Replicating the literature on meritocratic promotion in China

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Abstract

In the previous chapter, I found no evidence for meritocratic promotion of prefecture leaders. In this chapter, I reanalyze the literature on meritocratic promotion. Replicating five papers, I find that the evidence for prefecture leaders is not robust to reasonable specification choices. I conclude that my null result is not contradicted by the literature. However, I do find some evidence of meritocracy for county leaders, and propose a model where county-level meritocracy can be an explanation for Chinas economic growth, by incentivizing county leaders and selecting higher-level leaders based on ability to grow the economy.

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1 Introduction

In Chapter 1, I found no evidence for meritocratic promotion of prefecture leaders. And yet, there are many papers in the literature that claim to provide evidence for meritocracy at the prefecture level. How can this tension be resolved? In this chapter, I revisit five papers from this literature. Digging into these papers, I find that their prefecture results are not robust to reasonable specification choices, and in one case, are due to possible data errors. In each case, I find that the paper does not provide robust evidence for meritocratic promotion. I conclude that my results in Chapter 1 are sound, and that the papers in this literature contain flaws.

To preview my results, I replicate papers published in the Journal of Economic Growth (Yao and Zhang, 2015), the Economic Journal (Li et al., 2019), the Quarterly Journal of Economics (Chen and Kung, 2019), Comparative Political Studies (Landry et al., 2018), as well as a working paper (Lorentzen and Lu, 2018).[1] I find that the results for meritocratic promotion of prefecture leaders in four papers (Yao and Zhang, 2015; Li et al., 2019; Landry et al., 2018; Lorentzen and Lu, 2018) are replicable using their own data and code, but are not robust to different specifications. I find that the results in the final paper (Chen and Kung, 2019) are possibly due to data errors. Using Clemens (2017)'s terminology, I am performing a reanalysis in the former cases, and a verification in the latter case.[2]

Lastly, I re-examine the evidence for meritocracy at the province and county levels. At the province level, a new paper (Sheng, (forthcoming) claims to find evidence for meritocratic promotion only for provincial governors during the Jiang Zemin era (1990-2002). I test this hypothesis using the data from Jia et al. (2015) and find no such effect. For county leaders, the two papers on county-level politicians (Chen and Kung, 2016; Landry et al., 2018) use non-standard specifications, so I re-analyze their data using my preferred specification: regressing an annual promotion variable on cumulative average relative GDP growth. In this case I find suggestive evidence for meritocracy being implemented for county leaders. I conclude by proposing a model of meritocracy where county-level promotion tournaments provide a causal explanation for China's economic growth, by incentivizing county leaders and selecting higher-level leaders based on ability to grow the economy.

[1]Appendix Table 13 presents a summary of the sample and methods used in each paper.

[2]Clemens distinguishes between replication and robustness. Replication includes verification (same specification, same population, and the same sample) and reproduction (same specification, same population, and a different sample). Robustness includes reanalysis (different specification, same population, and possibly the same sample) and extension (same specification, different population, and a different sample). In my case, I am using the same data as the original paper, but changing the specification. For Chen and Kung (2019), data errors count as a failed verification.

2 Yao and Zhang (2015)

Yao and Zhang (2015), published in the Journal of Economic Growth, was the first paper to study meritocratic promotion at the prefecture level in China. They apply the AKM approach to leaders and cities (instead of workers and firms), using leaders that move across cities to identify leader ability to boost GDP growth. The main contribution is estimating the effect of leader ability on promotion.

Leader effects are estimated in a three-way fixed-effect model, along with year and city fixed effects:

$$y_{ijt} = \beta X_{ijt} + \theta_i + \psi_j + \gamma_t + \epsilon_{ijt}. \quad (1)$$

Here y_{ijt} is real GDP growth in city j in year t, X_{ijt} is time-varying controls, θ_i is leader i's fixed effect, and ψ_j and γ_t are city and year fixed effects. When using the largest sample connected by movers, all three fixed effects can be identified in a regression of GDP growth on the fixed effects. Note that this paper pools prefecture mayors and secretaries, which allows for a larger maximal connected set, but also gives up the ability to test for heterogeneity in meritocratic promotion across mayors and secretaries. Note also that restricting to the largest connected set means potentially losing external validity, if there are heterogeneous effects by membership in this connected set.

The authors estimate the effect of leader ability on promotion in the following model:

$$p_{ijt} = \alpha\theta_i + \delta Z_{ijt} + \nu_k + \eta_t + u_{ijt}. \quad (2)$$

Here p_{ijt} is either a dummy or a categorical variable, Z_{ijt} is control variables, and ν_k and η_t are province and year fixed effects. I directly replicate their Table 4 in Table 1 below. I make a few changes to their code. First, I cluster standard errors at the prefecture level; the original paper did not cluster. Second, the original paper made a coding error in the $Age > Threshold$ variable. Specifically, the authors neglected the fact that Stata's *gen* function treats missing observations as infinite, so observations with a missing age variable are coded as being above the threshold. I correct this error, which reduces the sample size in Columns 3-6 to match that in Columns 1-2 (as the latter columns automatically exclude the missing observations). Despite these changes, the results are almost identical. For example, the original coefficient on Leader effect × (Age > Threshold) in Column 5 is 0.291^{***}, while mine is 0.311^{***}.

They find no average correlation between leader effects and promotion, in either the LPM or ordered probit models (Column 1 in Tables 4 and 5).[3] This is consistent with my finding

[3]Their original Tables 4-5 are presented as Appendix Figures 4-7.

in Chapter 1 that China does not promote prefecture leaders meritocratically (on the basis of GDP growth). Despite finding no average effect, the authors do not frame their paper as contradicting the literature.[4] Moreover, this paper is cited in the literature as supporting the meritocracy hypothesis.[5]

This is because the authors further test for an interaction between leader ability and age, reporting a positive interaction effect that is significant at the 5% level. To narrow in on this result, they test for a series of interactions with indicator variables for age being above a threshold (from 49 to 52), finding that the effect of leader ability on promotion is strongest for leaders older than 51. They conclude that leader ability matters for older politicians, because more years of experience produces a clearer signal of ability.

This result is consistent with a limited promotion tournament, where the Organization Department promotes older leaders based on their (lifetime) ability to boost growth (because older leaders have clearer signals of ability), but applies different promotion criteria to younger leaders (whose signals are too weak to detect). But this limited model contradicts the usual characterization of China's promotion tournament as including all leaders, irrespective of age: in each province, leaders compete to boost GDP growth, and the winners (with the highest growth) are rewarded with promotion.

Moreover, half of all promotions occur for leaders younger than 51. If the Organization Department cannot measure ability for these young leaders, what criteria does it use to promote them? Furthermore, recall that the original motivation was to explain China's rapid growth. The incentives generated by this limited tournament are weaker, since the reward is only applied later in life; if young leaders are impatient, they will discount this future reward and hence put less effort into boosting growth. The limited tournament model thus has less explanatory power.[6] Given these differences in interpretation, it is not clear why this paper has been cited without qualification as evidence for meritocratic promotion, when it supports only a limited promotion tournament.

[4] "We also improve on the existing literature on the promotion tournament in China. Using the leader effect estimated for a leaders contribution to local growth as the predictor for his or her promotion, we refine the approach of earlier studies." (Yao and Zhang 2015, p.430)

[5] Chen and Kung (2016): "those who are able to grow their local economies the fastest will be rewarded with promotion to higher levels within the Communist hierarchy [...] Empirical evidence has indeed shown a strong association between GDP growth and promotion ([...] Yao and Zhang, 2015)".

Yao (2018): "Some studies have found that officials who perform better during their term of office are promoted more easily ([...] Yao and Zhang 2015)".

Li et al. (2019): "the promotion of Chinese local officials is linked to economic growth in their jurisdictions. This strong linkage between the private interests of local officials and regional economic development thereby triggers an intensive tournament competition ([...] Yao and Zhang, 2015)."

[6] Another explanation suggested by the authors is that competition in the promotion tournament is more intense for older leaders, which increases the importance of ability in determining promotions. However, it is not clear why competition should vary with leader age, nor why more intense competition should increase

Besides these problems in interpretation, I also find issues in the paper's empirical results. When estimating leader effects, the authors regress GDP growth on the three fixed effects as well as three covariates: initial city GDP per capita (by leader term), annual city population, and the annual provincial inflation rate. We might worry that small cities mechanically grow faster, since they start from a lower base. But since the model includes city effects, level differences in growth rates are not an issue. A second worry is that the variance of idiosyncratic shocks to growth is correlated with city size. Since growth shocks could affect promotion outcomes, it makes sense to control for initial GDP by term. However, it is not clear why population and inflation should be included. The authors mention that labor migration can drive GDP growth (p.413), but a leader's policies affect migration, so population is plausibly a collider or 'bad control', if leader ability affects growth through good policies that increase migration. The authors provide no justification for including inflation, which is odd because the dependent variable (real per capita GDP growth) is already expressed in real (rather than nominal) terms.

