Geys, B., Heggedal, T.-R., & Sørensen, R. J. (2017). Are bureaucrats paid like CEOs? Performance compensation and turnover of top civil servants. *Journal of Public Economics, 152*, 47-54 DOI: https://doi.org/10.1016/j.jpubeco.2017.05.006

Are Bureaucrats Paid like CEOs?
Performance Compensation and Turnover of Top Civil Servants[*]

Benny Geys, Tom-Reiel Heggedal and Rune J. Sørensen

Norwegian Business School BI, Department of Economics, Nydalsveien 37, 0484 Oslo, Norway
Email: benny.geys@bi.no; tom-reiel.heggedal@bi.no; rune.sorensen@bi.no

Abstract
Recent research explores the effect of financial and career incentives on public-sector hiring processes and subsequent performance. The reverse relation between performance and bureaucrats' compensation and turnover has received only limited attention. Due to the distinct features of public-sector organizations, bureaucrats are traditionally argued to require either permanent positions and fixed wages, or low-powered performance incentives. This article studies how the performance of top civil servants in Norwegian local governments affects their compensation and turnover. We thereby build on a unique new dataset over the period 1991-2014. Our results indicate that better performing top civil servants obtain a higher compensation and are less likely to be replaced. Nonetheless, these incentives remain low-powered in line with agency theory prescriptions.

Key words: Bureaucracy, performance pay, public administration, executive compensation, Norway.

JEL codes: D73, H11, H70, L30.

Highlights
- Top civil servants in local government are rewarded for good performance.
- Better budgetary outcomes translate into higher wages and lower turnover.
- Improving negative budgetary outcomes has stronger effects than further increasing budget surpluses.
- Pay-for-performance remains modest, consistent with low-powered incentives in the public sector.

1. Introduction

Performance incentives in the public sector came to prominence with the rise of New Public Management in the 1980s. A substantial academic literature analyzes the effect of such incentives on public-sector performance of (mostly street-level) bureaucrats.[1] The results indicate that incentive schemes generally positively affect some aspects of public-sector performance (e.g., better pupil test scores, improved tax collection, and so on). In sharp contrast, the actual incentive structures that "civil servants face within bureaucracies are seldom studied" (Bertrand et al., 2016: 2). This limits our understanding of how bureaucrats' performance influences their financial compensation and turnover. In particular, little is known about how real-world compensation and turnover of top civil servants responds to 'bottom line' performance. Are their positions and income unrelated to performance, as traditionally preferred by public administration scholars (Weber, 1978; Wilson, 1989)? Or do they rather face low-powered performance incentives, as deemed optimal from an agency theory perspective (Holmstrom and Milgrom, 1991; Dixit, 2002)? The ultimate issue in this context is whether, and to what extent, modern bureaucrats at the top echelons of the public-sector hierarchy are rewarded according to their observed performance. We aim to fill this research gap by quantifying the relationship between top civil servants' performance and their compensation and turnover.

Our empirical analysis relies on a unique new dataset for the period 1991-2014 covering all top civil servants in Norwegian municipalities (henceforth referred to as 'Chief Municipal Officer', or CMO). The main response variables – CMO turnover and wages – derive from a comprehensive register operated by the Norwegian Association of Local and Regional Authorities (the employers' organization of local authorities). CMO performance is operationalized via a municipality's budget surplus as local governments in Norway are legally required to operate a balanced budget. Failure to comply may subject the municipality to central-government control over major fiscal decisions. Consequently, the local budget often becomes a major evaluation criterion for CMOs. This validates its choice as a performance measure in our analysis (more details below).

Clearly, a crucial identification concern with analyses of the performance-compensation relation is unobserved productivity of municipalities and CMOs. We alleviate this concern by controlling

---

[1] Recent contributions on this incentives-performance link in the public sector include Ashraf et al. (2014), Luo et al. (2015), Bertrand et al. (2016), Britton and Propper (2016), Burgess et al. (2016), Kahn et al. (2016), Rasul and Rogger (2016) and Karachiwalla and Park (2017) (for a meta-analysis of earlier work, see Weibel et al., 2010).

for a range of observed and unobserved elements via a fixed effects approach. Specifically, we include fixed effects for municipalities in all specifications, and generally also add fixed effects for CMOs. However, neither of these captures the potential complementarity in productivity between municipalities and CMOs. Our most demanding specification therefore includes municipality-CMO fixed effects (see also Enikolopov, 2017). This draws inferences from variation in (lagged) performance and compensation *within* a CMO's employment spell in a given municipality. Even in this most challenging specification, we show that CMOs receive higher compensation and face a lower probability of turnover when the municipality's budgetary performance is better. In terms of effect size, we find that a one standard-deviation improvement in the municipality's budget surplus reduces the risk of turnover by approximately 10% to 13%, and increases CMO monthly gross wages by 0.2% to 0.5%.

Our results mirror the private-sector CEO literature in establishing the implementation of performance-based contracts at the top echelons of local bureaucracies (Jensen and Murphy, 1990; Hall and Liebman, 1998). Yet, the size of our coefficient estimates also indicates that incentives remain low-powered. This in line with agency theory prescriptions for complex public bureaucracies with multiple principals and objectives (Dixit, 1997, 2002; Burgess and Ratto, 2003; Besley and Ghatak, 2005). Moreover, the observed effects are strongest when the budget surplus in the previous period was very low or negative, and substantively weaker when budget balances were positive. This non-linearity is consistent with the intuitive notion that improving negative budgetary outcomes is better than increasing the size of a budget surplus (which would signal excessive taxation and/or inadequate service provision).

In an extension to our baseline findings, we address the potential concern that the observed performance-compensation relation is driven by factors beyond the CMO's control. In particular, we examine the effect of common shocks to neighboring municipalities as well as exogenous shocks in municipalities' hydropower revenue streams (Hægeland et al., 2012; Andersen et al., 2014; Borge et al., 2015; Geys and Sørensen, 2016). For both types of shocks, the coefficient of the systematic component of performance is imprecisely estimated and statistically insignificant. Interestingly, this is at odds with the literature on executive rewards in *private* sector firms. Such studies generally *do* find a relationship between CEO compensation and aggregate performance shocks (Frydman and Jenter, 2010; Kaplan and Minton, 2012; Jenter and Kanaan, 2015).

