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Do Local Amenities Increase Monopsony Power?

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Abstract

We ask whether workers in high amenity locations are willing to cede greater degrees of monopsony power to their employers in exchange for the ability to remain in their more desirable locales. Our hypothesis is that negative returns to seniority should be greater for workers in higher amenity locations than for otherwise similar workers in lower amenity locations. Empirical evidence from a sample of public Ph.D. programs is consistent with this prediction. Using property values as well as number of pleasant days as a proxy for local amenities we find that the estimated negative returns to seniority are between 1.3 and 4.1 percent larger for higher property values locations and the negative returns to seniority are between 1.3 and 5.3 percent larger for locations with more pleasant days, all else equal.

1.   Introduction

Public-sector pay is a hotly debated issue complicated by the fact that both taxpayers and public-sector employees may be willing to sacrifice increased taxes and/or decreased wages in exchange for the ability to remain in more desirable locations. Brueckner and Neumark (2014) examine one side of this issue by asking whether taxpayers in more desirable locations are willing to accept higher taxes that subsidize higher public-sector wages in such locations. Their findings indicate that public-sector wage differentials are indeed larger in more desirable locations, which they find consistent with their underlying theory.

We examine the other side of the issue by asking whether public-sector employees are willing to accept lower salary growth in order to remain in their more desirable locations. Using prevailing property values as well as the number of pleasant days as a proxy for local amenities, we examine this possibility by estimating AY2011 log annual salary functions for a unique sample of academic economists: more than 600 faculty from 45 different nationally-representative public Ph.D.-granting economics programs.

As a baseline, we estimate log annual salary regressions that control for seniority but not for differences in prevailing property values or the number of pleasant days. For the sample of public granting Ph.D. programs, we estimate the negative returns to seniority to be roughly 2 percent, which is consistent with previous findings of Moore, Newman, and Turnbull (1998) and Ransom (1993). We then allow for potential differences due to locational amenities by including interactions terms between seniority and either prevailing property value or the number of pleasant days. For both measures of local amenities, holding all else constant, we estimate the negative returns to seniority to be significantly higher for faculty in locations with higher amenities, which we find to be consistent with our underlying hypothesis.

2.   Data

Given the current availability of online public-employee databases, in 2012 we searched the internet for AY2011 salary data of economics faculty at non-top-15 the public Ph.D.-granting economics programs listed in the 2010 NRC Rankings. We focus this study on non-top-15 programs because Hilmer and Hilmer (2011) demonstrate that negative returns to seniority are only observed within economics programs ranked outside the top-15[1]

Following hedonic theory, we use two measures of local amenities as a proxy for the local amenities associated with living in a particular location; property values and the number of pleasant days. To compare prevailing property values, we rely on Coldwell Banker's "comparison of selling prices of similar homes in similar neighborhoods in more than 300 markets."[2] As a result of these efforts, we were able to collect usable data on 634 faculty members at 45 public Ph.D.-granting programs. The number of pleasant days is the average number of days per year that the mean temperature was between (55° F and 75° F), the minimum temperature was above 45° F, the maximum temperature was below 85° F and there was no

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[1] As the authors note, a plausible explanation for this difference is that programs at the very top of the program-quality distribution are more likely participants in the upper tail of the individual-quality distribution, meaning that they are more likely to pay the top dollar required to match outside offers in order to attract and retain highly prominent researchers required to maintain their place in the program quality distribution.
[2] To perform these calculations, the authors "looked at a 2,200-square-foot house with 4 bedrooms, 2 1/2 bathrooms, a family room and a two-car garage. The neighborhood - a more subjective measure - is one "typical for corporate middle-management transferees."   source: http://money.cnn.com/pf/features/lists/hpci_data/index.html