While the authors perform multiple robustness checks after they have estimated the leader effects, they do not apply robustness checks to the estimation of the leader effects itself. Given the lack of a strong justification for including population and inflation as covariates, I re-estimate the leader effects controlling only for initial GDP. Using these new leader effects, I then re-estimate their Table 4, which was directly replicated above. The results of my reanalysis are presented in Table 2.

While the average effect of leader effects (Column 1) is quite similar to the original (0.033 vs. 0.029), I find no statistically significant interaction effect with age (Column 2). The signs remain unchanged, but the magnitude of the coefficients drops by half, and the results are nonsignificant. Turning to the age threshold results (Columns 3-6), I find that the coefficient on Leader effect $\times$ (Age $>$ Threshold) remains statistically significant only for the age 51 threshold, though at the 5% level instead of the original 1% (Column 5). These coefficients are smaller by one-third to one-half, compared to the original regressions.

I find similar results when reanalyzing the other specifications (LPM and ordered probit in both single- and multiple-equation models); see Appendix Tables 14 – 16. The interaction effect with Age becomes nonsignificant, and out of the threshold interactions, only the age 51 threshold retains significance (at the 5% level).

Since dropping population and inflation when estimating leader effects seems like an innocuous change, I conclude that the reported interaction effect is not robust.[7] This is an

the Organization Department's weight on ability.

[7]In unreported results, I find that controlling for both initial GDP and initial population (rather than annual population) again leads to a nonsignificant interaction. However, the replication files are missing data on a leader's first year in office, so this estimate uses a smaller sample size than in the original regressions.

innovative, insightful[8], and well-written paper. However, the results do not support a model of meritocratic promotion for prefecture leaders in China.

3 Li et al. (2019)

Li et al. (2019), published in the Economic Journal, studies GDP growth targets and promotion tournaments in China. They note that targets are higher at lower levels of the administration; for example, prefectures set higher targets than do provinces. Their explanation is that the number of jurisdictions competing in each promotion tournament is decreasing as one moves down the hierarchy, which increases the probability of a leader winning the tournament. As a consequence, leaders exert more effort, and higher-level governments can set higher growth targets while satisfying the leaders' participation constraint.

As part of their model, they assume that promotion is meritocratic: performance (measured by GDP growth) increases the probability of promotion, consistent with the literature. Further, they report an original result: the effect of performance on promotion is increasing in the growth target faced. That is, a one percentage-point increase in growth will increase a mayor's $\mathbb{P}$(promotion) by a larger amount when the provincial target is higher, relative to when the target is lower.

This result seems naturally testable by interacting $Growth \times Target$ in a panel regression, with a predicted positive coefficient on the interaction term. However, the authors argue that OLS is invalid, instead reporting results based on MLE where promotion is determined by a contest success function. Why does OLS not apply? "Standard linear regression does not work here partly because promotion is determined by local officials own growth rates as well as by the growth rates of their competitors. The nonlinearity of the promotion function is another factor that invalidates the OLS estimation." (p.2906)

But these do not seem to be problems for OLS. First, as is standard in this literature, the promotion tournament can be captured by using prefecture growth rates relative to the annual provincial growth rate. Second, OLS is the best linear approximation to a nonlinear conditional expectation function. So if there is a positive nonlinear relationship between promotion and growth, we should be expect that it will be detected by OLS. Given the lack of justification for omitting results from linear regression, I will test for an interaction effect between growth and the growth target using a linear probability model and logistic

[8]For example, they note that almost all members of the Politburo Standing Committee (PSC) have worked in a small set of advanced provinces and big cities that benefited from special economic policies. Hence, defining political connections based on shared work experience with current PSC members may result in a spurious positive correlation between connections and promotion. (p.421) This insight is the basis of Fisman et al. (2020).

regression.

First, I present the original Li et al. Table 5 results in Figure 1. This table shows MLE estimates of the following log-likelihood:

$$logL = \frac{1}{T}\sum_{i,t}(d_{it}log(p_{it}) + (1-d_{it})log(1-p_{it})).$$

Here d_{it} is in indicator for promotion, and p_{it} is the promotion probability defined by:

$$p_{it} = \frac{g(y_{it}, \bar{y}_t, x_{it})}{\sum_j g(y_{jt}, \bar{y}_t, x_{jt}))}.$$

In this equation, g is a linear score function, y_{it} is leader i's GDP growth rate, $\bar{y}_t$ is the growth target set by the upper-level government, and x_{it} contains control variables. The score function has the form

$$g(y_{it}, \bar{y}_t, x_{it}) = 1 + \alpha_1 y_{it} + \alpha_2 \bar{y}_t + x_{it}\beta.$$

The model in Li et al. assumes that $\alpha_1 > 0$ and $\alpha_2 < 0$, corresponding to the assumptions of meritocratic promotion and complementarity between growth targets and the responsiveness of promotion to GDP growth. As we can see in Figure 1, the coefficient on GDP growth is positive, while the coefficient on the growth target faced is negative, whether using annual or cumulative growth.

Next, I reanalyze the Li et al. hypothesis using an interaction effect and OLS. To capture the idea that the effect of GDP growth on promotion is increasing in the growth target faced, I estimate the following model:

$$Promotion_{ijpt} = \beta_1 Growth_{ijpt} + \beta_2 Growth_{ijpt} \times Target_{pt} + \lambda X_{ijpt} + \epsilon_{ijpt}. \quad (3)$$

In this setup, the Li et al. assumptions are formulated as $\beta_1 > 0$ (in a model without the interaction term) and $\beta_2 > 0$: growth directly increases the probability of promotion, and the effect of growth on promotion is increasing in the growth target faced.

The results are presented in Table 3, which replicates columns (1) and (3) in Table 5 of Li et al. (2019). First, I test the generic meritocracy hypothesis in the first and third columns, omitting the interaction term. I find that GDP growth has no average effect on promotion, either as annual or average cumulative growth. This confirms my null result from Chapter 1. The second and fourth columns find positive interaction effects between realized growth and the growth target faced, but these are not statistically significant.[9] I find similar results when using logistic regression (see Appendix Table 17). In unreported results, I include separate province and year fixed effects (instead of province-year fixed effects), and find similar nonsignificance. Hence, while the authors find that the corresponding results are statistically significant when using MLE, they are not robust to linear specifications. A further worry is that the panel is somewhat unbalanced (due to missing data on growth targets). As shown in Appendix Figure 12, the sample size varies moderately from year to year, possibly leading to unrepresentative estimates.

While Li et al. (2019) is an interesting extension to the promotion literature and offers an insightful analysis of GDP growth targets as a function of the number of contestants per promotion tournament, it does not provide robust evidence for meritocratic promotion of prefecture leaders.

4 Chen and Kung (2019)

Chen and Kung (2019), published in the Quarterly Journal of Economics, studies land corruption in China, with secondary results on meritocratic promotion. The main result is that local politicians provide price discounts on land sales to firms connected to Politburo members, and these local politicians are in turn rewarded with promotion up the bureaucratic ladder.

For provincial leaders, they find a strong effect of land sales on promotion for secretaries, but not for governors. In contrast, GDP growth strongly predicts promotion for governors, but not secretaries. They conclude that "the governor has to rely on himself for promotion, specifically by improving economic performance or GDP growth in his jurisdiction [...] only the provincial party secretaries are being rewarded for their wheeling and dealing".

They find similar results at the prefecture level: land deals predict promotion for secretaries, but not for mayors, while GDP growth predicts promotion for mayors, but not for secretaries. Overall, this supports the model of party secretaries being responsible for social policy, while governors (and mayors) are in charge of the economy, with performance on these tasks determining promotion.[10] Thus, at both province and prefecture levels, government leaders (governors and mayors) compete in a promotion tournament based on GDP growth,

[9] Note that the growth target (set by the provicial government for prefecture leaders to achieve) varies at the province-year level, and hence is collinear with the province-year fixed effect.

[10] Jia (2017) makes a similar point: "[Provincial secretaries'] major responsibilities include the implementation of the central government policies and social stability whereas governors' key duty is to promote growth." p.12 fn.15

while party secretaries do not.[11]

However, Chen and Kung (2019)'s results for prefecture mayors are questionable, because their promotion data seems to contain data-entry errors. In my data, the annual promotion rate varies from 5 to 30% (peaking in Congress years), while the Chen and Kung (2019) data never exceeds 15% and has six years where the promotion rate is less than 2%. Figure 2 compares the annual promotion rate from Chen and Kung to my own data as well as the data from Yao and Zhang (2015) and Li et al. (2019), where each paper uses a binary promotion variable. While the latter three sources broadly agree on the promotion rate, the Chen and Kung data is an outlier.