We know only four comparable studies documenting performance pay in the public sector. Li and Zhou (2005) illustrate that higher economic growth improves the promotion prospects of Chinese provincial and city officials. Binderkrantz and Christensen (2011) find that goal achievement and executive pay are positively correlated using data covering about 60 Danish central government agencies. Yet, the association remains weak and statistically insignificant. Haeck and Verboven (2012) show that professors at a European university are more likely to be promoted when they show better research and teaching performance. Enikolopov (2017) shows that stronger growth in population and tax revenues translates into higher wages for city managers in US municipalities with council-manager forms of government. To the best of our knowledge, existing research has rarely – as we do – concentrated on individuals at the top echelons of the public-sector hierarchy. Furthermore, no previous study has simultaneously addressed the impact of performance on executive turnover and wages in the public sector.

2. Institutional setting

2.1 Municipal service provision and fiscal autonomy

Norway has three levels of government: the local level with currently 428 municipalities, the regional level with 19 counties and the national level. Local governments have several regulatory responsibilities in business development, planning of area utilization and the development of (social) housing. They are also responsible for implementing a range of social welfare services, primary health care, elderly care and several infrastructure services.

Important for our purpose, the Norwegian Local Government Act specifies that local governments must operate a complete, realistic and balanced budget. In practice, this implies that the budget should have an operating surplus at least sufficient to cover the interest, principal and necessary provisions for unexpected events. Further specifying this requirement, the Statistical Reports Committee for county and municipal government finance recommends that the gross current surplus should amount to 3% of total current revenues. In cases where local governments fail to balance their books, the municipality can be listed in the Register for Governmental Approval of Financial Obligations (ROBEK). Such listing implies central-government control over the municipality's major fiscal decisions – including decisions on loans, financial leasing and major contracts relating to buildings, installations and purchases of operating equipment with consequences for more than four years. This is a credible threat. No less than 45% of all Norwegian municipalities (N=212) where subject to this type of central-government control for at least one month in the period 2001-2011. Auxiliary regressions indicate that a worsening of

the local budget surplus with 1% increases the odds of becoming listed in ROBEK with roughly 13% (see Table A1 in the Online Appendix).[2] Given its central importance in local governments' fiscal framework, the budget surplus will play a key role in our empirical analysis.

2.2 The Chief Municipal Officer (CMO)

The CMO constitutes the top administrative position in Norwegian municipalities, and is charged with running the local government on a day-to-day basis. From a legal perspective, CMOs are responsible for the implementation of all public policies adopted by the municipal council, for ensuring that the municipality conforms to legal requirements imposed by higher levels of government, and for preparing the budget proposal with municipalities' executive board. They are hired by the municipal council following a public hiring process, and work under labor contracts with permanent positions in about 80% of the municipalities.[3] Most municipalities also formalize a leadership contract with the CMO. These stipulate fairly broad criteria used in the annual or biennial assessment of CMOs' performance. In our review of these (publicly available) leadership contracts, we find that they all identify economic results as a major evaluation measure. The 'cardinal sin' is often characterized as a failure to keep the books balanced (as is also required by law; see above).[4] Hence, it is clear that CMO effort should be aimed at maintaining desirable budgetary outcomes. Other assessment criteria typically include the exercise of leadership and implementation of government goals, the development of the municipal organization, as well as user and employee satisfaction (as measured via local surveys).

CMO performance assessments are carried out by a committee appointed by the municipality's executive board. The results are *not* made public, such that there is no scope for implicit incentives arising from 'naming and shaming'. Yet, similar to many private-sector organizations, these assessments are used to determine salary increases as well as contract extensions to CMOs with temporary contracts. For CMOs with a permanent contract, negative assessments can in principle not lead to dismissal. Firing a CMO in effect requires some form of gross misconduct (e.g., fraud). Nonetheless, CMOs regularly step down from their positions. This may be either

---

[2] The ROBEK register was established in 2001 as part of a reform of municipalities' financial regulation. Still, a comparable legal scheme allowed the central government to impose financial restrictions on municipal decisions also before 2001. For further information, see https://www.regjeringen.no/en/topics/municipalities-and-regions/register-for-governmental-approval-of-fi/Consequences-for-registered-municipaliti/id488944/

[3] See Table 4.1 in the report «*Kommunal Organisering 2012*» provided by NIBR for the Ministry of Local Government, see http://www.hioa.no/extension/hioa/design/hioa/images/nibr/files/2012-21.pdf

[4] The mayor might also have a strong personal incentive to impose strict budgetary discipline on the CMO. Auxiliary regressions indeed indicate a statistically significant positive relation between the (lagged) local budget surplus and the mayor's probability of re-election (for a graphical representation, see figure A6 in the Online Appendix).

voluntary (e.g., due to retirement, or moving to another position in the public or private sector) or forced (in which case CMOs receive a severance package). While retirements are uncommon among CMOs (e.g., less than 1% of CMO turnover observations in our dataset), media coverage suggests that a large share of terminations are less than voluntary. Clearly, the reason for CMO turnover is critical to the interpretation of our findings. Hence, we will return to such forced versus voluntary terminations in more detail below.

3. Empirical analysis

3.1 Data and descriptive statistics

We analyze data on all 1412 CMOs active in all Norwegian municipalities over a period of 24 years (1991-2014). This means that the complete dataset includes about 10,000 municipality-year observations. The main response variables – CMO turnover ($Turnover$) and wages ($Wage$) – are registered by the Norwegian Association of Local and Regional Authorities on December 1st of each year. This annual information allows us to generate an indicator variable for CMO turnover in any given year and municipality: i.e. 0 when the municipality has the same CMO as in the previous year and 1 when the CMO was replaced ($Turnover$). Shifts caused by CMOs moving to an identical position in another municipality are *not* coded as turnover (hence, they receive value 0). The reason is that such moves are likely to reflect a career development choice by the CMO rather than a 'contract termination' decision by the municipality (see also below). CMOs might also move to a private-sector organization or elsewhere in the public sector. Unfortunately, this information is not available to us. Still, such *voluntary* contract terminations are more likely to occur when performance is good (since this gives the CMO a better bargaining position). In contrast, *forced* terminations will arise particularly under poor performance. We exploit this line of argument to explicitly test for asymmetries in our findings depending on the actual level of CMOs' performance in sections 3.3 and 3.4 below.

