Internet Appendix for "Are Incentive Contracts Rigged By Powerful CEOs?"[1]

In this supplement we report our results on tests that aim to get a sense of an upper bound on rigging.[2] In the paper, since we standardize our performance measures by removing contemporaneous industry shocks, we are likely to lose cases of rigging where ex post manipulation of performance variables is driven by industry shocks. In that sense the estimates reported in the paper provide a lower bound on the amount of rigging. To estimate a possible upper bound of rigging, we reconstruct our performance measures by allowing them to pick up the effects of contemporaneous industry shocks. In developing such an estimate, an issue that arises is that the distribution of raw accounting and stock return realizations during the sample period are quite different. This makes it difficult to directly compare the two raw measures to get a sensible measure of ex post maximum return performance, $Max\{ROA_{it},\ Rstock_{it}\}$. For instance, the mean accounting return is 4.4% (standard deviation of 6%) while the mean stock return is 16.5% (standard deviation of 38%).

To address this issue while allowing for contemporaneous industry shocks, we modify the way in which we standardize accounting and stock returns. We still need to standardize the performance measures to make the distributions of the two returns comparable so that $Max\{.,.\}$ can be sensibly computed. However, instead of standardizing by the industry mean and standard deviation of the return *every year*, we now standardize by the industry mean and standard deviation of the return *computed over the entire sample period*. By doing so, we allow the impact of contemporaneous industry shocks to potentially show up in the rigging estimates.

More specifically, we standardize ROA_{it} and $Rstock_{it}$ by two-digit SIC code returns according to

$$\begin{aligned} zROA_{it}^{modified} &= \frac{ROA_{it} - \overline{ROA}}{\sigma^{ROA}}, \\ zRstock_{it}^{modified} &= \frac{Rstock_{it} - \overline{Rstock}}{\sigma^{Rstock}}, \end{aligned} \tag{IA.1}$$

[1] Morse Adair, Vikram Nanda and Amit Seru, Internet Appendix for "Are Incentive Contracts Rigged By Powerful CEOs?" Journal of Finance. Please note: Wiley-Blackwell is not responsible for the content or functionality of any supporting information supplied by the authors. Any queries (other than missing material) should be directed to the authors of the article.

[2] We thank the referee for this suggestion.

where $\{\overline{ROA},\ \overline{Rstock}\}$ and $\{\sigma^{ROA},\ \sigma^{Rstock}\}$ are firm i's industry mean return and standard deviation, respectively, for accounting (ROA) and stock ($Rstock$) performance over the entire sample period. We then define $Max_{it}^{modified}$ as the ex post maximum return of these standardized performance measures ($zROA_{it}^{modified},\ zRstock_{it}^{modified}$) for firm i in year t.

We re-estimate the main specification of the paper (Table III) using these measures instead of the ones used in Table III. The results are presented in Table IA.I and suggest that, consistent with our main prediction, the interaction of Max with CEO power variables is positively significant for all the three power measures. To get a sense of the extent to which rigging explains compensation sensitivity to $zROA$ and $zRstock$, we recompute the extent to which (in dollars and in percent) pay-for-performance is rigged versus a result of incentives using the method outlined in Section V.B of the paper.

Our results suggest that about 28% of incentive pay for $zROA^{modified}$ and about 61% for $zRstock^{modified}$ are due to rigging when $\%Insider$ is employed as a power measure. Similarly, using the other two measures of power suggests that rigging might explain as much as 20% to 30% of compensation sensitivity to $zROA$ and 27% to 39% of compensation sensitivity to $zRstock$.

As can be seen, these economic magnitudes are larger than those reported in the paper using the standardized performance measures (16% and 38% of incentive pay for $zROA$ and $zRstock$, respectively). This seems sensible since the contemporaneous industry shocks that are not removed from these measures also show up in the rigging estimates. Overall, this test suggests that the upper bound on rigging estimates might be on the order of 20% to 28% for the accounting return measure and 30% to 60% for the stock return measure. Alternatively, using within-firm sample standard deviations for accounting and stock returns instead of unit changes, we get an upper bound on rigging on the order of 16% to 22% for accounting returns and 28% to 57% of stock returns.

We investigate the effects of standardizing performance on our rigging estimates in another way as well. In particular, we follow the approach discussed above, but instead of standardizing by the *industry mean* and standard deviation of the return computed over the entire sample period, we now standardize by the *sample mean* computed over the entire sample period. The idea behind this analysis is to only remove overall time trends from the rigging estimates. As can be seen from the estimates in Table IA.II, the

effect of rigging is even larger. In particular, using this approach, the upper bound on rigging estimates is on the order of 26% to 43% for the accounting return measure and 38% to 65% for the stock return measure.