Neither the text nor the appendix in Chen and Kung (2019) discusses the data sources or specifically how the promotion variable was defined (e.g., what differentiates a transfer from a promotion), so it is not clear why their promotion rate differs so much from the rest of the literature. Without an explanation, this disagreement should lead us to be cautious in interpreting their results.

Furthermore, upon investigating this discrepancy, I discovered apparent data errors in their promotion variable. The annual promotion variable is defined to be 1 in the year a mayor is promoted, and 0 otherwise. However, out of the 201 cases with $Promotion = 1$, 124 occur before the mayor's last year in office (with the remaining 77 cases occuring in the last year). Moreover, this variable is equal to 1 multiple times per spell in 4% of leader spells. Table 4 calculates the sum of the promotion variable at the spell level. Out of 1216 spells, 51 (=16+12+18+5) have $Promotion = 1$ more than once per spell. For example, consider a mayor who is in office for five years and then promoted; the promotion variable should be 0 in the first four years, then 1 in the final year. However, the Chen and Kung data has spells where the promotion variable is, for example, 0 in the first two years, and 1 in the final three years.

Since the replication files include prefecture- but not mayor-level data, this error is not easy to detect; a sequence of 1's could reflect multiple mayors being promoted in their first year, rather than the same mayor being coded as promoted multiple times in the same spell. I obtained the raw mayor data from James Kung, and used it to generate a corrected annual promotion variable, which is 1 only in a mayor's final year in office (when the mayor is promoted). This data-coding error more than doubles the number of promotions. Figure 3 shows the original and corrected data, along with my promotion data. Since the Chen and Kung promotion rate is smaller than the rest of the literature, fixing the data errors in fact

[11] Note that the authors find a positive correlation between growth and promotion while using annual GDP growth rather than average cumulative growth; they also do not control for tenure, which in my data has a strong positive correlation with promotion.

makes the disagreement with the literature even more pronounced.

Next I test whether the Chen and Kung meritocracy result for prefecture mayors (reported in their Table IX) is driven by their promotion variable.[12] First, using the corrected promotion variable, I find that the results are mostly consistent, with a positive $p < 0.01$ coefficient on GDP growth in each regression (see Appendix Table 19). So the meritocratic effect found in Chen and Kung (2019) is not driven by the particular data error discussed above. However, it could still be driven by their promotion definition, which, as shown in Figures 2 and 3, differs sharply from the rest of the literature.

Hence, I re-estimate the effect of GDP growth on promotion with my own promotion data.[13] To focus on the effect of GDP growth, I omit all politician-defined covariates and include only the prefecture covariates (tax revenue growth rate, log GDP per capita, and log population). This is to avoid issues stemming from possible disagreements over the identity of mayor i in prefecture p in year t.[14] I also cluster standard errors at the prefecture level, because the original paper did not cluster. Finally, I restrict the sample size to match my promotion data; my data is missing a few prefectures in Tibet, which reduces the sample size from the original 2569 to 2549.

I estimate the following regression:

$$y_{ijpt} = \beta \cdot Growth_{ijpt} + \delta X_{jpt} + \theta_t + \gamma_j + \epsilon_{ijpt}. \tag{4}$$

The dependent variable is an ordered or dummy promotion variable, and prefecture covariates are included in X. As in the original specification, I include year (θ_t) and prefecture (γ_j) fixed effects.

Columns 1-2 of Table 5 present ordered probit and LPM results using the original Chen and Kung promotion data. Despite the above changes in specification and sample, the results are nearly identical to those in the original paper. For example, the Chen and Kung (2019) LPM coefficient on GDP growth is 0.365^{***}, compared to 0.379^{***} here (Column 2). Hence, the meritocratic effect reported in the original paper is not driven by politician covariates, small changes in the sample, or clustering standard errors.

[12] I provide a direct replication of Table IX in Appendix Table 18, where I perfectly reproduce the results in the original paper.

[13] Table IX estimates the effect of land sales, political connections, and GDP growth on promotion for prefecture mayors over 2004-2014. However, there are some discrepancies between the published table and the replication code. First, the table reports using data from 2004-2016, but the replication files only include data over 2004-2014. Second, while the authors report using robust standard errors, this is not implemented in the replication code. Third, the table reports using province fixed effects, but the replication code actually uses prefecture fixed effects.

[14] For example, if my data has mayor A in office, while their data records mayor B, then the age, education, and political connection variables will disagree.

To test whether the promotion variable is key to their results, I perform the same analysis using my own promotion data in Columns 3-4 of Table 5. I find that the coefficient on GDP growth is now negative and nonsignificant. This nonsignificance holds over three other versions of my promotion variable (using different definitions as in Chapter 1), as I show in Appendix Tables 20 - 22.

Hence, given these results and the disagreements over the promotion variable between Chen and Kung and the rest of the literature, I conclude that the positive growth-promotion correlation for prefecture mayors found in Chen and Kung (2019) was an artifact of their potentially flawed promotion variable. While offering an astute analysis of land corruption, Chen and Kung (2019) does not provide robust evidence that prefecture mayors are promoted meritocratically on the basis of GDP growth.

5 Landry et al. (2018)

Landry et al. (2018), published in *Comparative Political Studies*, tested the meritocratic promotion hypothesis at the provincial, prefecture, and county levels over 1999-2007. They find strong evidence for meritocracy at the county level, but not at the prefecture or province levels. They also find that politicial connections (defined as the 'patron connection' from Chapter 1) affect promotion most at the provincial level. (Following Jia et al. (2015), they also test for an interaction effect between growth and connections, but find no significant results.) They interpret their findings as demonstrating the loyalty-competence tradeoff faced by Chinese officials: county leaders are selected based on competence, since they do not pose a threat to central government officials; while prefecture and provincial leaders are selected based on connections and other non-performance factors, since competent but disloyal leaders, if promoted, could threaten the incumbent elites. Thus, the Chinese system can select for leaders who are both competent and loyal.

This paper follows the literature in using a linear probability model to estimate the effect of relative GDP growth on promotion.[15] In particular, they estimate the following model:

$$\begin{gathered} y_{ijpt} = \beta_1 Growth_{ijpt} + \beta_2 Connection_{it} + \\ \beta_3 Growth_{ijpt} \times Connection_{it} + X_{ijpt} + \delta_p + \gamma_t + \epsilon_{ijpt}. \end{gathered} \tag{5}$$

However, they depart from the literature in using spell-level data rather than a prefecture-year panel. Hence, they regress a promotion dummy on a leader's average GDP growth,

[15]The paper also tests for meritocracy using the growth rate of tax revenue as a measure of performance. Given my focus on GDP growth, I ignore these results here.

while the usual approach is to calculate a leader's cumulative average growth rate over their tenure. While Landry et al.'s null prefecture results are consistent with mine, for the sake of robustness I perform a reanalysis using a different specification. Next I re-analyze their Tables 5-6 using cumulative average growth in a jurisdiction-year panel instead of spell-level data; this includes results for province-, prefecture-, and county-level politicians.[16]

The results are presented in Tables 6 - 8. I find similar results, but they do not support the overall narrative in Landry et al. (2018). For provincial leaders, Landry et al. (2018) reported no effect of GDP growth for secretaries, and a strong negative effect for governors. They also found no effect of connections for secretaries, and a weak positive effect for governors. In my replication, I find similar null effects for secretaries, but I fail to match their governor results: using annual data, the strong negative effect of GDP growth becomes a precise zero, and while I find a positive correlation with connections, it is one-quarter the size and not statistically significant.

At the prefecture level, I confirm their original result of no growth-promotion correlation for either mayors or secretaries, which is again consistent with my Chapter 1 results. I find a very strong negative effect of connections on promotion, that disappears (entirely for secretaries and mostly for mayors) upon controlling for politician characteristics. This is because the connection variable is strongly correlated with tenure, and politicians are less likely to be promoted early in their term. (Note that in Chapter 1 I also found a weak negative effect of patron connections for mayors.)

I find somewhat consistent evidence that county leaders are promoted meritocratically. I find a very weak effect for secretaries, much smaller than in the original paper (0.008^{*} compared to 0.044^{***}). I find a slightly larger effect size for mayors (0.012^{**} compared to the original 0.037^{***}), but this average is masked by heterogeniety via a negative interaction with connections, contradicting the narrative from Jia et al. (2015) of connections being complementary to performance. Furthermore, while the original results suggest a weak positive effect of political connections for county mayors, I find a nonsignificant effect (after controlling for tenure, as with the prefecture results).

Thus, while the data in Landry et al. (2018) weakly supports the hypothesis of county-level meritocracy, it does not fit a simple model of a loyalty-competence tradeoff. Political connections do not become more important at higher levels; instead, they either have no effect on promotion (for county and province leaders, and prefecture secretaries) or have a weak negative effect (for prefecture mayors). However, the result of meritocratic promotion for county leaders does seem somewhat robust, as I find similar results when using annual panel data.

[16] Appendix Tables 23-25 provide direct replications of the original results.

6 Lorentzen and Lu (2018)

Lorentzen and Lu (working paper, 2018) is a recent contribution to the meritocracy literature. Drawing on the 2012 corruption crackdown, one section of their paper focuses on three high-ranking "Tigers" who were arrested for corruption. In particular, they study whether leaders were promoted non-meritocratically in the provinces associated with these Tigers during the years preceding the crackdown.[17] If true, a natural conclusion is that the corruption crackdown was motivated by actual corrupt behavior (rather than merely being a power grab by Xi Jinping).

The paper uses data on prefecture mayors and party secretaries over 2006-2012. In contrast to my preferred specification with annual data on cumulative average GDP growth, it uses spell-level data and average growth. Further, it restricts the sample to leaders with spells beginning after 2005 and ending before 2013. The authors run the following linear probability model[18]:

$$y_{ijp} = \beta_1 \cdot Growth_{ijp} + \beta_2 \cdot Growth_{ijp} \times Tiger_p + \delta X_{jp} + \theta Z_{ijp} + \gamma_p + \epsilon_{ijp}. \qquad (6)$$

Here the dependent variable is a promotion dummy, $Tiger_p$ is a dummy for Shanxi, Jiangxi, and Sichuan, X_{jp} is prefecture characteristics, Z_{ijp} is individual characteristics, and γ_p is a province fixed effect. The authors find that $\beta_1 > 0$ and $\beta_2 < 0$, with statistical significance at the 5% or 10% level.[19] Given that the Tiger provinces were the ones where high-ranking officials were arrested, this result supports the hypothesis that promotion was non-meritocratic in the Tiger provinces and meritocratic everywhere else.

Since this paper is still unpublished, there is no replication data that I can use to re-analyze its results. But I can test if its results are robust to using my own data (on prefecture mayors) and preferred specification. First, I run a similar regression using spell-level data and province fixed effects, while restricting the sample to 2006-2012 and using only leaders with spells beginning after 2005 and ending before 2013. As in my main results from Chapter 1, I add in leader and prefecture covariates in separate columns.

Table 9 presents my replication of the results from Table 4 of Lorentzen and Lu (2018).

[17] The three Tigers and their associated provinces are Su Rong (Jiangxi), Zhou Yongkang (Sichuan), and Ling Jihua (Shanxi).

[18] The paper also includes interactions between *Tiger province* and various other criteria for meritocratic promotion: experience in the provincial General Office, experience in other provincial departments, membership in the provincial Communist Youth League, as well as measures of political connections (shared college, hometown, and work history). Given my focus on GDP growth, I omit these variables here. In unreported results, I find no change when also controlling for *Connections* × *Tiger province*, using my own political connections variable.

[19] Their Table 4 is presented as Appendix Figure 13.

Column (3) contains my preferred specification, including leader and prefecture covariates. I find that β_1 and β_2 are always nonsignificant, and do not have the expected signs.[20] Since using spell-level data does not use annual variation and results in a small sample size (and large standard errors on the interaction term), I also test the 'Tiger province' hypothesis using annual data and my specification from Chapter 1 (with cumulative average GDP growth as the independent variable). The results are presented in Appendix Table 29, where I again find nonsignificant estimates of β_1 and β_2. Hence, my reanalysis of Lorentzen and Lu (2018) does not confirm their results. This could be driven by differing definitions of promotion, different control variables, or different samples. Without the original data, I cannot draw any firm conclusions about this disagreement.

Overall, I am not able to find evidence that the promotion of prefecture mayors was nonmeritocratic in Shanxi, Jiangxi, and Sichuan (and meritocratic elsewhere) prior to the 2012 corruption crackdown.

7 Historical meritocracy for provincial leaders?

In a forthcoming paper, Sheng (2020) finds that meritocratic promotion was implemented for provincial governors only during the Jiang Zemin era (1990-2002), and never for provincial secretaries. Sheng argues that Deng Xioping's 1992 "southern tour" solidified political support for economic reform, and in response Jiang Zemin pushed for liberalization and economic growth, ostensibly using meritocratic promotion of governors to achieve this goal. Sheng writes that "a clear-cut policy preference [by the central leadership] for economic growth *per se* seemed most discernable in the years presided over by Jiang Zemin, but largely absent in the other years due to either lack of elite policy unity or doubts over the wisdom of inordinate reliance on GDP growth." Hence, we should expect to find a correlation between growth and promotion only for governors, and only during the Jiang Zemin era.

Here I test this finding by replicating it using the data from Jia et al. (2015). There are several differences between the datasets. This dataset has a smaller sample, from 1993-2009, so I can only test for parts of the Jiang Zemin and Hu Jintao eras. Jia et al. (2015) measures GDP growth by subtracting the national average, then calculating the cumulative average over a leader's term. In contrast, Sheng (2020) does the same but additionally subtracts the average of provincial growth taken over all years prior to the year a leader takes office; this is to capture whether a leader's growth performance is superior to their predecessors. Furthermore, Sheng (2020) presents results from an ordered probit model.

[20] I repeat the same analysis using different promotion definitions in Appendix Tables 26 – 28.

Since the promotion variable in Jia et al. (2015) is binary, I can only run linear probability and probit models. Finally, the papers have different control variables, as well as different definitions of promotion.

With these caveats in mind, I replicate Table 2 from Sheng (2020) in Table 10 below. To mimic Sheng's results, I estimate linear probability models separately by governors and secretaries, as well as by era.[21] In contrast to Sheng's results, I find no positive and statistically significant effect for governors during the Jiang era. This null result may be explained by differences from Sheng (2020) in model specification, control variables, or sample periods. Future research should investigate which factors are driving the disagreement.

8 Meritocracy for county leaders?

Meritocratic promotion has been tested at the county level by two papers. Chen and Kung (2016) studies county secretaries over 1999-2008, and Landry et al. (2018) studies both mayors and secretaries over 1999-2007.

Chen and Kung (2016) analyzes the effect of land revenues on promotion. Here, I use their data to test for meritocratic promotion based on GDP growth. The original paper uses the annual growth rate of GDP per capita as the independent variable in linear probability and ordered logit models. I construct my preferred growth variable, the cumulative average of relative growth over a politician's tenure (relative to the prefecture average). This variable better captures the promotion tournament, where politicians are evaluated on their overall relative performance, rather than their growth rate in any one year. I omit the land revenue variables used in the original paper. My results are in Table 11. I find a positive coefficient on GDP growth, which is robust across multiple specifications.

I analyze the Landry et al. (2018) data in Table 12. The coefficient on *Growth* is statistically significant with no controls, but shrinks in magnitude when controlling for politician and county characteristics. Since they use GDP measured in standard deviations, but do not report summary statistics on GDP growth, I use the standard deviation (0.154) from Chen and Kung (2016) to normalize. The effect for secretaries is $0.008^{*}/0.154 = 0.052^{*}$, and the effect for mayors is the same, but nonsignificant. Comparing to the Chen and Kung (2016) secretary results from the LPM, we see that the coefficients are similar (0.071^{**} vs. 0.052^{*}). Some difference in coefficients is expected, as the regressions use different control variables and promotion definitions.[22] Despite this slight disagreement, I conclude that there is some

[21] I attempted to estimate probit and logit models, but found that they did not converge, due to small sample size.

[22] In the estimation samples, Chen and Kung (2016) has a promotion rate of 8.95% while Landry et al.

evidence for meritocracy at the county level.

To further test for consistency across datasets, I test for heterogeneous effects over time. Specifically, I split the sample into eras by General Secretary: Jiang Zemin (1999-2002) and Hu Jintao (2003-2008). The results for Chen and Kung (2016) are presented in Columns (4) and (8) of Table 11. I find a positive interaction effect (statistically significant only in the logit specification), indicating that meritocracy was stronger during the Hu era.