Table 1
Public Ph.D.-Granting Programs

Program	Property Value	Pleasant Days	Program	Property Value	Pleasant Days
Arizona	$250,833	43	Missouri	$168,872	51
Arizona State	$293,334	62	Nebraska	$200,375	47
UC Davis	$661,875	72	New Hampshire	$335,966	48
UC Irvine	$869,125	125	SUNY Albany	$284,095	45
UC Riverside	$459,133	88	SUNY Binghamton	$152,875	45
UC Santa Barbara	$1,603,750	152	SUNY Buffalo	$224,725	73
UC San Diego	$1,875,000	182	NC State	$228,785	58
UC Santa Cruz	$885,546	147	UNC Chapel Hill	$228,785	57
Connecticut	$366,125	66	Ohio State	$243,725	55
Florida	$259,950	75	Oklahoma State	$142,600	52
Florida State	$296,191	75	Clemson	$195,606	57
Georgia	$230,152	64	South Carolina	$190,058	57
Georgia State	$303,000	60	Texas A&M	$190,964	60
Illinois	$223,317	59	UT Austin	$199,381	60
Southern Illinois	$171,912	60	UT Dallas	$261,325	65
Indiana	$178,166	54	Houston	$151,600	81
Purdue	$173,600	52	Utah	$262,117	39
Iowa	$206,625	62	Utah State	$237,518	35
Iowa State	$247,000	61	Virginia	$335,874	68
Kansas	$237,237	52	UW Seattle	$386,600	83
Kentucky	$209,588	54	Washington State	$238,418	37
Massachusetts	$389,283	40	West Virginia	$146,000	58
Michigan State	$270,700	65			

Notes: "Property Value" is the average housing price as calculated by Coldwell Banker's comparison of selling prices of similar homes in similar neighborhoods in more than 300 markets, which in this case is "a 2,200-square-foot house with 4 bedrooms, 2 1/2 bathrooms, a family room and a two-car garage. The neighborhood - a more subjective measure - is one typical for corporate middle-management transferees." Source: http://money.cnn.com/pf/features/lists/hpci_data/index.html. "Pleasant Days" is the average number of days per year that the mean temperature was between (55° F and 75° F), the minimum temperature was above 45° F, the maximum temperature was below 85° F and there was no significant precipitation or snow depth over the last 23 years according to NOAA data. Source: https://kellegous.com/j/2014/02/03/pleasant-pla

significant precipitation or snow depth over the last 23 years according to NOAA data. These programs, their associated prevailing property values, and number of pleasant days are listed in Table 1. UC San Diego has both the highest property value and the most pleasant days in our sample while Oklahoma State has the lowest property value and Utah State has the fewest pleasant days. Individual-specific data are collected from publicly-available sources. Gender is determined from departmental websites and/or individual homepages. Individual employment histories are determined from CVs that the vast majority of faculty members post on their individual homepages. Individual-specific peer-reviewed publication data through 2011 are collected from *Econlit*, which is the American Economic Association's bibliography of economics literature throughout the world. To account for potential differences in the quality and/or likely importance of different publications, we distinguish between three different types of publications: (1) articles in the top 5 economics journals according to Scott and Mitias (1996), (2) articles in the remainder of their top 36 economics journals, which are primarily top field journals, and (3) articles in all other *Econlit* listed economics journals.

Table 2
Summary Statistics for Property Value, Pleasant Days, and Annual Salary

	Property Value	Pleasant Days	Annual Salary
Mean	386,992.80	70.22	139,863.50
	(387,435.20)	(32.40)	(50,075.67)
Minimum	142,600	35	67,839
10%	173,600	45	92,029
25%	209,588	54	104,181
50%	250,833	60	125,458
75%	335,874	72	162,510
90%	869,125	125	210,180
Maximum	1,875,000	182	415,858
Observations	634	634	634

Table 2 presents summary statistics for property value, pleasant days and annual salary. As expected, the property value distribution is skewed to the right with a mean property value of $386,992 and a median property value of $250,833. The average number of pleasant days is 70.22, which is approximately 20% of the year, while the sample ranges from a low of 10% pleasant days in the year to a high of 50%. The mean annual salary is nearly $140,000, while the 10th percentile is $90,029 and the 90th percentile is $210,180.

Table 3 presents the rest of the summary statistics. The average professor in our sample has been at their university for 20 years with almost 25 years of experience. The sample is overwhelmingly male at almost 87% and 16% of our sample are from California universities. The average number of publications in the sample is almost 25 articles with over half of those publications appearing outside top level journals.

Table 3
Additional Summary Statistics

	Ph.D. Sample
Seniority	20.219
	(11.447)
Experience	24.572
	(12.246)
Male	.865
California	.157
Total Articles	24.715
	(24.912)
Top 5 Articles	2.398
	(3.548)
Top 36 Articles	7.551
	(9.697)
Other Articles	14.765
	(16.237)
Observations	634

3. Results

As a baseline, column 1 of Table 4 replicates previous studies by Bratsberg, Ragan, and Warren (2003), Moore, Newman, and Turnbull (1998), and Ransom (1993) that control for years of seniority and years of experience. Overall, the estimated negative return to the first year of seniority for our Ph.D. sample is a statistically significant 2.2 percent, a finding very much in line with previous estimates of Bratsberg, Ragan, and Warren (2003) and Moore, Newman, and Turnbull (1998), and Ransom (1993). This effect seems to persist over time, as the estimated marginal effect of going from 10 to 11 years of seniority remains large, at -1.59 percent.