Table IA.I
Incentive Pay and Rigging with Total Compensation: Standardization Using Industry Mean Over Entire Sample Period

In this table we report estimates from the regression that uses the natural log of the CEO total compensation as the dependent variable. We iteratively employ the three power measures– *PowerIndex*, *Insider%*, and *%Appointed*–in a lagged performance fixed effects specification (in columns (1), (3), (5), and (7)) and an AR fixed effects specification (in columns (2), (4), (6), and (8)). $zROA^{modified}$ and $zRstock^{modified}$ are the standardized return on assets and stock returns. Instead of standardizing by the industry mean and standard deviation of the return *every year*, we now standardize by the industry mean and standard deviation of the return *computed over the entire sample period*. $Max^{modified}$ for each firm in any year is constructed as $Max\{\text{zROA}^{modified}, \text{zRstock}^{modified}\}$. Other controls in the regressions include the natural log of firm assets, *Ln(Assets)*; the prior five-year average Black-Scholes volatility, *Volatility*; shares owned by the CEO, *Shares Owned*, and its square; tenure of the CEO, *Tenure* and its square; and option holdings of the CEO, *OptionsValue*. All regressions are estimated with time and firm fixed effects and standard errors are reported in parentheses. Robust standard errors are reported in the fixed effects specification with lagged performance measures. Data in this table are for the period 1992 to 2003. ***, **, and * denote significance at the 1%, 5% and 10% levels respectively.

	Dependent Variable: *Ln(TDC)*							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Max_{it}	0.088***	0.092***						
	(0.024)	(0.021)						
Power Index_{it}			0.049**	0.051***				
			(0.024)	(0.016)				
$\text{Max}^{modified}$*Power Index_{it}			0.029***	0.028***				
			(0.009)	(0.008)				
$\text{Insider\%}_{it}$					-0.006	0.008		
					(0.058)	(0.061)		
$\text{Max}^{modified}$*$\text{Insider\%}_{it}$					0.269***	0.243***		
					(0.061)	(0.062)		
$\%\text{Appointed}_{it}$							-0.062	-0.055
							(0.092)	(0.075)
$\text{Max}^{modified}$*$\%\text{Appointed}_{it}$							0.066**	0.078***
							(0.028)	(0.028)
Observations	8303	8227	8303	8227	6124	5855	5822	5490
AR rho		0.23		0.23		0.12		0.11
R^2	0.42	0.37	0.42	0.37	0.42	0.39	0.40	0.39
Time & Firm F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table IA.II
Incentive Pay and Rigging with Total Compensation: Standardization using Sample Mean Over Entire Sample Period

In this table we report estimates from the regression that uses the natural log of the CEO total compensation as the dependent variable. We iteratively employ the three power measures– *PowerIndex*, *Insider%*, and *%Appointed*–in a lagged performance fixed effects specification (in columns (1), (3), (5), and (7)) and an AR fixed effects specification (in columns (2), (4), (6), and (8)). $zROA^{Time}$ and $zRstock^{Time}$ are the standardized return on assets and stock returns. Instead of standardizing by the industry mean and standard deviation of the return *every year*, we now standardize by mean and standard deviation of the return *computed over the entire sample period*.Max^{Time} for each firm in any year is constructed as $Max\{\text{zROA}^{Time}, \text{zRstock}^{Time}\}$. Other controls in the regressions include the natural log of firm assets, *Ln(Assets)*; the prior five-year average Black-Scholes volatility, *Volatility*; shares owned by the CEO, *Shares Owned*, and its square; tenure of the CEO, *Tenure* and its square; and option holdings of the CEO, *OptionsValue*. All regressions are estimated with time and firm fixed effects and standard errors are reported in parentheses. Robust standard errors are reported in the fixed effects specification with lagged performance measures. Data in this table are for the period 1992 to 2003. ***, **, and * denote significance at the 1%, 5% and 10% levels respectively.

	Dependent Variable: *Ln(TDC)*							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Max_{it}	0.171***	0.159***						
	(0.031)	(0.023)						
Power Index_{it}			0.040	0.045***				
			(0.025)	(0.015)				
Max^{Time}*Power Index_{it}			0.064***	0.062***				
			(0.011)	(0.009)				
$\text{Insider\%}_{it}$					-0.023	-0.010		
					(0.056)	(0.061)		
Max^{Time}*$\text{Insider\%}_{it}$					0.346***	0.345***		
					(0.072)	(0.070)		
$\%\text{Appointed}_{it}$							-0.068	-0.090
							(0.091)	(0.075)
$\text{Max}^{modified}$*$\%\text{Appointed}_{it}$							0.091***	0.102***
							(0.033)	(0.032)
Observations	8303	8227	8303	8227	6124	5855	5822	5490
AR rho		0.23		0.23		0.13		0.12
R^2	0.44	0.37	0.43	0.37	0.43	0.39	0.40	0.39
Time & Firm F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes