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MAPPING COMPENSATION PATTERNS: HORIZONTAL RENTS IN US STATE PUBLIC SECTORS

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Abstract
Contemporary discussions surrounding income inequality primarily revolve around the concept of "unearned" incomes, where the affluent accumulate wealth from the labor of the less privileged. However, this paper posits that there are additional income disparities that warrant attention, characterized as "unearned" or unwarranted concerning economic fairness and efficiency. This study delves into a specific category of such potentially unmerited income disparities: the compensation premiums provided to public sector employees, which surpass the remuneration of their counterparts in the private sector during the period 2011-2015. We term these additional rewards as "horizontal rents," distinguishing them from the "top rents" acquired by individuals at the pinnacle of the income distribution.

Keywords: Income Inequality, Unearned Incomes, Compensation Premiums, Public Sector Workers, Economic Equity

1. INTRODUCTION

Current debates on income inequality usually focus on “unearned” incomes flowing to the very rich from everyone else. While this is an important public issue, there exist other significant income flows that can be viewed as “unearned” or unjustified from the standpoint of economic equity and efficiency. This paper studies one group of such potentially unearned income flows - the compensation premiums paid to public sector workers in excess of their peers in the private sector for the years 2011-15. We call such excess rewards “horizontal rents,” as opposed to “top rents” earned by those at the top of the income distribution.

Existing research has found that public sector workers in the U.S. and many other market economies earn more, on average, than their private sector peers with similar characteristics. A recent Congressional Budget Office study reports that controlling for education, skills, age, work experience, professional occupation and other observable characteristics, per hour compensation of federal non-defense employees in 2016 was 17% above that of private sector workers (CBO, 2017). For the state workers, the average overpayment is estimated to be between 3-10%, while for the local government workers -between 13-18% (Gittleman and Pierce, 2011, p. 233).

We extend this research by providing estimates of public/private-sector compensation premiums on the state-by state basis on the aggregate as opposed to individual worker level. The main variable of interest for our study is the state-level “rent load” – the sum of public sector rents measured as a percentage of a state GDP. Having estimated rent loads for all states we then analyze their determinants, and consider measures that may lead to their reduction.[5]

The paper is organized into the following five sections. Section two provides the definition and background information on the re-distributive horizontal rents. Section three is a brief overview of the relevant literature. Section four presents the empirical test of the determinants of horizontal rent loads using the US statelevel data. Section five summarizes the findings of the study and discusses potential rent-containing policies.

2. BACKGROUND AND THEORY

Competitive markets theoretically pay inputs based on productivity. Payments in excess of competitive returns, or economic rents, can arise from many sources. These include differentials arising from resource non heterogeneity, monopoly control over inputs, corruption, fraud, and other market failures.

A rent-based approach to income distribution proposed by the Fabian school (Webb, 1888; Shaw, 1891) and elaborated by Sorensen (1998, 2000) effectively starts with a perfectly competitive economy where every factor of production is paid its marginal revenue product and no exploitation occurs. Economic rent, defined as income in excess of marginal productivity, is only generated when actual income of a factor of production exceeds its income in a competitive economy:

$$R_i = VA_i - VC_i \quad (1)$$

where R_i is economic rent for asset i, $V^A{}_i$ is the actual income received on asset i, $V^C{}_i$ is marginal revenue product, or income, that would be received under perfectly competitive market conditions (Sorensen, 2000, p. 1536). Assets in (1) include labor to allow for the fact that some workers can receive economic rents when compensated above their marginal productivity.

Horizontal rents (R^H) are payments accruing to some groups of workers in excess of compensation that would prevail under competitive economic conditions. These payments include rents collected by public-sector workers and also above-market pay premiums to some other groups of workers such as trade-union members. At 22 million, the US public sector workers are among the largest such groups and their overpayment levels are relatively well documented.

Particularly egregious of such overpayment are often made public. Examples include one janitor with San Francisco's transit system earning $270k (Gajanan, 2016), lifeguards in Newport Beach, California, earning over $200k (Andrzejewski, 2015), and numerous local government employees in California townships earning more than $400k (Bucher, 2014).