The results using the Landry et al. (2018) data are in Columns (3) and (6) in Table 12. I again normalize using the standard deviation from Chen and Kung (2016). The Landry et al. (2018) interaction effect for secretaries is $0.012/0.154 = 0.078$, somewhat close to the Chen and Kung (2016) LPM coefficient of 0.05 (although neither are statistically significant). I take this agreement as further evidence that the datasets are similar, and that there is a meritocratic promotion signal to be detected. The interaction effect for mayors is negative with similar magnitude ($-0.011/0.154 = -0.071$), though nonsignificant, indicating that mayors and secretaries were possibly treated differently during the Hu era.

Overall, I take these results as suggestive evidence for meritocratic promotion of county leaders. However, we should wait to see additional robustness checks before drawing firm conclusions. For example, future work should extend the sample period beyond 1999-2008, as well as test for robustness to different definitions of promotion.

9 Conclusion

The best-published papers studying meritocracy at the prefecture level do not provide robust evidence that prefecture leaders are promoted based on their performance in growing GDP. My null result in Chapter 1 is not contradicted by the literature, since the results in the literature are not robust to reasonable specification changes. Overall, I conclude that meritocratic promotion, at least at the prefecture level, does not explain China's rapid economic growth. However, we saw that county-level leaders do appear to be promoted meritocratically, using data from Chen and Kung (2016) and Landry et al. (2018). Hence, it is possible that meritocracy does exist in China, but only for county leaders.

So how should we think about meritocracy in China? Despite the mixed evidence for meritocratic promotion at the province and prefecture levels, it is still plausible that meritocracy has contributed to China's growth. County leaders are promoted meritocratically, directly incentivizing them to boost GDP growth. In particular, the high-ability county leaders are promoted to prefecture positions. But since prefecture leaders then consist only

(2018) has a rate of 13.5%.

of high-ability leaders, there isn't enough variation in ability to implement a prefecture-level promotion tournament based on GDP growth. In other words, range restriction prevents the Organization Department from implementing meritocratic promotion above the county level. Running a successful county-level tournament precludes prefecture and provincial tournaments. Hence, the Organization Department must use other criteria in determining promotions of prefecture and provincial leaders.[23]

Thus, county leaders are continuously incentivized to boost economic growth, and only leaders with demonstrated ability in this task are promoted to prefecture and provincial positions. While they are not directly incentivized, these higher-level leaders are selected based on their ability to grow the economy, and they supervise the county leaders in their jurisdiction. We can think of this as a version of partial meritocracy, in contrast to a 'maximal' version where leaders at all levels are incentivized through promotion tournaments. While the maximal version provides stronger incentives for boosting GDP growth, the partial version does generate some incentives as well. Hence, it seems reasonable to conclude that, meritocracy in fact does partly explain China's economic growth, giving an answer to the initial question that motivated these two chapters.

[23]However, as we have seen in my replication of Landry et al. (2018), it is not the case that higher-level leaders are promoted based on political connections, as in a simple model of a competence-loyalty tradeoff. Furthermore, as discussed in Chapter 1, the provincial literature finds inconsistent results for the effect of political connections. Shih et al. (2012) and Jia et al. (2015) provide evidence for a positive effect, while Fisman et al. (2020) finds a negative effect.

10 Tables and figures

Table 1: Direct replication of Table 4, Yao and Zhang (2015)

	(1)	(2)	(3)	(4)	(5)	(6)
			Threshold: 49	Threshold: 50	Threshold: 51	Threshold: 52
Leader effect	0.029	-1.262**	-0.107	-0.072	-0.113	-0.039
	(0.049)	(0.597)	(0.080)	(0.076)	(0.070)	(0.066)
Leader effect × Age		0.026**				
		(0.012)				
Age	-0.006***	-0.006***				
	(0.001)	(0.001)				
Provincial experience	0.051***	0.053***	0.052***	0.053***	0.054***	0.053***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Tenure	0.025***	0.025***	0.023***	0.023***	0.023***	0.024***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Leader effect × (Age > threshold)			0.234**	0.193*	0.311***	0.170
			(0.107)	(0.107)	(0.102)	(0.113)
Age > threshold			-0.045***	-0.038***	-0.043***	-0.049***
			(0.012)	(0.012)	(0.012)	(0.012)
Observations	4249	4249	4249	4249	4249	4249
Adjusted R^2	0.043	0.044	0.043	0.042	0.044	0.043

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Dependent variable is a promotion dummy. Province and year fixed effects. Standard errors are clustered at the prefecture level.

Table 2: Reanalysis of Table 4, Yao and Zhang (2015)

	(1)	(2)	(3) Threshold: 49	(4) Threshold: 50	(5) Threshold: 51	(6) Threshold: 52
Leader effect	0.033	-0.577	-0.030	-0.009	-0.066	-0.012
	(0.053)	(0.657)	(0.085)	(0.080)	(0.072)	(0.068)
Leader effect × Age		0.012				
		(0.013)				
Age	-0.006***	-0.006***				
	(0.001)	(0.001)				
Provincial experience	0.051***	0.051***	0.051***	0.052***	0.053***	0.052***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Tenure	0.025***	0.025***	0.023***	0.023***	0.023***	0.024***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Leader effect × (Age $>$ threshold)			0.111	0.081	0.223**	0.110
			(0.114)	(0.112)	(0.103)	(0.111)
Age $>$ threshold			-0.044***	-0.037***	-0.042***	-0.048***
			(0.012)	(0.012)	(0.012)	(0.012)
Observations	4249	4249	4249	4249	4249	4249
Adjusted R^2	0.043	0.043	0.043	0.042	0.043	0.043

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Dependent variable is a promotion dummy. Province and year fixed effects. Standard errors are clustered at the prefecture level.

Figure 1: Li et al. (2019), Table 5

Table 5. *Structural Estimation of Promotion Function for Prefectural Leaders.*

	(1)	(2)	(3)	(4)
Realised growth rate (annual)	0.014***	0.014***		
	(0.003)	(0.004)		
Realised growth rate (cumulative)			0.017***	0.017***
			(0.005)	(0.003)
GDP growth target faced	−0.081***	−0.084**	−0.079*	−0.085**
	(0.030)	(0.042)	(0.041)	(0.034)
GDP growth target made		−0.004		−0.004*
		(0.003)		(0.002)
Missing GDP growth target made		−0.476		−0.511
		(0.407)		(0.374)
Dummy for secretary	0.617	0.524*	0.629	0.476*
	(0.391)	(0.269)	(0.458)	(0.252)
Age	0.003	0.001	0.004	0.001
	(0.006)	(0.010)	(0.008)	(0.008)
Tenure	0.306***	0.359***	0.288***	0.376***
	(0.066)	(0.047)	(0.052)	(0.040)
College education	0.102	0.355***	0.159	0.368***
	(0.391)	(0.072)	(0.529)	(0.055)
Number of tournaments	517	517	517	517
Number of contestants	6441	6441	6441	6441
Log likelihood	−4.802	−4.772	−4.816	−4.769

Notes: All columns use 517 provincial-level tournaments over 27 provincial units (excluding four directly administered metropolitan areas: Beijing, Tianjin, Shanghai and Chongqing) from 2003 to 2014, including both prefectural secretaries and mayors.

Table 3: Replication of Table 5 in Li et al.(2019): LPM

	(1)	(2)	(3)	(4)
Growth rate (annual)	0.0276	-1.528		
	(0.148)	(1.103)		
Annual growth × target		14.95		
		(10.68)		
Growth rate (cumulative)			0.0689	-1.343
			(0.162)	(1.063)
Cumulative growth × target				13.68
				(10.20)
Observations	6441	6441	6441	6441
Adjusted R^2	0.157	0.157	0.157	0.157
Province-year FE	Yes	Yes	Yes	Yes

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Dependent variable is Promotion. Province-year fixed effects. Standard errors clustered at the prefecture level. Covariates: mayor/secretary fixed effect, *Age* and Age^2, *Tenure*, and *Education*.