Our second dependent variable – CMO wages ($Wage$; in NOK) – includes both gross regular monthly salary as well as various supplementary compensations deriving from, for instance, allowances for evening and night shifts or work on Saturdays and Sundays. Still, these 'extras' on average only account for approximately 1% of a CMOs' total wage level. Hence, in sharp contrast to CEOs in the private sector the majority of the monthly wage is determined by the regular part of the compensation scheme.

The descriptive statistics in Table 1 show that roughly 12% of CMOs are replaced each year. The average CMO tenure lies just under nine years (ranging between 0 and 45 years). The average CMO's gross monthly wage level is 43,079 NOK (in current prices). This amounts to about twice the average salary level across all municipal employees. The average gross salary in 2014 is 74,523 NOK (circa 10,200 US Dollars; December 2014 exchange rates). The evolution over time in both CMO turnover and wages is provided in, respectively, Figures A1 and A2 in the Online Appendix. Figure A1 highlights that the turnover rate is fairly consistent over time, although with a weak upward trend. Figure A2 shows a strong increase in CMO wages over the 1991-2014 period. This considerably outpaced the increase in the average salary level across all municipal employees.

Table 1: Descriptive statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) Min	(5) max
Dependent variables					
Turnover (1 if CMO change, 0 otherwise)	9,973	0.129	0.335	0	1
CMO monthly gross salary, log-scale	10,106	10.593	0.389	8.781	11.736
Main independent variables					
Surplus, %	9,730	0.027	0.045	-0.328	0.475
Surplus (lagged)	9,548	0.027	0.045	-0.328	0.475
Regional surplus, %	8,818	0.024	0.029	-0.554	0.378
Regional surplus (lagged)	8,729	0.027	0.028	-0.187	0.377
Hydropower electricity sales (per cap)	9,428	0.362	1.355	-5.693	54.698
Control variables					
CMO age	10,178	50.377	7.411	26	70
CMO gender (1 if female)	10,178	0.132	0.338	0	1
CMO retirement (1 if CMO age>=65)	10,178	0.008	0.089	0	1
CMO tenure (in years)	10,004	8.785	8.624	0	45
Monthly gross salary municipal employees, log-scale	8,912	9.954	0.292	9.480	10.520
Population size	9,966	10,247	28,445	209	634,463
Share in pre-school age (0-5 years)	9,966	0.077	0.015	0.032	0.148
Share in school age (6-15 year)	9,966	0.127	0.019	0.058	0.193
Share aged 67+ years	9,966	0.166	0.037	0.066	0.325
Unemployment rate	9,541	0.025	0.013	0	0.129
ROBEK	8,905	0.084	0.259	0	1

Our main explanatory variable is a municipality's net operating surplus (*Surplus*). This is operationalized as current revenues minus current expenditures, net interest and principal payments (expressed as a share of current revenues). As any deficit must normally be covered within the next two years, local governments with a budget deficit must reduce operating costs

or postpone investments (since this requires sufficient fiscal capacity to meet borrowing requirements). The data is taken from the Local Government Database of the Norwegian Social Science Data Service (NSD). Table 1 shows that the average surplus is 2.7% with an overall standard deviation of 4.5% (Figure A3 in the Online Appendix provides an illustration of the overall distribution). The cross-sectional standard deviation is 2.4%, whereas the within-municipality inter-temporal standard deviation is 3.8%.

We also collect a set of control variables covering CMO-specific characteristics such as her gender, education level, age and eligibility for retirement (1 if CMOs' age exceeds the official retirement age of 65 years).[5] The latter is particularly relevant since it controls for possible age-related contract terminations (which are likely to be voluntary). Then, we add variables capturing the effects of time-varying, municipality-level covariates. This comprises population size (measured on a logarithmic scale), shares of young (0-5 years) and school-age children (6-15 years), elderly (67 years and more), as well as the unemployment rate. These demographic data come from NSD, and are organized by Fiva et al. (2015). Finally, we include the average wage level of all other municipal employees. This is important as a control when analyzing the development of CMO wages.

3.2. Main results

To assess how CMO's performance is linked to their wages and turnover, we estimate the following regression models (where j denotes municipality, r denotes CMO, and t denotes year):

$$log(Wage_{jrt}) = \alpha Surplus_{jt-1} + Controls_{jrt} + \gamma_j + \delta_t (+\theta_{[j]r}) + \varepsilon_{jrt} \qquad (1a)$$

$$Turnover_{jrt} = \beta Surplus_{jt-1} + Controls_{jrt} + \vartheta_j + \mu_t (+\rho_{[j]r}) + \epsilon_{jrt} \qquad (1b)$$

The existence of performance-related remuneration and turnover decisions would require that $\alpha > 0$ and $\beta < 0$. Note that throughout the main part of the analysis we lag the budget surplus variable with one period (i.e. $Surplus_{jt-1}$). This choice is validated in a more extended model with additional leads and lags of the surplus variable. Figure A4 in the Online Appendix indeed indicates that all results reported below are driven by the one-year lag.

---

[5] Retirement at the official retirement age is not compulsory, and several CMOs stay on for a few years even after turning 65. The oldest CMO in our sample is 70 years old. As such, there are no mandatory retirements. This precludes analysis of such age-related 'term limits'.

Both models include a full set of municipality fixed effects (γ_j, ϑ_j) and year fixed effects (δ_t, μ_t). In some specifications, we also add a complete set of CMO fixed effects (θ_r, ρ_r) or municipality-CMO fixed effects (θ_{jr}, ρ_{jr}). This provides a much harsher test of our central hypothesis. Identification then derives only from within-CMO variation over time – further restricted to variation across her employment spell in a given municipality when using municipality-CMO fixed effects (Enikolopov, 2017). The latter capture potential complementarities in productivity between municipalities and CMOs. Moreover, they also control for possible bias arising when 'better' CMOs move to similar positions offering a higher wage.[6] As an additional robustness check, some specifications are extended with a full set of municipality-specific time trends. Standard errors are clustered at the municipality level throughout the analysis.

Table 2 summarizes the key findings. Panel I has CMO turnover as the dependent variable, while Panel II looks at CMO wages. The different columns represent alternative specifications of equations (1a) and (1b). These gradually impose more stringent restrictions on the model and strengthen identification of the effects of interest. In Column (1), we only control for municipality and year fixed effects. Column (2) additionally includes CMO- and municipality-specific controls, while Columns (3) to (5) add municipality-specific time trends, CMO fixed effects, and municipality-CMO fixed effects, respectively. We only present the results from the variable of central interest to preserve space. Yet, a complete table including all control variables can be found the Online Appendix (Table A2).