The definition of rents in (1) does not explicitly identify their funding sources. However, it can be assumed that the *principal* source of public sector rents is the labor income of their private sector peers. Our benchmark is the income of a median private-sector worker. Most rents are extracted from the income of this worker contemporaneously in the form of additional taxes. An additional rent burden is imposed on this worker when current period rents are funded through public debts, to be repaid out of this worker's future income.

On the macroeconomic level, horizontal rent flowscan be aggregated into a *horizontal rent-load* - a ratio of the sum of horizontal rents to state GDP:

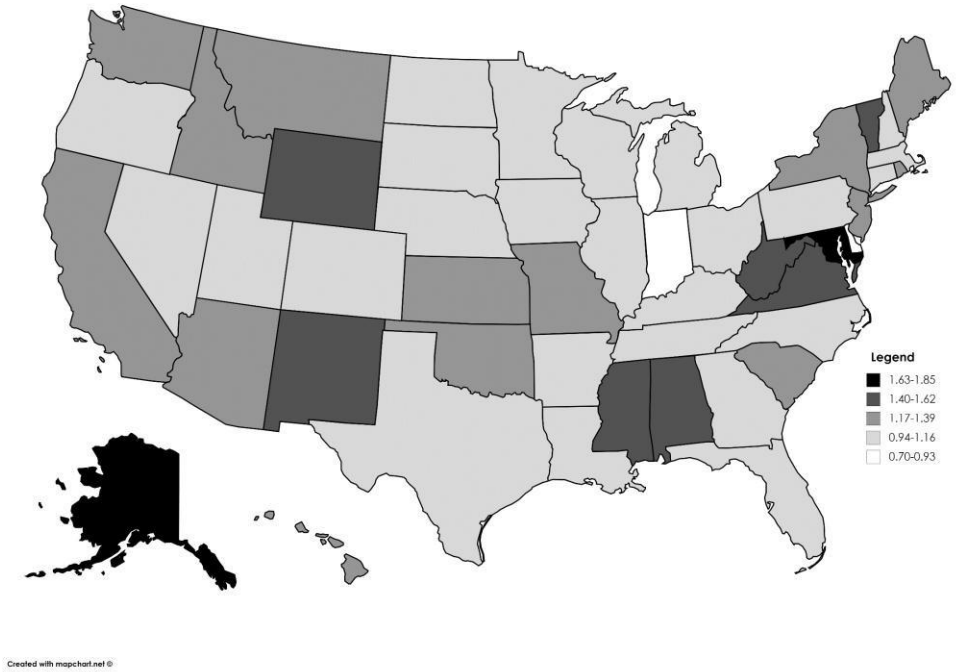
$$h_t = \square\ H_t / (Y_t) \quad (2)$$

where h_t is the rent load ratio in time period t ,Y_t is the GDP, $H_t$is money value of horizontal rent flows in time period t.

Our own estimates based on the annual public sector wage bill for the US in 2015.For the overpayment rates for federal, state and local workers, we estimate the total US public sector (horizontal) rent at some $217 billion, or 1.19% of the US GDP. This amount reflects the wage premium that governments, at all levels, paid their employees in excess of what would be paid to comparably skilled private sector workers.

For 2015, the average state-level horizontal rent load thus determined was 1.2% of U.S. GDP. For the entire U.S. economy, this corresponds to approximately $217 billion. The states with the lowest 2015 rent loads included Delaware (.72%), Indiana (.87%), Connecticut and Massachusetts (both .97%). States with the highest estimated rent loads were Maryland (1.85%), Alaska (1.63%), Virginia (1.61%), and New Mexico (1.59%). The state distribution of horizontal rents is shown geographically in Figure 1. It is interesting that no clear geographic pattern of estimated rent loads emerges suggesting there are a variety of factors determining these payments that are not linked to geography.

Figure 1. Average Horizontal Rent Loads by State for 2015



3. LITERATURE SURVEY

Much research has been conducted to determine public-private wage gap in the U.S. and other countries. Early studies regarding this topic in the U.S. include works by Smith (1976, 1977) who estimated that federal government employees earned 10-to-15% more than their private-sector counterparts.

