Data Sources and Regression Results for:
COVID-19 and the Market for Skyscrapers

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I. Data Sources

World

- Skyscraper Completions and Heights (150 m+): http://www.skyscrapercenter.com/
- Global GDP since 1960 (constant 2010 USD): https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.
- Urbanization Rate: https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS

New York City

- NYC Skyscraper Completions Count (100 m+): Emporis.com
- NYC Employment: https://labor.ny.gov/stats/index.shtm
- Turner Construction Cost Index: http://www.turnerconstruction.com/cost-index
- S&P 500 Index: http://www.econ.yale.edu/~shiller/data.htm
- Fed. Funds rate: https://fred.stlouisfed.org/series/FEDFUNDS
- National CPI for Urban Consumers: https://fred.stlouisfed.org/series/CPIAUCSL
- NYC office vacancy: On request, from various sources.

II. Regression Models

World

The dependent variable in Table 1 is the number of skyscraper completions (150 meters or taller) each year since 1970. Table 2 the dependent variable is the log of the number of completions. I tried various specifications, and lags, and Equation (2) or (4) seems to work best for a simple prediction model. The right-hand side variables are the percent change in GDP from one year to the next, the urbanization rate (%) (both lagged two or three periods), the lag of completions and a time trend. Note that the log of completions count does not appear to have a unit root (but it is not clear that this is the case for levels of the count). Here I just use OLS for simplicity (the lag coefficient is 0.81). Predictions in the blog post graph are from Table 1, Equation (2).

Table 1

	(1) count	(2) count	(3) count	(4) count
L.count	0.807***	0.665***	0.654***	0.642***
	(9.19)	(4.10)	(3.91)	(3.89)
year	1.057*	-2.750	-3.963	-3.798
	(1.85)	(-0.59)	(-0.81)	(-0.75)
L3.gdp_pct		4.156		4.078
		(1.33)		(1.30)
L2.gdp_pct			0.402	
			(0.12)	
L3.urbanrate		12.31	15.30	
		(0.88)	(1.05)	
L2.urbanrate				15.14
				(1.02)
_cons	-2088.6*	4962.6	7263.0	6925.1
	(-1.84)	(0.57)	(0.79)	(0.73)
N	51	51	51	51
R-sq	0.911	0.917	0.914	0.917
adj. R-sq	0.908	0.910	0.906	0.910
AIC	492.3	493.0	494.8	492.7
BIC	498.0	502.6	504.5	502.3

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 2

	(1) lncount	(2) lncount	(3) lncount	(4) lncount
L.lncount	0.596***	0.469***	0.505***	0.458***
	(5.29)	(3.64)	(3.86)	(3.55)
year	0.0288***	-0.00177	-0.00274	-0.00850
	(3.52)	(-0.06)	(-0.09)	(-0.28)
L3.gdp_pct		0.0471		0.0465
		(1.62)		(1.61)
L2.gdp_pct			0.0335	
			(1.13)	
L3.urbanrate		0.106	0.101	
		(1.30)	(1.19)	
L2.urbanrate				0.124
				(1.46)
_cons	-55.87***	0.879	2.936	13.52
	(-3.51)	(0.02)	(0.05)	(0.24)
N	51	51	51	51
R-sq	0.939	0.945	0.943	0.945
adj. R-sq	0.936	0.940	0.938	0.941
AIC	16.49	15.09	16.52	14.63
BIC	22.29	24.75	26.18	24.28

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

New York City

Table 3 gives regressions for completions count (100 m+) for the past 64 years. Controls are Turner Construction Cost Index, year trend, S&P 500 Index, Fed Fund Rate, US CPI, NYC Employment and Dummy Variable "Koch Bonus" that takes on 1 in years 1982-1988, 0 otherwise, and office vacancy in midtown Manhattan. The "Koch Bonus" were years with FAR bonuses to build office in west midtown, and as the bonus closing data began to approach builders rushed to start their projects (see Barr, 2010). Lags were chosen based on those that gave highest t-value (and which reduced the AIC and BIC). CPI was included as a way to convert price variables to real levels. Table 4 gives the same regressions, but the dependent variable is in logs. Note that neither dependent variable has a unit root. Predictions in the blog post graph are from Equation (1), Table 3.

Table 3

	(1) count	(2) count	(3) count
L2.lnemp	75.05***	61.23***	
	(6.54)	(3.72)	
L4.turner	-0.0398***	-0.0350**	-0.0384***
	(-2.82)	(-2.39)	(-2.72)
year	0.776***	1.031***	0.583***
	(2.81)	(2.94)	(2.88)
L5.lnsp	-3.458	-3.164	
	(-1.44)	(-1.31)	
L.kochbonus	8.003***	9.156***	8.258***
	(3.58)	(3.76)	(3.70)
L2.fedfunds	-0.108	-0.00883	-0.0376
	(-0.37)	(-0.03)	(-0.14)
L2.lncpi		-7.605	
		(-1.17)	
L2.nycempl~t			0.0172***
			(5.20)
L3.vacancy			-0.238
			(-1.38)
_cons	-2113.5***	-2476.9***	-1195.5***
	(-3.65)	(-3.78)	(-3.00)
N	64	64	64
R-sq	0.564	0.574	0.552
adj. R-sq	0.518	0.521	0.505
AIC	377.9	378.4	379.6
BIC	393.1	395.7	394.7

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 4

	(1) lncount	(2) lncount	(3) lncount
L2.lnemp	9.793***	8.021***	
	(7.82)	(4.61)	
L4.turner	-0.00348**	-0.00285*	-0.00382**
	(-2.32)	(-1.83)	(-2.61)
year	0.0647**	0.0976**	0.0610***
	(2.22)	(2.66)	(2.89)
L5.lnsp	-0.265	-0.227	
	(-1.05)	(-0.90)	
L.kochbonus	0.709***	0.857***	0.663***
	(3.01)	(3.37)	(2.93)
L2.fedfunds	0.0246	0.0377	0.0216
	(0.80)	(1.18)	(0.75)
L2.lncpi		-0.987	
		(-1.45)	
L2.nycempl~t			0.00220***
			(6.14)
L3.vacancy			-0.0413**
			(-2.30)
_cons	-204.1***	-251.1***	-125.4***
	(-3.36)	(-3.67)	(-3.03)
N	63	63	63
R-sq	0.616	0.630	0.634
adj. R-sq	0.575	0.583	0.595
AIC	88.13	87.75	85.01
BIC	103.1	104.9	100.0

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

References

Barr, J., 2010. Skyscrapers and the skyline: Manhattan, 1895–2004. *Real Estate Economics*, *38*(3), pp.567-597.