---

[6] One might in principle also consider a hazard model to analyze the turnover data. Yet, this would not allow inclusion of municipality-CMO fixed effects, since each CMO only has one employment spell within a given municipality.

Table 2. Budgetary performance and CMO turnover and wage

VARIABLES	(1) No covariates	(2) All covariates	(3) Mun. Trend	(4) CMO FE	(5) Match FE
Panel I: CMO Turnover					
Surplus (lagged)	-0.306***	-0.361***	-0.390***	-0.292**	-0.283**
	(0.111)	(0.108)	(0.117)	(0.119)	(0.119)
Municipal controls	NO	YES	YES	YES	YES
Individual controls	NO	YES	YES	YES	YES
Municipality FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Municipality-specific trend	NO	NO	YES	YES	YES
CMO FE	NO	NO	NO	YES	NO
Match specific FE	NO	NO	NO	NO	YES
Observations	9,456	9,154	9,154	9,154	9,154
R^2 (within)	0.006	0.059	0.114	0.455	0.460
Number of municipalities	444	439	439	439	439
Panel II: CMO Wages					
Surplus (lagged)	0.093**	0.093***	0.068***	0.039 [+]	0.038 [+]
	(0.036)	(0.030)	(0.026)	(0.024)	(0.024)
Municipal controls	NO	YES	YES	YES	YES
Individual controls	NO	YES	YES	YES	YES
Municipality FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Municipality-specific trend	NO	NO	YES	YES	YES
CMO FE	NO	NO	NO	YES	NO
Match specific FE	NO	NO	NO	NO	YES
Observations	8,152	6,961	6,961	6,961	6,961
R^2 (within)	0.962	0.970	0.979	0.988	0.988
Number of municipalities	444	423	423	423	423

Note: The dependent variable is an indicator variable for CMO turnover in Panel I and the natural logarithm of CMO wages in Panel II. The central explanatory variable is the one-year lagged level of the municipal net operating surplus (as a share of municipal current revenues). Different columns represents alternative specifications using only municipality and year fixed effects (Column 1), and adding CMO- and municipality-related controls (Column 2), municipality-specific time trends (Column 3), CMO fixed effects (Column 4) and municipality-CMO fixed effects (Column 5). In all models, we exclude the 0.5% observations at the top and bottom of the operating surplus distribution. Standard errors clustered at the municipality level in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$, [+] $p<0.15$.

The relation between budget performance and CMO turnover is negative and statistically significant throughout Table 2. This finding persists even in the most restrictive models including CMO or municipality-CMO fixed effects. The effect of performance on wages is always positive, but considerably weakens when including CMO or municipality-CMO fixed effects. As shown in Table A3 in the Online Appendix, however, substantively and statistically stronger effects are observed for the *Wage* equation when excluding the 1% or 5% observations at the top and bottom of the budget surplus distribution, respectively. This is due to the absence of pay-for-performance

effects among the top performers (see section 3.3 for more details). This strongly suggests that meaningful performance effects on CMO wages exist particularly when CMOs improve on poor performance.

In terms of effect sizes, the coefficient estimates in Table 2 for the *Turnover* equation vary between –0.28 and –0.39. This implies that a one standard-deviation improvement in the municipality's budget surplus (i.e. 0.045, see Table 1) reduces the probability of turnover by between 0.0126 and 0.0176. Given that the average annual probability of turnover is 0.129 (see Table 1), a one standard-deviation improvement in the municipality's budget surplus reduces the risk of turnover by approximately 10% to 14%. This is a substantively meaningful effect. Similar calculations suggest that a one standard-deviation improvement in the municipality's budget surplus increases the log of CMO monthly gross wages by between 0.0017 and 0.0042. An increase with 0.2% to 0.4% would reflect a yearly wage increase of 1789NOK to 3578NOK at the average wage level in 2014 (equivalent to $245 to $489). This initially appears marginal in substantive terms. Yet, it should be taken into account that this wage increase in our setting is part of the regular wage component. As such, it reflects a *permanent* increase rather than a one-off bonus. Even a small wage increase might then stimulate CMO effort. Nonetheless, it is clear that performance-related incentives on the whole remain low-powered, which is in line with agency theory predictions.[7]

Interestingly, extending equations (1a) and (1b) with additional lags of the performance variable indicates that the largest coefficient estimates (in absolute terms) are observed for the one-year lagged performance measure (details in Table A4 in the Online Appendix). Such *horizon incentives* are important since a short assessment time-frame may lead agents to concentrate predominantly on the short-term effects of their actions (MacRae, 1977; Healy and Malhotra, 2009). Somewhat surprisingly, a three-year lag does appear to matter for CMO wages. Still, as remuneration in our setting consist for more than 99% of a regular monthly component, this simply reflects the permanent nature of wage increases.

---

[7] We also experimented with a number of alternative performance measures, including (lagged) median and average gross income per taxpayer. CMO turnover and wages do *not* significantly respond to these alternative performance measures. Moreover, including these variables did not affect our findings for the surplus variable. One possible explanation is that CMOs may be deemed to have insufficient direct control over such outcome variables. Wage levels tend to be highly regulated in Norway, whereas economic policy is predominantly determined at the national government level.

Finally, it is important to observe that there is little indication for similar performance effects on the average wage level of all other municipal employees (see table A5 in the Online Appendix). Wage increases due to good budgetary performance thus appear to accrue to the top civil servants responsible for the municipalities' budget. This adds further confidence that our effects in Table 2 reflect performance pay in CMOs' compensation schemes.

3.3. Non-linear performance-compensation

In private-sector settings, CEOs are often particularly rewarded for (very) high profit levels. The same is unlikely to arise in our public-sector setting for at least two reasons. First, barring cases of outright corruption or rent-seeking, CMOs cannot reap any direct surplus from the earnings of the local administration. Moroever, taxpayer control prevents these agents from increasing taxes (much) more than required to provide public goods (Geys and Vermeir, 2008; Kayser and Peress, 2012). Second, minimal levels of service provision are often legally imposed on the public sector (Burgess and Ratto, 2003) and there may be "critical threshold levels of public tolerance" for bad outcomes (Dixit, 2002: 699). Risk-averse principals thus might be more interested in avoiding particularly bad outcomes (i.e. very low or negative budget surpluses). This should imply performance-related schemes that are very steep in vicinity of these outcomes (Dixit, 2002; Burgess and Ratto, 2003).