Contemporary research on this matter report similar results. Giordano *et al* (2011) investigated public private wage differentials in ten Eurozone countries (i.e., Austria, Belgium, France, Germany, Greece,

Ireland, Italy, Portugal, Slovenia, and Spain). Utilizing microdata that controlled for a number of individual characteristics and an OLS regression with a dummy variable for the public sector employment, this study found a wage gap favoring the public sector workers in all but two countries. Christofides and Michael (2013) sought to estimate the public-private sector pay gap for 27 EU countries. Controlling for age, education, gender and professional occupation, they identified a 12% average "unexplained" wage gap in favor of public sector workers. The largest gaps were found in Luxembourg, Cyprus, Portugal, Italy, Greece, and Spain. In contrast, Norway, Germany, Belgium, and Austria showed a negative unexplained gap, suggesting that public sector workers in those countries are underpaid compared to their private sector peers. For Spain, Hospido and Moral-Benito (2014) estimated average unexplained hourly public-private sector wage gap to be 10%. For Greece, the unexplained public sector wage premium fluctuated in 2008-2013 between 10% and 15% (Christopoulou and Monastiriotis, 2015).

Public sector pay premiums were also found in individual country studies, e. g. 10-20 % in the UK, and 12-23 % in Australia (Nickell and Quintini 2002; Bender 2003). Similarly in Canada, Lammam, *et al* (2016) found an average public sector wage premium for federal, provincial, and local public employees to be 10.6%. Their results also revealed that public sector workers enjoyed earlier retirement (on average by 2.3 years) and a much greater job security, reflected by a lower probability of losing a jobs – just 0.5% versus 3.8% in the private sector.

A number of recent studies of the public pay premium focused on its micro-level determinants. Thus, Brueckner and Neumark (2014) analyzed differences in overpayment of public-sector workers across US states and metro areas. They established that higher premiums are found in states and cities with attractive amenities that discourage taxpayers to vote with their feet against higher local taxes. In a related line of research, Diamond (2017) found that higher public-sector premiums are also associated with scarcity of land available for residential housing.

Most studies of public-private pay gap report that wherever a public premium is found, it primarily reflects more generous health and pension benefits that on average comprise about one third of total public-sector compensation compared to approximately one quarter of compensation in the private sector (Diamond, 2017). In addition, many authors stress that income-based comparisons of public- and private-sector pay understates the true public pay premium as it ignores the significantly higher job security afforded to public employment. Existing studies estimate the monetary value of this attribute of public-sector employment at 9-10% of total compensation (Ramoni-Perazzi and Bellante, 2007; Pfeifer, 2010). An additional premium to public-sector pay could be imputed to reflect other aspects of public employment such as the less strenuous work effort, shorter working hours, and higher frequency of shirking (Gittleman and Pierce, 2011; CBO, 2012, Lammam*et al*, 2016; Prümer and Schnabel, 2019).

A study done in California analyzed the effects of so-called sunshine laws that disclose public-sector compensation levels (Mas, 2017) in state labor market. Among top managers, the short-term effects included a jump in the quit rate of 75% compared to localities that had already posted their public-sector compensation levels. Wages for these top-management employees fell a modest 7%.

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4. DATA SOURCES AND EMPIRICAL MODEL

The main variable of interest in this study is the state-level "horizontal rent load" – the share of the state GDP represented by the total sum of overpayment of the public sector workers of that state. To determine the level of (annual) horizontal rent load for each state, we needed to estimate a total dollar value of overpayments received by the public sector workers of that state. For that we needed to compare the state and local public employee compensation inclusive of wages and benefits to the level of compensation of their private-sector peers with similar characteristics. Federal employees are excluded. While federal workers are present in each state (e.g. FBI and Department of Commerce officers) their salaries are funded independently from the state and local budgets and therefore are not directly comparable to the state and local public sector workers.

An earlier study (Gittleman and Pierce, 2011) reported that across states, controlling for education, skills, age, work experience, professional occupation and other observable characteristics, per hour compensation of state government workers on average surpassed the compensation of private workers by between 3-10%, while for local government workers the overpayment was between 13-18% (Gittleman and Pierce, 2011, p. 233).