To test our hypothesis, we introduce the possibility that locational amenities affect the negative returns to seniority adding interactions between the property values and years of seniority. The results of the expanded regression are presented in column 2 of Table 3. Of most importance to this study, as predicted by our hypothesis that locational amenities will increase monopsony power, the estimated returns to seniority increase by -0.3 percent for each $100,000 increase in prevailing property value. This effect persists over time, with the estimated marginal effect of going from 10 to 11 years of seniority for the sample minimum ($142,600), sample

Table 4
Log Annual Salary Regression Results

	Baseline	PV / 100,000		Pleasant Days	
	(1)	(2)	(3)	(4)	(5)
Amenity * Seniority	---	-.0030***	-.0029***	-.0035***	-.0034***
	---	(.0008)	(.0008)	(.0012)	(.0012)
Amenity * Sen Squared	---	.00007***	.00007***	.00008**	.00003**
	---	(.00002)	(.00002)	(.00003)	(.00003)
Amenity	---	.0146***	.0210***	.0140***	.0179***
	---	(.0035)	(.0048)	(.0046)	(.0048)
Seniority	-.0215***	-.0115	-.0114	.0016	.0013
	(.0059)	(.0072)	(.0073)	(.0109)	(.0110)
Seniority Squared	.00028**	.0001	.0001	-.0002	-.0002
	(.00013)	(.0002)	(.0002)	(.0003)	(.0003)
Amenity * Experience	---	.0023***	.0023***	.0032***	.0031***
	---	(.0007)	(.0007)	(.0011)	(.0011)
Amenity * Exp Squared	---	-.00004**	-.00004**	-.00006**	-.00006**
	---	(.00002)	(.00002)	(.00003)	(.00003)
Experience	.0301***	.0226***	.0221***	.0104	.0107
	(.0059)	(.0069)	(.0070)	(.0104)	(.0104)
Experience Squared	-.0004***	-.0003*	-.0002*	.0000	.0000
	(.0001)	(.0001)	(.0001)	(.0002)	(.0002)
Top 5 Articles	.0256***	.0209***	.0203***	.0217***	.0215***
	(.0080)	(.0058)	(.0057)	(.0062)	(.0061)
Top 36 Articles	.0051**	.0050**	.0052**	.0043*	.0043*
	(.0025)	(.0024)	(.0024)	(.0024)	(.0024)
Other Articles	.0024**	.0026**	.0027**	.0027***	.0027***
	(.0011)	(.0011)	(.0011)	(.0011)	(.0011)
California	---	---	-.0835**	---	-.0419
	---	---	(.0396)	---	(.0392)
Male	.0224	.0264	.0253	.0233	.0217
	(.0251)	(.0223)	(.0231)	(.0230)	(.0234)
Intercept	11.4856***	11.4229***	11.4169***	11.3766***	11.3580***
	(.0333)	(.0365)	(.0365)	(.0489)	(.0466)
R-Square	.3948	.4251	.4323	.4251	.4258
Observations	634	634	634	634	634

Notes: Dependent variable is the natural log of the 2011 individual's annual salary. Values in parentheses are standard errors that are clustered by institution. ***, **, * indicate significance at the 1, 5, and 10 percent levels.

mean ($387,000), the sample maximum ($1,875,000) property values being -1.3%, -1.7%, -4.1%, respectively. Column 3 adds a dummy variable to investigate whether the results in column 2 are driven by a potential California effect. The coefficient estimates in columns 2 and 3 are nearly identical with the estimated coefficients having very similar magnitudes and statistical significances. An individual on faculty in California earns 8.4% less relative to faculty members in other states, once the other variables are controlled for.