This potential non-linearity in the performance-compensation relation is evaluated via a set of natural spline regressions (Beatty *et al.*, 2009; Brülhart *et al.*, 2012; Geys and Osterloh, 2013). The results from imposing a cubic spline with three knots on the surplus variable are visualised in Figure 1. Similar results are obtained when allowing for 4 or 5 knots (Figure A5 in the Online Appendix). The smooth line is the estimated regression line, with the shaded areas representing 95% confidence intervals for both *Turnover* (left-hand side) and *Wages* (right-hand side).

Figure 1: Natural spline regression results
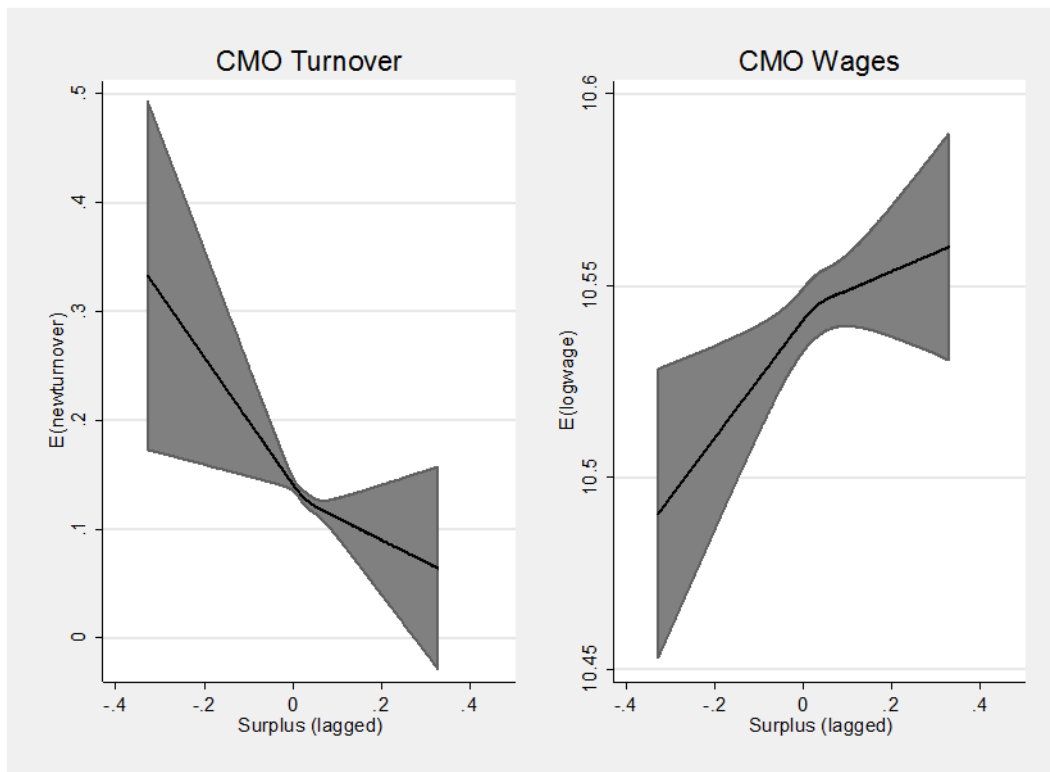
Note: Smooth line represents the predicted values from a natural spline regression with three knots.
95% confidence interval indicated by shaded area.

The results in Figure 1 show a notable noteworthy kink in the estimated regression line just right of budgetary balance. This non-linearity is consistent with the idea that CMO's principals are particularly sensitive to very negative budgetary outcomes. They are much less likely to reward unnecessarily large budget surpluses. Interestingly, the deflection point is in very close proximity to the 3% guideline proposed by the Statistical Reports Committee for county and municipal government finance (see above). Hence, CMO's principals appear to strongly take these guidelines into account when evaluating CMO performance.

3.4. Forced vs voluntary turnover

As mentioned, we cannot observe whether CMO turnover as documented in our data reflects voluntary or forced contract terminations. This might affect the interpretation of our results since observed performance can impact *both* the CMO's outside options *and* the performance evaluation by the municipality. In this section, we provide a number of additional tests assessing whether our results pick up the choice of the CMOs (i.e. voluntary turnover) rather than the choice of their principals (i.e. forced turnover).

First, forced terminations are most likely to arise when performance is poor. A stronger performance-turnover relation under poor performance – as uncovered in section 3.3 – thus indicates that our findings are closely tied to performance-related dismissals. To further corroborate this, we looked more carefully into performance at the 3% threshold set by the Statistical Reports Committee for county and municipal government finance (see above). This shows that a larger deficit *below* this threshold increases the probability of CMO turnover, whereas a larger surplus *above* the threshold reduces CMO turnover. Noting that our operationalization excludes CMO changes from one municipality to another (see also below), this suggests that our findings predominantly reflect forced CMO turnover following poor performance. These auxiliary analyses thus are in line with the spline regressions shown in Figure 1.

Second, better performance is likely to lead to improved outside options for the CMO, and thus can be expected to increase the rate of voluntary terminations. We test this by looking at 167 cases where the CMO moves from one municipality to another. Conditional on CMOs leaving their position, a larger surplus significantly increases the probability of shifting to another municipality (Table A6 in the Online Appendix). Such moves to another municipality are also associated with a statistically significant wage increase (Table A7 in the Online Appendix). Taken together, these findings highlight that municipalities value CMOs with a good record of accomplishments (as measured by the current surplus). Better performance may lead to improved outside offers. This confirms the likely voluntary nature of between-municipality changes. It also corroborates our decision to exclude them from our main analysis above. More importantly, these results indicate that the effect of performance on *voluntary* turnover goes in the opposite direction than its effect on *forced* turnover. Consequently, any voluntary terminations remaining in our dataset would work to bias our estimates towards zero, and lead us to underestimate the effect of performance on forced turnover.