In our study, the estimation of public sector overpayments uses the comparison of hourly wages of the state and local government workers to private sector wages as reported in the 2011-2015 MORG (NBER, 2021) micro data. Adjustments for differences in pension, health insurance and other benefits between public and private sector workers are made based on Bureau of Labor Statistics data (BLS, 2021).

For the analysis of the determinants of the state-level horizontal rent loads we estimate two types of empirical regression models: the static and the dynamic.

The static regression model uses averaged values of horizontal rent load h and independent variables for the period 2011-2015:

$$hi\,t - = \mu + \gamma\, G\, D\, P\, i\, t - + \beta\, \alpha\, i\, t - + \delta\, B\, i\, t - + \theta\, X\, i\, t - + \epsilon\, i\, t \qquad (3)$$

Where h_{it} is the horizontal rent load for state i in year t, is a constant term, $G\,D\,P_{it}$ is the GDP variable, α_{it} is a share of people employed in public sector, B_{it} represents total state budget. The vector

X_{it} represents other characteristics of states and ϵ_{it} is the error term.

The dynamic regression model uses panel data for 2011-2015 and takes the following form:

$$h_{it} = \mu + \gamma\, G\, D\, P_{it} + \beta\, \alpha_{it} + \delta\, B_{it} + \theta\, X + \epsilon_{it} \qquad (4)$$

We tested other specifications of this model by considering fixed and random effects of states, and found that both specifications are worse than pooling model (4)

As control variables we analyzed a variety of economic, social and political characteristics of states that could potentially explain the distribution of state-level rent loads. These characteristics are listed in Table 1 that also contains descriptive statistics for each variable.

First to be included is the state government's share of the state's economy as measured by state revenue collections as a percent of state GDP. Table 1 shows the U.S. state average for this variable is 13% with a range between 8% and 23%. We anticipate that the larger the state's revenue share of its GDP, the greater is the opportunity for rent payments to state employees.

In addition to the state's revenue share of GDP, we included a variable that adds local government revenues to state spending as a percent of state GDP.[13] This measure of state and local public revenues share varied between 15% and 27%. As with the state's revenue share, we anticipate that higher relative levels of state and local revenues will increase opportunities for horizontal rent capture.

As indicators of potential budget constraints on state's public sector employment we included two variables: state debt as a percentage of GDP and state debt per capita. Both indicators can potentially restrict public sector hiring and resulting horizontal rents.

To account for the state's economy strength, we included the level of each state's *per capita* GDP. This variable is meant to be an indicator of a state's overall ability to fund public employment at higher levels that might result in higher rent loads.

To account for a state's economy dynamism we included compound annual average growth rate for state's economy over the five-year period between 2010: IV and 2015:IV. We hypothesize that states with higher growth rates should experience relatively tight private-sector labor markets that could reduce pay disparity with the public sector where pay is less dependent on market conditions. Thus, this variable should negatively impact a state's rent load.

The influence of trade unions, as measured by the percent of workers who are union members, could affect workers-members ability to capture above-market returns on their labor. However one should distinguish the impact of public sector and private sector unionization rates. The former is as an indicator of the public sector labor strength, which helps increase their wages thus possibly increasing horizontal rents. The latter measure indicates strength of the private sector labor and thus can work in the opposite direction.

We next consider the issue of a state's foreign-born population. Higher levels of a state's population that are foreign-may increase the public sector rent for two reasons. First, the relatively high level of public services required by some categories of immigrants, such as refugees, can lead to a corresponding increase in the number of public sector workers servicing their needs. Second, it is known that compared to native-born immigrants are on average lower-skilled, lower paid and predominantly are employed in private sector. Both of these factors the can potentially increase the horizontal rent load.

Next included is a binary variable meant to capture a state's political climate. The variable equals one if during three or more years of the 2011- 2015 period the state governor was a member of the Republican party. The expectation was that in states where Republicans controlled the governor's office, there would be more fiscal restraint thus lowering a state's public workers payroll, pay premiums and corresponding rent loads.

Right-to-work states prohibit unions from negotiating labor contracts that specify mandatory union dues and fees. Twenty-five states in 2015 had right-to-work legislation. If such legislation hampers union collective bargaining power, states with right-to-work laws should have reduced public horizontal rent loads.

