4-1-1991

The Urbanization Deflator of the GNP, 1919-1984: Reply

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Published version. *Southern Economic Journal,* Vol. 57, No. 4 (April 1991): 1179-1182. DOI.

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Robert Whaples' comment [3] should be quite interesting for two types of readers. Those interested in the historical consequences of the ever growing extent of urban disamenities in the U.S. will find in this study an attempt to replace an extrapolation based on current data with an estimate based on actual historical data. Those interested in the computational technique of estimating the overall impact of urban disamenities—i.e., the urban deflator of the GNP—will also find in Whaples' comment an important corroboration to the method of estimation and extrapolation developed by Clark, Kahn, and Ofek [1]. By far more interesting to the general reader, though, is an intriguing conjecture proposed by the author which seems to depart from the approach taken by earlier studies. Implicit in some of the earlier studies (e.g., Nordhaus and Tobin [2], or Clark, Kahn and Ofek [1]) is a working assumption that attributes the bulk of the growing urban disamenity to two trends: population redistribution from nonurban to urban areas, and the tendency of small cities to grow larger. Whaples, in contrast, attributes major importance to historical changes in the very nature of the overall urban disamenity. Specifically, if we correctly understand the argument, the urban disamenity is said to grow systematically more intense over the course of time regardless of city size. Put differently, according to this conjecture cities of given size are less livable now than at the beginning of the century. We shall eventually take issue with this conjecture, but first we need to inquire into the empirical foundation over which it has been established.

Whaples' argument relies on a discrepancy, or seeming discrepancy, between our extrapolation of a 4.6 percent deflator for 1920 (based in part on current data) and his own estimates (based entirely on historical data) that average about 2.1 percent for 1919. Ruling out statistical errors, one can explain the difference between the initial extrapolation and the subsequent estimate in two possible ways. Whaples, for instance, ascribes the bulk of the discrepancy to the rising magnitude of the urban disamenity (holding city size constant) over the 60 years that elapsed between 1919 and 1980. Alternatively, one can ascribe the discrepancy—in full or in part—to differences in data and specification. To ascertain the validity of Whaples' argument one should thus try to trace the discrepancy to its most probable sources: a task undertaken in what follows. Incidently, in doing so we will also show that the new estimate does not detract from the power of the original extrapolation, but rather reinforces it.

While using the same general method, the actual procedure of estimation used by Whaples differs from ours in two major details necessitated by deficiencies in the data available for 1919. Lack of disaggregated observations compelled the investigator to base his estimates of earning functions on grouped (city average) data rather than on individual observations. Then, lack of sufficient variation in the grouped data compelled him to resort to quadratic rather than cubic specification. Such deviations in the procedure of estimation are bound to lead to some discrepancies in the results. The question is how much and in what direction? This question is best answered by replicating the two procedures in a year for which the data can support both of them, such as 1980.

Table I reports regression results for 1980 we have estimated using grouped (city average)

Table I. Regression Analysis: Polynomial Specification (Aggregated 1980 Census Data)

T values in ()
Dependent variable: ln wage | Number of observations: 258

Regression form	LINEAR	QUADRATIC	CUBIC
INTERCEPT	6.199	6.538	6.559
	(16.1)	(16.4)	(16.3)
EDUCATION	0.296	0.273	0.272
	(10.3)	(9.26)	(9.15)
EXPERIENCE	0.031	0.027	0.027
	(3.41)	(2.98)	(2.94)
EXPERIENCE SQ	−.001	−.001	−.001
	(3.04)	(2.65)	(2.61)
LOG JAN	−.019	−.031	−.032
	(.865)	(1.36)	(1.39)
SUN	−.380	−.363	−.362
	(3.20)	(3.10)	(3.09)
COASTAL	−.056	−.055	−.055
	(3.57)	(3.53)	(3.53)
MIGR	−.460	−.442	−.440
	(3.49)	(3.41)	(3.38)
FLFP	−.011	−.040	−.041
	(.079)	(.303)	(.314)
ENROLLMENT	−.222	−.183	−.181
	(1.27)	(1.06)	(1.04)
POPULATION	0.018	0.064	0.074
	(2.61)	(3.72)	(2.47)
POPULATION SQ	****	−.008	−.012
		(2.90)	(.996)
POPULATION CUBE	****	****	.0004
			(.424)
Adjusted *R*-squared	.42	.44	.44