Given these results, one might wonder what proportion of the positive performance-remuneration correlation is explained by (a) promotion to a better-paying municipality, and (b) higher wage holding municipality constant. We test this by taking municipality fixed effects out of our baseline estimation model. Using CMO fixed effects without municipality fixed effects implies that we are assessing variations in performance within CMOs within and across municipalities. Hence, comparison of findings with and without municipality fixed effects provides some indication of the effect deriving from promotions to a better-paying municipality. Our results

indicate that removing municipality fixed effects increases the coefficient estimate of the surplus variable about threefold (Table A7 in the Online Appendix). Promotion to another better-paying municipality thus explains about two-thirds of the performance-remuneration relation.[8]

Finally, we examine how variations in outside options due to local labor market conditions – which should mainly influence voluntary rather than forced terminations – affect our findings. As a first step, we have municipality-level unemployment rates as a control variable in the baseline regressions. As a second step, we also exploit the idea that employment and income opportunities may develop similarly within municipalities' labor market regions, but differently across such regions. We therefore include region-year fixed effects for the 89 economic regions in Norway – defined by Statistics Norway as an independent urban settlement center and its surrounding commuting area. This allows controlling for potentially diverging developments between regions that might correlate with the budget surplus and the probability of voluntary turnover. The results in Table 2 are robust to both of these controls for outside options. Moreover, the point estimate on the surplus variable even increases in the specification with region-year fixed effects (Table A8 in the Online Appendix). To the extent that these correct for variations in CMOs' outside options, this observation suggests that the effect of performance on forced turnover may be underestimated when not controlling properly for outside options.

4. Extension: Rewards for relative performance or luck?

Agency theory prescribes that performance due to common shocks or exogenous fluctuations should *not* be rewarded (Holmstrom, 1979, 1982). We exploit two exogenous shocks to municipality performance to verify this prediction in our setting. First, since economic shocks are likely to have similar effects across neighboring municipalities, we assess whether CMOs' principals filter out information about common economic shocks in a group of comparable municipalities (Jenter and Kanaan, 2015; Enikolopov, 2017). We thereby focus on the municipality's economic region, as defined in section 3.4. Second, we use windfalls due to changes in municipalities' revenues from hydropower electricity sales (for a similar approach, see Bertrand and Mullainathan, 2001). Many Norwegian municipalities receive at least part of their revenues from hydroelectric power plants and related facilities (between 0 and 76% of total revenues with a mean value of 3.71%; Geys and Sørensen, 2016). Municipalities with large hydropower plants (i.e. over 4,000 natural horsepower) are entitled to use up to 10 per cent of the

---

[8] We are grateful to an anonymous referee for suggesting this additional test.

generated electric power at production costs. Since these production costs are substantially below the market price, the vast majority of municipalities puts the licensed production up for sale. These electricity sales revenues in any given year are at least partly exogenous for two reasons. First, municipalities cannot influence the produced quantity. This is determined by the facilities' owners.[9] Second, municipalities have on control over the sales price, which is set by the market for electricity.[10]

We employ a two-stage approach where the first stage (equation 2a) decomposes municipal performance into a systematic component – the relative performance measure ($RelPerf$) – and a municipality-specific component. The second stage (equations 2b and 2c) then includes both these components in the model explaining CMO turnover or wages.

$$Surplus_{jt-1} = r_1 RelPerf_{t-1} + Controls_{jt-1} + \gamma_j + \delta_t \left(+\theta_r\right) + \varepsilon_{jrt} \quad (2a)$$

$$log\left(Wage_{jrt}\right) = k_1 \widehat{Surplus}_{jt-1} + k_2 \hat{\varepsilon}_{jrt} + Controls_{jrt} + \gamma_j + \delta_t \left(+\theta_{[j]r}\right) + \aleph_{jrt} \quad (2b)$$

$$Turnover_{jrt} = l_1 \widehat{Surplus}_{jt-1} + l_2 \hat{\varepsilon}_{jrt} + Controls_{jrt} + \vartheta_j + \mu_t \left(+\rho_{[j]r}\right) + \aleph_{jrt} \quad (2c)$$

We expect $k_1 = 0$, $k_2 > 0$ and $l_1 = 0$, $l_2 < 0$. Table 3 shows the results. As before, Panel I has CMO turnover as the dependent variable, while Panel II analyses CMO wages.

The results in Table 3 indicate that the effect of the systematic component of performance is imprecisely estimated and always remains statistically insignificant at conventional levels. Since these results lack statistical precision, we cannot state that performance-related remuneration takes into account *only* local performance under the control of the CMO. Even so, our findings here are at odds with the literature on executive rewards in private-sector firms. The literature generally finds little evidence for relative performance evaluations (Frydman and Jenter, 2010; Kaplan and Minton, 2012; Jenter and Kanaan, 2015), and shows that CEOs are paid for good luck and punished for bad luck (Bertrand and Mullainathan, 2001; Dittmann et al., 2014).

---

[9] Central government, county governments and private companies own most hydropower plants. The municipalities where the plants are located very rarely own the facilities, and thus have no direct influence over production decisions.

[10] Some examples of changing hydropower electricity sales revenues within municipalities are illustrated in Figure A7 in the Online Appendix. The year-on-year change in such revenues ranges from a drop of 25.8% to increases well over 100%.

Table 3. Relative performance evaluation

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel I: CMO Turnover				*Panel II: CMO Wages*			
	Regional budget performance		*Hydropower electricity sales*		*Regional budget performance*		*Hydropower electricity sales*	
	First stage	Second stage	First stage	Second stage	First stage	Second stage	First stage	Second stage
RelPerf (lagged)	0.240***		0.0028***		0.240***		0.0025**	
	(0.030)		(0.001)		(0.030)		(0.001)	
Predicted lagged surplus		-0.172		-2.671		0.029		0.261
		(0.830)		(1.923)		(0.125)		(0.424)
Residual lagged surplus		-0.368 ***		-0.279**		0.034		0.038 +
		(0.123)		(0.120)		(0.026)		(0.024)
Municipal controls	YES	YES	YES	YES	YES	YES	YES	YES
Individual controls	YES	YES	YES	YES	YES	YES	YES	YES
Municipality FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Municipality-specific trend	YES	YES	YES	YES	YES	YES	YES	YES
Match specific FE	NO	YES	NO	YES	NO	YES	NO	YES
F-test first stage	63.70 ***	-	8.03 ***	-	60.17 ***	-	6.30 **	-
Observations	8,516	8,516	9,058	9,058	7,510	6,412	7,874	6,961
R^2 (within)	0.238	0.466	0.224	0.460	0.245	0.989	0.233	0.988
Number of municipalities	436	436	430	430	436	394	430	423

Note: The dependent variable is an indicator variable for CMO turnover in Panel I and the natural logarithm of CMO wages in Panel II. *Surplus* is the one-year lagged level of the municipal net operating surplus (as a share of municipal current revenues). *RelPerf* is the population-weighted mean of *Surplus* in the municipality's economic region (columns 1, 2, 5 and 6), or the municipality's income from the sale of electricity from the hydropower plants on its territory (columns 3, 4, 7 and 8). All specifications include municipality and year fixed effects, CMO- and municipality-related controls, and municipality-specific time trends. Columns (2), (4), (6) and (8) furthermore add municipality-CMO fixed effects to the second-stage equation. In all models, we exclude the 0.5% observations at the top and bottom of the operating surplus distribution. Standard errors clustered at the municipality level in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$, + $p<0.15$.