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Table 1. Descriptive Statistics

Variable	*Obs.*	*Mean*	*Std. Dev.*	*Min*	*Max*
Horizontal Rent Load	245	1.19	2.17	.723	1.851
State Revenue Share of GDP	245	12.9	3.9	8.0	23.0
State Debt to GDP (%)	245	16.1	3.8	5.31	25.1
State Debt *per capita*	245	8,399	2,682	3,711	17,399
GDP *Per Capita* (000s)	245	53.34	10.86	35.13	73.32
Average GDP growth 2011-15	245	1.45	1.3	-.1	6.3
State Worker Unionization (%)	245	32.5	18.1	7.28	70.8
Percent Foreign Born	245	9.17	6.18	1.6	27.4
Right-to-Work State (Yes = 1)	245	.52	.505	0	1
Total Population (000s)	245	6,384	7,211	5,856	38,918
Nominal Minimum Wage	245	7.56	.47	7.25	9.14
Local Revenue Share of GDP	245	9.48	1.67	5.1	14.2
State & Local Revenue Share of GDP	245	23.0	3.58	17.5	32.6
Public Worker Share of Labor Force	245	16.9	3.65	11.7	28.0
State & Local Spending Share of GDP	245	19.9	2.87	15.03	27.4
Total Unionization Rate	245	11.26	5.02	4.9	25.2
Percent Foreign Born	245	9.17	6.18	1.6	27.4
Governor (Republican = 1)	245	.64	.485	0	1
Nominal State GDP ($ Billions)	245	342.2	417.2	29.8	2,260

Source: Authors calculations from indicated sources.

Table 2. Horizontal rent regression for *average* values of all variables, 2011-2015.

Dep. Variable:Horizontal Rent Load	(1)	(2)	(3)	(4)	(5)	(6)
Governor (R = 1)						-.0001 (.0005)
Right-to-Work State					-.0005 (.0007)	
State Share of GDP			.039 *** (.009)			

Local Share of GDP (b)	.0267 *** (.01)	.0314 *** (.011)			.031** (.012)	
State & Local Share of GDP				.01 ** (.005)		.014** (.006)
Percent of public workers in labor force)	0435*** (.005)	.0387*** (.005)		.044 *** (.005)	.04 *** (.006)	.0315*** (.006)
State debt to GDP ratio					0.008 (.007)	
State debt *Per Capita*						-5e-08 (9e-08)
Percent of unionized state workers		.0026*** (0.001)	-.0045*** (.002)		-.0014 (.002)	
Percent ForeignBorn (Corrected data)		0.008*** (0.002)	0.013*** (0.005)	.012 *** (.003)	.0015 (.004)	
GDP per capita	-.0374*** (.008)	-0.059*** (0.008)		-0.051*** (0.008)		
Constant	.0069	.0068	.0071	.0075	.0017	.004
Observations	50	50	50	50	50	50
Adjusted Rsquared	0.6645	0.78	0.29	0.74	0.52	0.49

Notes: Standard errors in brackets. *** p < 0.01, ** p < 0.05, * p < 0.1

For regressions based on average values of variables for 2011-15 presented in Table 2, the most significant factors are found to be local budget share of GDP as well as state and local budget share of GDP and percent of public workers in labor force. Also significant was the percent of foreign-born. Other things being equal, one percentage point increase of percent of public workers is associated with the *h* increase by 0.0387 percentage point. One percentage point increase of local budget share of GDP is associated with the *h* increase by 0.0314 percentage point. One percentage point increase of percent of foreign-born is associated with the *h* increase by 0.0057 percentage point.

Total number of employed and total population of states proved to be insignificant. Same result for rightto work status of a state, political affiliation of governors, minimum wage levels, state debt to GDP and state debt levels per capita.

Panel regression data in Table 3 is based on first differences and indicate an impact of *changes* in independent factors. Wald test indicates that ordinary regression is better than regression with fixed effects and we accept the null hypothesis for individual effects. Breusch and Pagan Lagrangian multiplier test for random effects indicates that ordinary regression is better than regression with random effects and we accept the null hypothesis for random individual effect.