Figure 2: Promotion rate: prefecture mayors

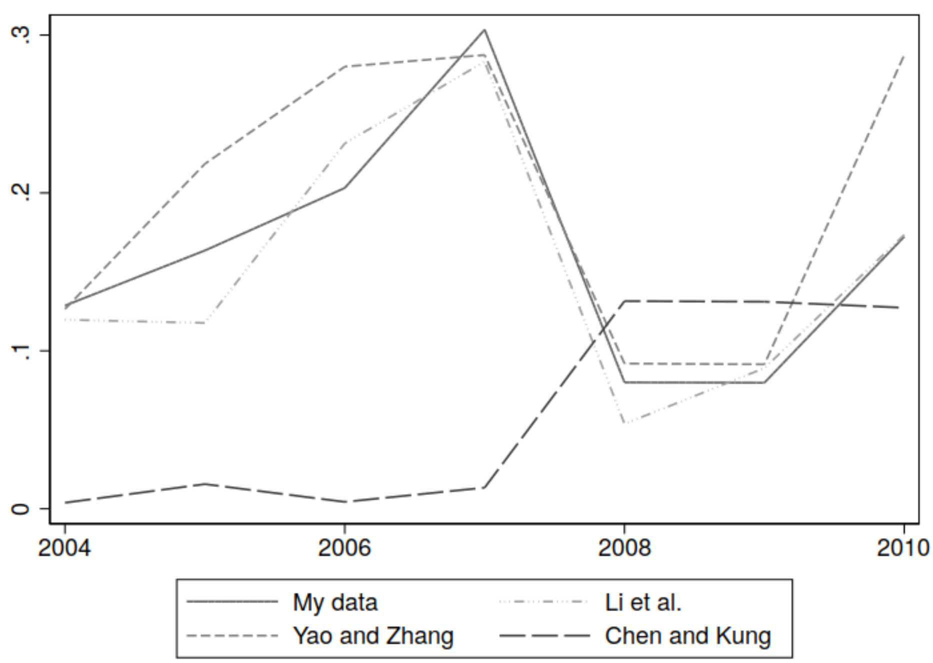

Table 4: Number of times $Promotion = 1$ by spell

Sum	0	1	2	3	4	5
Frequency	1129	36	16	12	18	5

Note: Spell-level data on prefecture mayors from Chen and Kung (2019).

Figure 3: Promotion rate: prefecture mayors

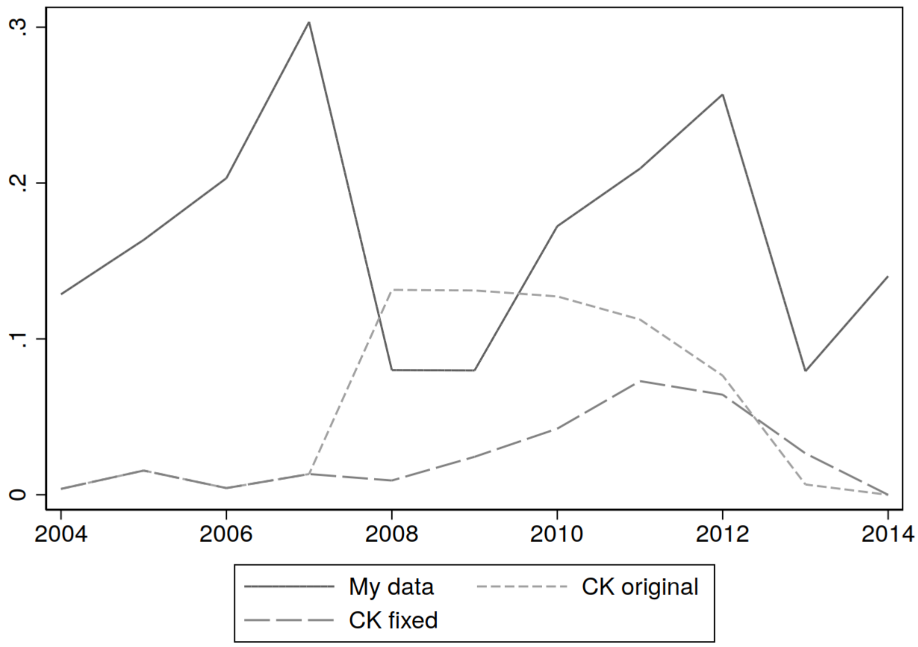

Table 5: Replication of Table IX, Chen and Kung (2019)

	Ordered probit (1)	LPM (2)	Ordered probit (3)	LPM (4)
GDP Growth	2.698**	0.379***	-0.303	-0.040
	(1.099)	(0.093)	(0.689)	(0.132)
Observations	2549	2549	2549	2549
Adjusted R^2		0.376		0.008

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Reanalysis of mayor results from Table IX in Chen and Kung (2019). Dependent variable is *Promotion*. Original promotion variable used in Columns 1-2; my promotion variable used in Columns 3-4. Prefecture and year fixed effects. Standard errors clustered at the prefecture level. Covariates: tax revenue growth, log GDP per capita, and log population.

Table 6: Provincial leaders, Landry et al. (2018)

	Secretary				Governor			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP growth	0.028	0.026	0.033	0.029	-0.015	-0.024	-0.018	-0.026
	(0.018)	(0.017)	(0.027)	(0.027)	(0.021)	(0.023)	(0.033)	(0.035)
Connection	0.013	0.016	0.012	0.016	0.060	0.055	0.060	0.055
	(0.028)	(0.031)	(0.029)	(0.032)	(0.042)	(0.048)	(0.042)	(0.048)
GDP $\times$ Connection			-0.008	-0.005			0.005	0.003
			(0.034)	(0.033)			(0.040)	(0.041)
Observations	249	249	249	249	251	251	251	251
Adjusted R^2	0.253	0.252	0.250	0.249	0.056	0.060	0.052	0.056
Politician covariates	No	Yes	No	Yes	No	Yes	No	Yes

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: *GDP growth* is the cumulative average of growth (relative to the national average) over a leader's term. Baseline controls include log (population), rural population percentage, log (brightness), log (distance to the higher level government), and the number of competitors at the same level of jurisdiction. Includes year fixed effects. Politician covariates include quadratics in age and years in office. Standard errors clustered at the province level.

Table 7: Prefecture leaders, Landry et al. (2018)

	Secretary				Mayor			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP growth	0.004	0.001	0.002	-0.003	0.009	0.011	0.016	0.016
	(0.007)	(0.007)	(0.013)	(0.013)	(0.009)	(0.009)	(0.019)	(0.018)
Connection	-0.055***	0.001	-0.055***	0.001	-0.093***	-0.035*	-0.093***	-0.035*
	(0.013)	(0.016)	(0.013)	(0.016)	(0.017)	(0.020)	(0.017)	(0.020)
GDP × Connection			0.003	0.006			-0.010	-0.007
			(0.014)	(0.014)			(0.021)	(0.021)
Observations	2229	2081	2229	2081	2237	2121	2237	2121
Adjusted R^2	0.133	0.163	0.133	0.162	0.132	0.161	0.131	0.160
Politician covariates	No	Yes	No	Yes	No	Yes	No	Yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: *GDP growth* is the cumulative average of growth (relative to the provincial average) over a leader's term. Baseline controls include log (population), rural population percentage, log (brightness), log (distance to the higher level government), and the number of competitors at the same level of jurisdiction. Includes year, province, and prefecture type fixed effects. Politician covariates include quadratics in age and years in office. Standard errors clustered at the prefecture level.

Table 8: County leaders, Landry et al. (2018)

	Secretary				Mayor			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP growth	0.012***	0.008*	0.018***	0.009	0.017***	0.012**	0.030***	0.026***
	(0.004)	(0.005)	(0.006)	(0.007)	(0.005)	(0.006)	(0.007)	(0.009)
Connection	-0.082***	-0.002	-0.082***	-0.002	-0.087***	0.014	-0.088***	0.014
	(0.006)	(0.009)	(0.006)	(0.009)	(0.007)	(0.011)	(0.007)	(0.011)
GDP $\times$ Connection			-0.012	-0.002			-0.025***	-0.025**
			(0.008)	(0.010)			(0.010)	(0.012)
Observations	13266	9838	13266	9838	14644	10084	14644	10084
Adjusted R^2	0.085	0.133	0.085	0.133	0.089	0.144	0.090	0.144
Politician covariates	No	Yes	No	Yes	No	Yes	No	Yes

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: *GDP growth* is the cumulative average of growth (relative to the prefecture average) over a leader's term. Baseline controls include log (population), rural population percentage, log (brightness), log (distance to the higher level government), and the number of competitors at the same level of jurisdiction. Includes year, prefecture, and county type fixed effects. Politician covariates include quadratics in age and years in office. Standard errors clustered at the county level.

Table 9: Nonmeritocratic promotion in Tiger provinces?

	(1)	(2)	(3)
GDP growth	-0.098	-0.118	0.314
	(0.620)	(0.648)	(0.673)
Growth × Tiger province	-0.170	-0.225	0.037
	(1.109)	(1.188)	(1.257)
Age		0.285**	0.318**
		(0.130)	(0.128)
Age squared		-0.003**	-0.003***
		(0.001)	(0.001)
Sex		0.093	0.108
		(0.094)	(0.089)
Home prefecture		-0.165	-0.170
		(0.106)	(0.107)
Connection		-0.043	-0.026
		(0.064)	(0.063)
Initial GDP			0.058
			(0.039)
Initial Population			0.110**
			(0.047)
Observations	421	418	418
Adjusted R^2	0.021	0.062	0.094
Province FE	Yes	Yes	Yes
Mayor covariates	No	Yes	Yes
Prefecture covariates	No	No	Yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: spell-level data for mayors with spells starting after 2005 and ending before 2013. *Tiger province* is a dummy variable for Shanxi, Jiangxi, and Sichuan. Standard errors clustered at the prefecture level.