We add columns (4) and (5) to Table 4 to examine if an alternative measure of locational amenities, the number of pleasant days, yields similar results to the ones we found using property values. Comparing columns 2 and 4, the results are almost identical in both magnitude and statistical significance. The estimated returns to seniority increase by -.35 percent for each 10 additional pleasant days. To see if this effect persists over time, the marginal effect of going from 10 to 11 years of seniority for the sample minimum (35), the sample mean (70.22) and the sample maximum (182) pleasant days being -1.3%, -2.2%, and -5.3%. Unlike the property value regression in column 3, the results using pleasant days in column 5 imply that if a school is located in California it does not have a statistically significant impact on salaries once all of the other factors are controlled for.

We attempt to make the interaction term results in Table 4 more clear by using the results in columns 2 and 4 to calculate predicted annual earnings for hypothetical individuals in communities with different prevailing property values and pleasant days who possess fixed years of experience and different years of seniority. In Figure 1, we consider males with 15 years of experience and sample average numbers of top 5, top 36, and other publications. The resulting predicted annual earnings differences highlight the degree to which prevailing property values impact seniority-based salaries. In particular, to newly hire (i.e. 0 years seniority) an individual with 15 years experience, we estimate that Ph.D.-granting programs in $1 million locations would have to pay roughly 59 percent more than they would have to pay otherwise similar individuals that they had employed for all 15 years (i.e. 15 years seniority) while for programs in $800,000, $600,000, $400,00, and $200,000 locations, the estimated differences would be 49, 40, 32, and 24 percent, respectively. The estimated differences decrease rapidly with seniority, falling to between 14 and 7 percent at 10 years seniority and 2 and 1 percent at 15 years seniority. Figure 2, which uses the number of pleasant days instead of property values as the measure of locational amenities, follows a similar pattern to Figure 1 although the effects are somewhat less pronounced.

Taken as a whole, our results suggest that individuals who live in higher amenity (and presumably more desirable) locations are willing to accept greater negative returns to seniority. As such, the results suggest that the estimated negative returns to seniority for academic faculty previously observed in the literature (Hilmer and Hilmer, 2011; Bratsberg, Ragan, and Warren, 2003; Moore, Newman, and Turnbull, 1998; and Ransom, 1993) may well be driven in part by the fact that many individuals are willing to trade reduced future salary increases for the opportunity to remain in more desirable locations.

