6 |       5,505          13.59         91.32
      R7-1 |       1,503           3.71         95.03
      R7-2 |       1,032           2.55         97.58
        R8 |         929           2.29         99.87
        R9 |          52           0.13        100.00
-----------+-----------------------------------
     Total |      40,494         100.00
```

Here is maximum FARs at the block level for 1961 (all uses).

```
   MaxFAR |       Freq.       Percent         Cum.
-----------+-----------------------------------
     0.500 |      13,171         32.60         32.60
     0.750 |       4,545         11.25         43.85
     1.000 |       3,251          8.05         51.90
     1.124 |       4,795         11.87         63.77
     2.000 |       2,750          6.81         70.58
     2.200 |       5,505         13.63         84.21
     3.100 |       2,535          6.28         90.48
     3.400 |         762          1.89         92.37
     4.000 |          58          0.14         92.51
     5.000 |         448          1.11         93.62
     5.400 |         929          2.30         95.92
     6.000 |         367          0.91         96.83
     6.750 |          52          0.13         96.96
    10.000 |         890          2.20         99.16
    15.000 |         339          0.84        100.00
-----------+-----------------------------------
     Total |      40,397        100.00
```

Here is maximum residential FARs at the property level for 2021

```
  residfar |       Freq.       Percent         Cum.
-----------+-----------------------------------
         0 |      32,949          3.84          3.84
        .5 |     315,035         36.71         40.55
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```
   .75 |    150,847     17.58      58.12
   .85 |      1,340      0.16      58.28
    .9 |     15,452      1.80      60.08
   1.1 |      4,110      0.48      60.56
  1.25 |     90,533     10.55      71.11
  1.35 |     30,979      3.61      74.72
     2 |     56,577      6.59      81.31
  2.43 |     71,605      8.34      89.65
     3 |     21,837      2.54      92.20
  3.44 |     24,700      2.88      95.08
     4 |     20,365      2.37      97.45
   4.2 |      1,127      0.13      97.58
     5 |      1,127      0.13      97.71
  6.02 |      9,700      1.13      98.84
  7.52 |      1,631      0.19      99.03
     8 |         72      0.01      99.04
     9 |        459      0.05      99.09
    10 |      7,768      0.91     100.00
-----------+--------------------------------
 Total |    858,213    100.00
```