Table 10: Provincial leaders: Jia et al. (2015)

	Governor (1) Jiang era	(2)	(3)	(4) Hu era	(5)	(6)	Secretary (7) Jiang era	(8)	(9)	(10) Hu era	(11)	(12)
GDP growth	0.368	0.827	0.535	0.790	-0.740	-1.904	0.086	-0.241	-0.231	-0.126	-0.431	-0.332
	(0.667)	(0.978)	(1.068)	(1.531)	(1.828)	(1.985)	(0.894)	(0.736)	(0.762)	(0.546)	(0.946)	(1.018)
Age		0.166	0.183*		-0.147	-0.189		-0.044	-0.030		0.155	0.217
		(0.108)	(0.091)		(0.182)	(0.175)		(0.118)	(0.116)		(0.125)	(0.149)
Age squared		-0.001	-0.002*		0.001	0.001		0.000	0.000		-0.001	-0.002
		(0.001)	(0.001)		(0.002)	(0.002)		(0.001)	(0.001)		(0.001)	(0.001)
Education		-0.019	-0.023		0.078	0.108		0.001	-0.006		-0.012	-0.007
		(0.120)	(0.132)		(0.141)	(0.114)		(0.048)	(0.041)		(0.056)	(0.069)
Central government experience		-0.082	-0.072		-0.021	-0.044		0.139***	0.142***		0.047	0.098*
		(0.078)	(0.085)		(0.116)	(0.096)		(0.038)	(0.036)		(0.041)	(0.049)
Ruling birth province		-0.071	-0.073		-0.146	-0.195**		0.021	0.028		-0.039	-0.047
		(0.066)	(0.076)		(0.086)	(0.078)		(0.058)	(0.059)		(0.073)	(0.062)
Growth during previous term		-0.641	-1.513		-2.378	-3.116		-0.044	-0.170		-2.677	-3.798
		(0.899)	(0.933)		(2.989)	(2.887)		(1.002)	(1.001)		(1.988)	(2.332)
Princeling			-0.164*			-0.460***			-0.173*			-0.122*
			(0.081)			(0.156)			(0.099)			(0.066)
Workplace connection			0.295***			-0.184*			-0.010			0.020
			(0.075)			(0.090)			(0.074)			(0.026)
Politburo connection			0.065			-0.213***			-0.059*			0.000
			(0.092)			(0.074)			(0.032)			(0.046)
Observations	266	265	265	212	212	212	273	272	272	215	214	214
Adjusted R^2	0.011	0.064	0.090	-0.047	0.004	0.074	0.180	0.228	0.223	0.054	0.128	0.127
Tenure and spell FEs	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: *GDP growth* is cumulative average relative GDP growth (relative to annual mean). Fixed effects for province and year. Standard errors clustered at the province level. The *Jiang era* covers 1993-2002, and the *Hu era* covers 2003-2009.

Table 11: County secretaries: Chen and Kung (2016)

	LPM				Ordered logit			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP growth	0.086***	0.068**	0.071**	0.044	1.168***	1.183***	1.206***	0.415
	(0.030)	(0.032)	(0.031)	(0.044)	(0.309)	(0.328)	(0.331)	(0.484)
Growth × Hu era				0.050				1.438**
				(0.059)				(0.648)
Age	0.008	-0.001	-0.004	-0.004	0.872***	0.815***	0.794***	0.799***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.218)	(0.220)	(0.219)	(0.220)
Age squared	-0.000	0.000	0.000	0.000	-0.010***	-0.010***	-0.009***	-0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)	(0.002)	(0.002)
Education	0.005***	0.005***	0.004**	0.004**	0.071***	0.069***	0.058***	0.058***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.019)	(0.020)	(0.020)	(0.020)
Initial GDP		0.001	0.001	0.001		0.057	0.053	0.053
		(0.006)	(0.006)	(0.006)		(0.060)	(0.060)	(0.059)
Initial tax revenue		0.031***	0.029***	0.029***		0.177***	0.160***	0.154***
		(0.006)	(0.006)	(0.006)		(0.055)	(0.056)	(0.056)
Initial population		0.003	0.002	0.002		0.097	0.096	0.101
		(0.006)	(0.006)	(0.006)		(0.064)	(0.065)	(0.065)
CYL secretary			0.028***	0.028***			0.328***	0.330***
			(0.009)	(0.009)			(0.099)	(0.099)
Shared workplace			0.049***	0.049***			0.512***	0.513***
			(0.007)	(0.006)			(0.071)	(0.071)
Shared hometown			0.104***	0.104***			0.762***	0.764***
			(0.017)	(0.017)			(0.113)	(0.113)
Observations	10208	9653	9653	9653	10609	10105	10105	10105
Adjusted R^2	0.096	0.099	0.113	0.113				

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: *GDP growth* is cumulative average relative GDP growth. LPM specification includes fixed effects for tenure and Prefecture × Year. Ordered logit specification includes fixed effects for tenure, Prefecture, and Year. *Initial X* variables are calculated during a politician's first year in office. Standard errors clustered at the prefecture level.

Table 12: County leaders: Landry et al. (2018)

	Secretary			Mayor		
	(1)	(2)	(3)	(4)	(5)	(6)
GDP growth	0.012***	0.008*	0.003	0.015***	0.008	0.013
	(0.003)	(0.005)	(0.007)	(0.004)	(0.006)	(0.008)
Growth × Hu era			0.012			-0.011
			(0.010)			(0.012)
Connection		-0.011	-0.011		-0.003	-0.003
		(0.014)	(0.014)		(0.019)	(0.019)
Age		-0.035**	-0.035**		0.033	0.033
		(0.016)	(0.015)		(0.035)	(0.035)
Age squared		0.000**	0.000**		-0.000	-0.000
		(0.000)	(0.000)		(0.000)	(0.000)
Tenure		0.065***	0.065***		0.127***	0.127***
		(0.012)	(0.012)		(0.012)	(0.012)
Tenure squared		-0.003	-0.003		-0.009***	-0.009***
		(0.002)	(0.002)		(0.002)	(0.002)
Initial population		0.033***	0.033***		0.016*	0.016*
		(0.007)	(0.007)		(0.009)	(0.009)
Observations	14380	9656	9656	15924	9845	9845
Adjusted R^2	0.154	0.198	0.198	0.178	0.245	0.245

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: *GDP growth* is cumulative average relative GDP growth. Fixed effects for county type and Prefecture × Year. *Initial population* is calculated during a politician's first year in office. Standard errors clustered at the prefecture level.

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A Literature characteristics

Table 13: Article characteristics

	Yao and Zhang (2015)	Li et al. (2019)	Chen and Kung (2019)	Landry et al. (2018)	Lorentzen and Lu (2018)
Sample period	1998-2010	2003-2014	2004-2014	1999-2007	2006-2012
Method	AKM leader effect	MLE	LPM, ordered probit	LPM	LPM
Data level	Annual	Annual	Annual	Spell	Spell
Mayor vs. secretary	Pooled	Pooled	Separate	Separate	Pooled
GDP growth	Annual	Annual, cumulative average	Annual	Average	Average
Reanalysis	Re-estimate leader effects dropping some controls	LPM, logistic	My promotion data	Annual data with cumulative average GDP growth	My promotion data; annual data with cumulative average GDP growth

B Yao and Zhang (2015)

Figure 4: Yao and Zhang (2015), Table 4

Table 4 The promotion equation: linear probability model

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Leader effect	0.0291	−1.262**	−0.116	−0.0819	−0.124	−0.0502
	(0.0661)	(0.613)	(0.0913)	(0.0859)	(0.0807)	(0.0765)
Leader effect × Age		0.0255**				
		(0.0120)				
Age	−0.00564***	−0.00559***				
	(0.00139)	(0.00139)				
Provincial experience	0.0509***	0.0526***	0.0418***	0.0423***	0.0441***	0.0434***
	(0.0121)	(0.0121)	(0.0115)	(0.0115)	(0.0115)	(0.0115)
Tenure	0.0246***	0.0247***	0.0212***	0.0211***	0.0215***	0.0220***
	(0.00303)	(0.00303)	(0.00282)	(0.00283)	(0.00284)	(0.00284)
	Age threshold:		49	50	51	52
Leader effect× (Age > threshold)			0.224**	0.184*	0.291***	0.156
			(0.105)	(0.103)	(0.102)	(0.105)

Figure 5: Yao and Zhang (2015), Table 4 (continued)