At least part of the difference between our findings for CMOs and earlier results for CEOs may be explained by the fact that private-sector top executives generally have greater influence over the compensation process (Bebchuk and Fried, 2003; Edmans and Gabaix, 2016). First, local governments provide similar services in a stable and homogenous environment. This facilitates performance comparison across authorities, which is arguably more challenging in the fluctuating and heterogeneous market sector. Second, politicians and public administrators are more reliant on widespread popular support than their colleagues in private companies. A CMO dismissal or wage rise may thus require a more transparent and thorough justification than a similar action in the private sector. Finally, CEOs are frequently appointed to the board of directors in both their own and other companies. This creates a network of "reciprocal interlocking" between companies' boards (Finch and White, 2005: 175). CMOs are not in a comparable position. They cannot serve as elected members of the local council in their own municipality.[11] Moreover, we know of no cases where the CMO of one municipality is elected as member of another local council.

5. Conclusion

A substantial theoretical and empirical literature studies the effects of (non-)financial incentives on self-selection and performance among *politicians* (see, e.g., Caselli and Morelli, 2004; Messner and Polborn, 2004; Poutvaara and Takalo, 2007; Keane and Merlo 2010; Ferraz and Finan, 2011; for a review, see Besley, 2005). More recent experimental work has also analysed how (non-)financial incentives influence self-selection of street-level *bureaucrats* (e.g., Dal Bó et al. 2013; Ashraf et al., 2016; Deserranno 2017). Our analysis instead looks at the relation between top bureaucrats' performance and their compensation and turnover. This has attracted far less attention. From a normative bureaucratic perspective, top civil servants should have permanent positions and receive compensations that do *not* correlate with public policy outcomes (Weber, 1978; Wilson, 1989). Agency theory instead suggests that *low-powered* performance incentives may be optimal in the public sector (Holmstrom and Milgrom, 1991; Dixit, 2002). Our empirical results suggest that Norwegian local governments follow the latter viewpoint. Overall, top executives in Norwegian local governments appear to be incentivized through a performance-related compensation scheme (i.e. wages and turnover probabilities) to hit well-defined short-term budgetary targets. This confirms that performance incentives are implemented at least with respect to budgetary outcomes. Still, it evidently

---

[11] See Norwegian Election Law (*Lov om valg til Stortinget, fylkestinget og kommunestyret*), § 3.3.

cannot exclude that it also arises beyond this budgetary dimension. This remains an interesting avenue for further research given the multi-dimensional nature of tasks in the public sector.

Three specific characteristics of the observed performance pay in our setting are important to point out more explicitly. First, while the impact on turnover is substantively meaningful, the wage effects are economically modest. Hence, performance incentives remain low-powered in line with agency theory predictions, and CMO work effort appears predominantly stimulated via the possibility of early contract termination. Second, the CMOs in our setting are not subject to an explicit bonus system. Rather, they receive a permanent wage increase as compensation for performance. CMO work effort thus might still be stimulated by the wage element in the performance pay scheme despite the substantively small wage effects. Third, the observed performance pay effects are asymmetric. The CMO is mostly punished under a very weak budgetary situation. Very large surpluses – which may suggest excessive taxation – have much smaller effects on turnover and wage levels.

References

Andersen, J.J., J.H. Fiva and G.J. Natvik (2014). Voting When the Stakes are High. *Journal of Public Economics* 110: 157-166.

Ashraf, N., O. Bandiera and B.K. Jack (2014). No Margin, No Mission? A Field Experiment On Incentives for Public Service Delivery. *Journal of Public Economics* 120: 1-17.

Ashraf, N., O. Bandiera and S.S. Lee (2016). Do-Gooders and Go-Getters: Career Incentives, Selection, and Performance in Public Service Delivery. *Mimeo*.

Beatty, T.K.M., E.R. Larsen and D.E. Sommervoll (2009). Driven to Drink: Sin Taxes near a Border. *Journal of Health Economics* 28: 1175-1184.

Bebchuk, L.A. and J.M. Fried (2003). Executive Compensation as an Agency Problem. *Journal of Economic Perspectives* 17(3): 71-92.

Bertrand, M. and S. Mullainathan (2001). Are CEOs Rewarded for Luck? The Ones Without Principals Are. *Quarterly Journal of Economics* 116: 901-932.

Bertrand, M., R. Burgess, A. Chawla and G. Xu (2016). The Costs of Bureaucratic Rigidity: Evidence from the Indian Administrative Service. *Mimeo*.

Besley, T. (2005). Political Selection. *Journal of Economic Perspectives* 19(3): 43-60.

Besley, T. and M. Ghatak (2005). Competition and Incentives with Motivated Agents. *American Economic Review* 95(3): 616-636.

Binderkrantz, A.S. and J.G. Christensen. (2011). Agency Performance and Executive Pay in Government: An Empirical Test. *Journal of Public Administration Research and Theory* 22: 31-54.

Borge, L.-E., P. Parmer and R. Torvik (2015). Local Natural Resource Curse. *Journal of Public Economics* 131: 101-114.

Britton, J, and C. Propper (2016). Teacher Pay and School Productivity: Exploiting Wage Regulation. *Journal of Public Economics* 133: 75-89.

Brülhart, M., C. Carrère and F. Trionfetti (2012), How Wages and Employment Adjust to Trade Liberalization: Quasi-Experimental Evidence from Austria. *Journal of International Economics* 86(1): 68-81.