KEY: WAGE = median income males over 15, with income; *EDUCATION* = median years of school completed for persons 25 years and over; *EXPERIENCE* = median age − education − 6 years; *LOG JAN* = log of average January temperature; *SUN* = percent annual sunshine; *COASTAL* = dummy variable (1 = coastal state, 0 = otherwise); *MIGR* = percent of state population 16 years and over residing in different county in 1975; *FLFP* = percent of females 16 years and over in the labor force; *ENROLLMENT* = persons enrolled in college (thousands).

data rather than the more powerful individual data set used in our original paper. However, these estimates for 1980 have the advantage of being compatible (in terms of overall specification) with the corresponding estimates for 1919 as reported in Whaples ([3], Table I, columns 1a–2b). Note that unlike individual data, grouped data are not sufficiently sensitive to support the cubic specification. This is evident in the overall failure to obtain relevant coefficients (on "population squared" and "population cubed") which are significantly different from zero, either for 1919 or for 1980. For that reason, we take it, the author has (correctly) chosen to use the quadratic rather than the cubic specification for the 1919 estimations.

We can do the same for 1980. Table I in conjunction with Tables I and II in our original paper enables us to reproduce the deflator for 1980 in three different configurations as reported below in

Table II. Urbanization Deflators 1919, 1920, and 1980: Alternative Estimates

	Individual Data		Grouped Data	
	Cubic Fit (1)	Quadratic Fit (2)	Quadratic Fit (3)	Difference (4) = (1) − (3)
1980	6.6	5.6	4.1	2.5
1919/1920	4.6[a]	—[b]	1.6[c]	3.0
Difference	2.0		2.5	−0.5

a. Extrapolation for 1920 from Clark, Kahn, and Ofek [1], Table II.
b. Individual data are unavailable for 1919/1920.
c. Whaples actual estimate for 1919.

Table II. These include our original estimate (using a cubic specification over individual observations), an estimate compatible with that of Whaples (using a quadratic specification over grouped data), and an intermediate case (using a quadratic specification over individual observations). In addition, Table II reports the findings for 1919/1920, including both our initial extrapolation and Whaples' subsequent estimate, each listed immediately below its 1980 analog (in terms of data and specification). Of the four estimates suggested by Whaples (in the range of 1.6 to 2.6 percentage points) we chose to list the smallest variant, 1.6, which is most favorable to his argument and least favorable to our counterargument.

It is evident from Table II (first line) that the size of the estimated deflators varies directly, both, with the explanatory variation in the data (grouped vs. individual), and with the sensitivity of the specification (quadratic vs. cubic). The difference between the most and least sensitive estimates of 1980 is 2.5 percentage points (Table II, line 1). The difference between Whaples' estimate for 1919 and our extrapolation for 1920 is 3.0 percentage points (line 2). In other words, using individual data which supports a cubic fit (rather than grouped data) accounts for almost all (2.5 out of 3.0 percentage points) of the difference between our original extrapolation and Whaples' estimates. With this knowledge concerning the discrepancy within 1980 estimates, the same discrepancy could have been applied to our 1920 extrapolation, almost exactly predicting Whaples' findings.

A comparison in Table II along columns rather than along lines is also instructive. Though different types of data and specification result in different magnitudes, the rates of change in the deflator over time (compare the figures along columns 1 and 3) are virtually the same; again, the discrepancy is on the order of only 0.5 percentage points. Put differently, the empirical work done by Whaples provides a fairly convincing corroboration to the general method of estimating the urban disamenity.

Unfortunately, properly interpreted, the findings seem to lend little or no support to Whaples' challenge of the hypothesis concerning the temporal intensification of the urban disamenity. Tracing the discrepancy to its sources (1.0 percent to the use of quadratic rather than cubic estimation and 1.5 percent to the use of grouped rather than individual observations) leaves at best 0.5 percent to support that hypothesis (table II, line 1). Had we used any of the remaining three variants of Whaples estimation as a basis for the comparison in table II, that support would shrink even further.

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References

1. Clark, David, James Kahn and Haim Ofek, "City Size, Quality of Life, and the Urbanization Deflator of the GNP: 1910–1984." *Southern Economic Journal*, January 1988, 701–14.

2. Nordhaus, William and James Tobin, "Is Growth Obsolete?" *Fiftieth Anniversary Colloquium V*. New York: National Bureau of Economic Research, 1972.

3. Whaples, Robert, "The Urbanization Deflator of the GNP, 1919–1984: Comment." *Southern Economic Journal*, April 1991.