In the panel regression the significant variables were state share of GDP, local share of GDP (and state and local share of GDP), and percent foreign-born. Thus, one percent increase of state share of GDP is associated with the *h* increase by 0.096 percent. One percent increase of percent foreign-born is associated with the *h* increase by 1.89 %.

In addition, this specification adds the GDP of states from 2011 to 2015. As predicted, this variable is significant and has a negative sign. The implication is that states experiencing relatively high growth rates see private-sector wage growth exceeding that in the public sector thereby lowering rent loads. An increase in state GDP by 1%, decreases *h* by 0.733%.

Table 3. Horizontal rent *panel* regression, 2011-2015.

Dep. Variable:Horizontal Rent Load	(1)	(2)	(3)	(4)
Governor (R = 1)			-.002 (.004)	
Right-to-work State				.003 (.004)
Nominal min wage			.011 (.008)	.013 (.008)
State share of GDP			.060 (.049)	
Local share of GDP	.096 *** (.031)		.082 ** (.034)	
State and local share of GDP		.154 *** (.047)		.153 *** (.048)
Percent foreign-born	1.89 ** (.876)	2.07 ** (.876)	1.62 * (.913)	1.77 ** (.899)
Percent of public workers in labor force			-.0001 (.001)	-.00015 (.001)
Percent of unionized state workers			-.0002 (.0005)	-.00023 (.0005)
State debt to GDP			-.1 (.086)	-.093 (.086)
State debt *Per Capita*			-.069 (.054)	-.071 (.053)

State GDP	-.733 *** (.059)	-.729 *** (.059)	-.709 *** (.060)	-.711 *** (.059)
Constant	.0057	.0061	.0046	.0017
Observations	200	200	200	200
Adjusted R-squared	0.4759	0.4792	0.4767	0.4785
p-value Wald test	0.8449	0.8339	0.4853	0.5638
p-value Breusch and Pagan Lagrangian multiplier test	1	1	1	1

Notes: Standard errors in brackets. *** p < 0.01, ** p < 0.05, * p < 0.1.

This confirms that in a growing economy private sector wages grow faster than in the public sector making the wage premium in the public sector smaller and reducing the resulting *h*.

Total number of employed and total population of states proved to be insignificant for all panel regressions. Similarly, to the results of static regressions right-to work status of a state, political affiliation of governors, minimum wage levels, state debt to GDP and state debt levels per capita also found to be insignificant.

It is important to note that static regressions presented in Tables 2 and dynamic panel regressions in Table 3 do not contradict each other in signs of coefficients for significant variables indicating stability of results.

5. CONCLUSIONS

This paper studied public sector rents - the compensation premiums paid to the US public sector workers in excess of their peers in the private sector. In the literature these rents are typically studied at the individual worker level. We extend this research by providing estimates of public/private-sector compensation premiums on the aggregate level on the state-by-state basis during the period of 2011-15. The main variable of interest for our study was the state-level "horizontal rent load" – the sum of public sector rents measured as a percentage of a state GDP.

The regression analysis of the determinants of states' horizontal rent load indicates that the most significant factors contributing to higher rent loads are state and local budget shares of the state GDP and share of public workers in labor force. Another statistically significant contributor was found to be the share of foreignborn in the population. At the same time, state debt-to-GDP and state debt levels *per capita*, as well as the size of total employment, right-to work status of a state, and the political affiliation of state governors, proved to be insignificant. The analysis confirmed the important role of the GDP growth in diminishing the level of horizontal rent loads. In all regression specifications the GDP variable proved significant and was negative. The implication is that in a dynamic growing economy private sector wages increase faster than in the public sector making the public wage premium smaller and reducing the resulting rent load.

These results suggest that a policy aimed at moderation or elimination of the public-private sector pay gap could involve two strategies. First is to manage the size of state and local governments, as measured by revenues collected, to reduce opportunities for rent payments in the public sector. The second is to

promote higher economic growth and competitive labor markets. By reducing the public-private pay gap faster economic growth seems to have an additional benefit of making income distribution in states more fair and equitable.

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