Burgess, S. and M. Ratto (2003). The Role of Incentives in the Public Sector: Issues and Evidence. *Oxford Review of Economic Policy* 19(2): 285-300.

Burgess, S., C. Propper, M. Ratto and E. Tominey (2016). Incentives in the Public Sector: Evidence from a Government Agency. *Economic Journal*, Forthcoming.

Caselli, F. and M. Morelli (2004). Bad Politicians. *Journal of Public Economics* 88: 759-782.

Dal Bó, E., F. Finan and M.A. Rossi (2013). Strengthening state capabilities: The role of financial incentives in the call to public service. *Quarterly Journal of Economics* 128(3): 1169-1218.

Deserranno, E. (2017). Financial Incentives as Signals: Experimental Evidence from the Recruitment of Village Promoters in Uganda. *Mimeo*.

Dittmann, I., E. Maug, and O.G. Spalt (2013). Indexing Executive Compensation Contracts. *Review of Financial Studies* 26(12): 3182-3224.

Dixit, A. (1997). Power of Incentives in Private versus Pubic Organizations. *American Economic Review* 87(2): 378-382.

Dixit, A. (2002). Incentives and Organization in the Public Sector: An Interpretative Review. *Journal of Human Resources* 37(4): 696-727.

Edmans, A., and X. Gabaix (2016). Executive Compensation: A Modern Primer. *Journal of Economic Literature* 54(4): 1232-1287.

Enikolopov, R. (2017). Are Bureaucrats really paid like Bureaucrats? *Mimeo*.

Ferraz, C. and F. Finan (2011). Motivating Politicians: The Impacts of Monetary Incentives on Quality and Performance. *Mimeo*.

Finch, E.M. and L.J. White (2005). Why do CEOs reciprocially sit on each other's Boards? *Journal of Financial Economics* 11(1-2): 175-195.

Fiva, J.H., A. Halse and G.J Natvik (2015). *Local Government Dataset*. Available at www.jon.fiva.no/data.htm.

Frydman, C., and D. Jenter (2010). CEO Compensation. *Annual Review of Financial Economics* 2(1): 75-102.

Geys, B. and S. Osterloh (2013). Borders as Boundaries to Fiscal Policy Interactions? An Empirical Analysis of Politicians' Opinions on Rivals in the Competition for Firms. *Journal of Regional Science* 53(4): 583-606.

Geys, B. and R.J. Sørensen (2016). Revenue scarcity and government outsourcing: Empirical evidence from Norwegian local governments. *Public Administration* 94(3): 769-788.

Geys, B. and J. Vermeir (2008). The Political Cost of Taxation: New Evidence from German Popularity Ratings. *Electoral Studies* 27(4): 633-648.

Haeck, C. and F. Verboven (2012). The internal economics of a university: Evidence from personnel data. *Journal of Labor Economics* 30(3): 591-626.

Hall, B.J. and J.B. Liebman (1998). Are CEOs Really Paid Like Bureaucrats? *Quarterly Journal of Economics* 113(3): 653-691.

Healy, A., and N. Malhotra (2009). Myopic Voters and Natural Disaster Policy. *American Political Science Review* 103(3): 387-406.

Holmstrom, B. (1979). Moral Hazard and Observability. *Bell Journal of Economics* 10: 74-91.

Holmstrom, B. (1982). Moral Hazard in Teams. *Bell Journal of Economics* 13(2): 324-340.

Holmstrom, B. and P. Milgrom (1991). Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design. *Journal of Law, Economics and Organization* 7: 24-52.

Hægeland, T., O. Raaum, and K.G. Salvanes. (2012). Pennies from Heaven? Using Exogenous Tax Variation to Identify Effects of School Resources on Pupil Achievement. *Economics of Education Review* 31: 601-614.

Jensen, M.C., and K.J. Murphy (1990). Performance Pay and Top-management Incentives. *Journal of Political Economy* 98(2): 225-264.

Jenter, D. and F. Kanaan (2015). CEO Turnover and Relative Performance Evaluation. *Journal of Finance* 70(5): 2155-2183.

Kaplan, S.N., and B.A. Minton (2012). How has CEO Turnover Changed? Increasingly Performance Sensitive Boards and Increasingly Uneasy CEOs. *International Review of Finance* 12: 57-87.

Karachiwalla, N. and A. Park (2017). Promotion incentives in the public sector: Evidence from Chinese schools. *Journal of Public Economics* 146: 109-128.

Kayser, M.A. and M. Peress (2012). Benchmarking across Borders: Electoral Accountability and the Necessity of Comparison. *American Political Science Review* 106: 661-684.

Keane, M.P. and A. Merlo (2010). Money, Political Ambition and the Career Decisions of Politicians. *American Economic Journal: Microeconomics* 2(3): 186-215.

Khan, A.Q., A.I. Khwaja and B.A. Olken (2016). Tax Farming Redux: Experimental Evidence on Performance Pay for Tax Collectors. *Quarterly Journal of Economics* 131(1): 219-271.

Li, H. and L.A. Zhou (2005). Political turnover and economic performance: The incentive role of personnel control in China. *Journal of Public Economics* 89(9): 1743-1762.

Luo, R., G. Miller, S. Rozelle, S. Sylvia and M. Vera-Hernández (2015). Can Bureaucrats Really Be Paid Like CEOs? School Administrator Incentives for Anemia Reduction in Rural China. *NBER Working Paper*, No. 21302.

MacRae, C.D. (1977). A Political Model of the Business Cycle. *Journal of Political Economy* 85(2): 239-263.

Messner, M. and M. Polborn (2004). Paying Politicians. *Journal of Public Economics* 88(12): 2423-2445.

Poutvaara, P. and T. Takalo (2007). Candidate Quality. *International Tax and Public Finance* 14(1): 70-27.

Rasul, I. and D. Rogger (2016). Management of Bureaucrats and Public Service Delivery: Evidence from the Nigerian Civil Service, *Economic Journal*, forthcoming.

Weber, M. (1978). *Economy and Society*. Berkeley: University of California Press.

Weibel, A., K. Rost and M. Osterloh (2010). Pay for Performance in the Public Sector: Benefits and (Hidden) Costs. *Journal of Public Administration Research and Theory* 20(2): 387-412.

Wilson, J.Q. (1989). *Bureaucracy: What government agencies do and why they do it*. New York: Basic Books.