4.   Conclusions

We add to the existing literature addressing public-sector salary determination by asking whether local amenities allow public-sector employers to exert greater degrees of monopsony power over their employees. As Brueckner and Neumark (2014) put it, "People can only
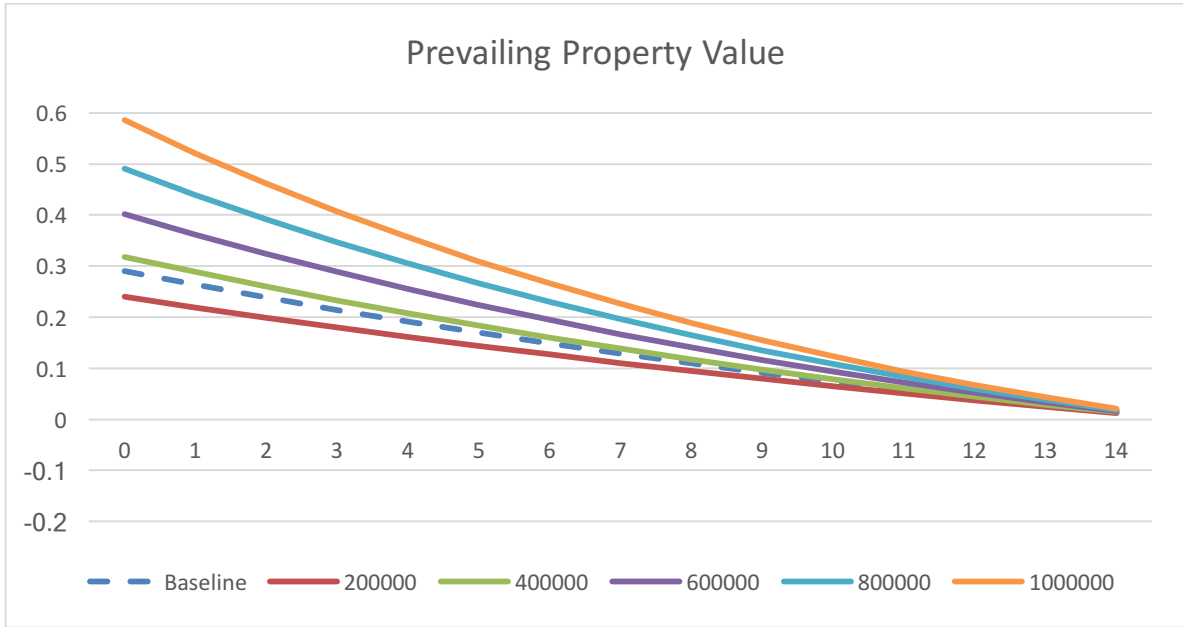
Figure 1
Predicted Annual Salary Differences by Prevailing Property Values and Years Seniority
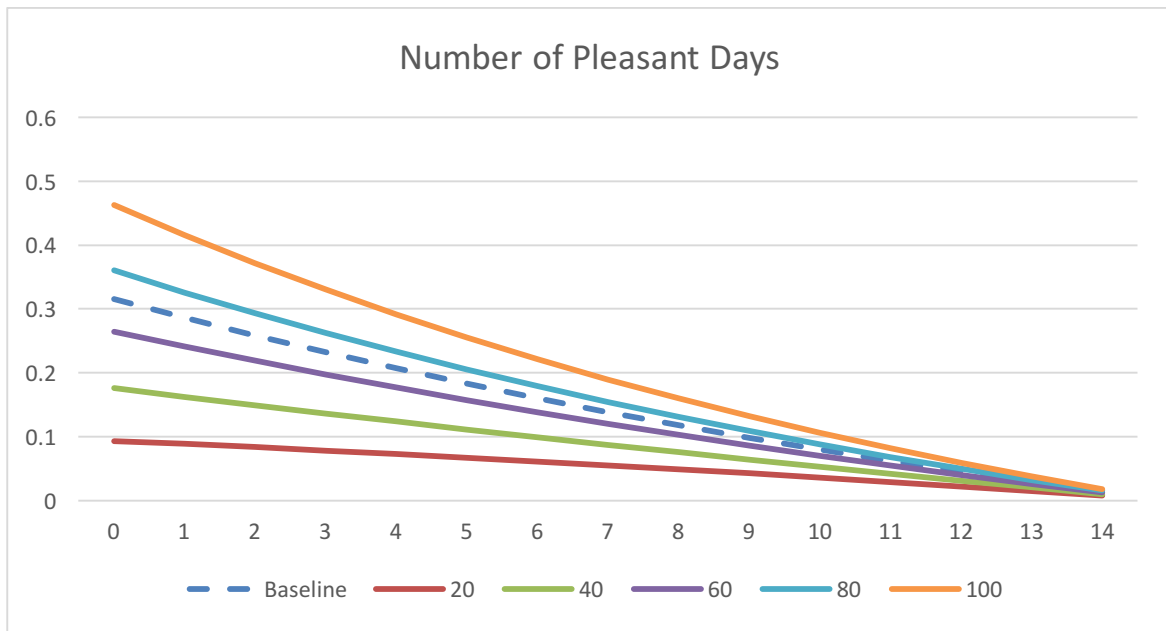for Individuals with 15 Years of Experience

Figure 2
Predicted Annual Salary Differences by Number of Pleasant Days and Years Seniority
for Individuals with 15 Years of Experience

consume the beaches and sunshine of southern California, or benefit from dense urban areas like Manhattan, by living nearby." Those authors consider the insight from the perspective of public-sector employees attempting to negotiate higher salaries, arguing that "The presence of local amenities can grant public sector workers a form of monopoly power" that lets them "extract rents up to the point where those who pay the rents are induced to leave the area." In contrast, we consider the insight from the perspective of public-sectors employers attempting to exploit monopsony power over their employees, arguing that the desire to retain local amenities may lead workers to accept below average salary increases over time in exchange for the ability to remain in those locations. If true, then we would expect the observed negative returns to seniority to be larger in high amenity locations than in low amenity locations.

We examine this possibility for a nationally-representative sample drawn from 45 public Ph.D.-granting programs. Using prevailing property values and number of pleasant days as proxies for local amenities we find that as amenities increase the estimated negative returns to seniority also increase. This might suggest that public-sector employers in more desirable locations are able to extract significant economic rent from their employees.

While our work only examines academic economists, it seems reasonable to assume that our analysis may well hold for other public-sector employees. Regardless of profession, so long as some workers are willing to sacrifice salary growth in exchange for the enjoyment of local amenities, we might expect them to accept slower salary growth in exchange for the ability to remain in their current locations.

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