Table 4 continued

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Age > threshold			−0.0515***	−0.0457***	−0.0507***	−0.0574***
			(0.0115)	(0.0113)	(0.0112)	(0.0115)
Constant	0.277***	0.273***	0.00984	0.00391	0.00226	0.00101
	(0.0750)	(0.0749)	(0.0299)	(0.0298)	(0.0296)	(0.0295)
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Provincial FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4249	4249	4487	4487	4487	4487
R-squared	0.051	0.052	0.049	0.048	0.050	0.050

Standard errors are in parentheses. *, **, and *** indicate, respectively, significance at the 10 %, 5 % and 1 % significance level. The R-squared does not account for the contribution of the dummy variables

Figure 6: Yao and Zhang (2015), Table 5

Table 5 The promotion equation: ordered probit model

	(1)	(2)	(3)	(4)	(5)	(6)
Leader effect	0.115	−5.106**	−0.492	−0.383	−0.520*	−0.265
	(0.247)	(2.259)	(0.343)	(0.323)	(0.305)	(0.290)
Leader effect $\times$ age		0.103**				
		(0.0444)				
Age	−0.0544***	−0.0543***				
	(0.00526)	(0.00526)				
Provincial experience	0.161***	0.167***	0.177***	0.181***	0.190***	0.187***
	(0.0451)	(0.0452)	(0.0441)	(0.0442)	(0.0443)	(0.0444)
Tenure	0.0283**	0.0282**	0.000999	0.00361	0.00935	0.0135
	(0.0112)	(0.0112)	(0.0106)	(0.0107)	(0.0108)	(0.0108)
	Age threshold:		49	50	51	52
Leader effect $\times$ (Age $>$ threshold)			0.931**	0.806**	1.211***	0.702*
			(0.400)	(0.393)	(0.396)	(0.408)

Figure 7: Yao and Zhang (2015), Table 5 (continued)

Table 5 continued

	(1)	(2)	(3)	(4)	(5)	(6)
Age > threshold			−0.260***	−0.273***	−0.342***	−0.407***
			(0.0440)	(0.0434)	(0.0439)	(0.0455)
Cut 1	−4.044***	−4.040***	−3.959***	−1.441***	−1.431***	−1.444***
	(0.290)	(0.290)	(0.420)	(0.120)	(0.120)	(0.120)
Cut 2	−1.211***	−1.204***	−1.047**	1.327***	1.340***	1.344***
	(0.281)	(0.281)	(0.413)	(0.119)	(0.119)	(0.119)
Marginal effects[a] of "Leader effect × (Age > threshold)"			0.3678***	0.3181**	0.4746***	0.2725*
			(0.1582)	(0.1552)	(0.1552)	(0.1585)
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Province FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4189	4189	4271	4271	4271	4271

Standard errors are in parentheses. *, **, and *** indicate, respectively, significance at the 10 %, 5 % and 1 % significance level

[a] When calculating the marginal effects, other covariates are measured at their means

Figure 8: Yao and Zhang (2015), Table 6

Table 6 Joint estimations: the L–L model

Variables	(1)		(2)		(3)		(4)		(5)	
	Growth	Promotion	Growth	Promotion	Growth	Promotion	Growth	Promotion	Growth	Promotion
Log initial per capita GDP	−0.0314***		−0.0313**		−0.0313**		−0.0313**		−0.0313**	
	(0.0122)		(0.0122)		(0.0122)		(0.0122)		(0.0122)	
Log population	−0.186***		−0.186***		−0.186***		−0.186***		−0.186***	
	(0.0228)		(0.0228)		(0.0228)		(0.0228)		(0.0228)	
Inflation rate	−0.0077***		−0.0077***		−0.0077***		−0.0077***		−0.769***	
	(0.0484)		(0.0484)		(0.0484)		(0.0484)		(0.0484)	
Leader effect	Included	−1.722**	Included	−0.162	Included	−0.124	Included	−0.168*	Included	−0.0810
		(0.739)		(0.113)		(0.106)		(0.0993)		(0.0941)
Age		−0.0165***								
		(0.00167)								
Leader effect × Age		0.0350**								
		(0.0146)								
Age threshold:			49		50		51		52	
Leader effect × (Age>threshold)				0.304**		0.260**		0.391***		0.222*
				(0.131)		(0.129)		(0.129)		(0.133)

Figure 9: Yao and Zhang (2015), Table 6 (continued)

Table 6 continued

Variables	(1) Growth	Promotion	(2) Growth	Promotion	(3) Growth	Promotion	(4) Growth	Promotion	(5) Growth	Promotion
Age > threshold				−0.0821***		−0.0850***		−0.105***		−0.124***
				(0.0143)		(0.0141)		(0.0141)		(0.0145)
Provincial experience		0.0556***		0.0606***		0.0617***		0.0635***		0.0619***
		(0.0146)		(0.0146)		(0.0146)		(0.0145)		(0.0145)
Tenure		0.0110***		0.00315		0.00382		0.00539		0.00658*
		(0.00363)		(0.00353)		(0.00354)		(0.00355)		(0.00354)
Constant	1.732***	0.956***	1.729***	0.212***	1.729***	0.204***	1.729***	0.201***	1.730***	0.199***
	(0.212)	(0.0891)	(0.212)	(0.0413)	(0.212)	(0.0411)	(0.212)	(0.0409)	(0.212)	(0.0409)
LR test statistic	2189.64		2189.44		2188.14		2193.07		2186.66	
LR test p value	0.000		0.000		0.000		0.000		0.000	
Observations	5403		5403		5403		5403		5403	

Standard errors are in parentheses. *, **, and *** indicate, respectively, significance at the 10 %, 5 % and 1 % significance level

Figure 10: Yao and Zhang (2015), Table 7

Table 7 Joint estimation: the L-OP model

Variables	(1)		(2)		(3)		(4)		(5)	
	Growth	Promotion	Growth	Promotion	Growth	Promotion	Growth	Promotion	Growth	Promotion
Log initial per capita GDP	−0.0315***		−0.0313**		−0.0313**		−0.0313**		−0.0313**	
	(0.0122)		(0.0122)		(0.0122)		(0.0122)		(0.0122)	
Log population	−0.186***		−0.186***		−0.186***		−0.186***		−0.186***	
	(0.0228)		(0.0228)		(0.0228)		(0.0228)		(0.0228)	
Inflation rate	−0.768***		−0.769***		−0.769***		−0.769***		−0.769***	
	(0.0484)		(0.0484)		(0.0484)		(0.0484)		(0.0484)	
Leader effect	Included	−5.106**	Included	−0.508	Included	−0.398	Included	−0.534*	Included	−0.279
		(2.259)		(0.343)		(0.323)		(0.304)		(0.290)
Age		−0.0543***								
		(0.00526)								
Leader effect × Age		0.103**								
		(0.0444)								
Age threshold:			49		50		51		52	
Leader effect × (Age > threshold)				0.925**		0.798**		1.203***		0.694*
				(0.400)		(0.393)		(0.396)		(0.408)

Figure 11: Yao and Zhang (2015), Table 7 (continued)

Table 7 continued

Variables	(1) Growth	Promotion	(2) Growth	Promotion	(3) Growth	Promotion	(4) Growth	Promotion	(5) Growth	Promotion
Age $>$ threshold				−0.261***		−0.274***		−0.342***		−0.407***
				(0.0440)		(0.0434)		(0.0439)		(0.0455)
Provincial experience		0.167***		0.177***		0.181***		0.189***		0.187***
		(0.0452)		(0.0441)		(0.0442)		(0.0443)		(0.0444)
Tenure		0.0282**		0.000940		0.00356		0.00930		0.0135
		(0.0112)		(0.0106)		(0.0107)		(0.0107)		(0.0108)
Constant	1.733***		1.729***		1.729***		1.730***		1.730***	
	(0.212)		(0.212)		(0.212)		(0.212)		(0.212)	
LR test chi-sq	2189.20		2189.34		2188.10		2193.14		2186.76	
LR test p value	0.000		0.000		0.000		0.000		0.000	
Observations	5403		5403		5403		5403		5403	

Standard errors are in parentheses. *, **, and *** indicate, respectively, significance at the 10 %, 5 % and 1 % significance level

Table 14: Reanalysis of Table 5, Yao and Zhang (2015)

	(1)	(2)	(3) Threshold: 49	(4) Threshold: 50	(5) Threshold: 51	(6) Threshold: 52
Leader effect	0.105	-1.712	-0.197	-0.143	-0.323	-0.134
	(0.191)	(2.521)	(0.257)	(0.235)	(0.217)	(0.201)
Leader effect × Age		0.036				
		(0.051)				
Age	-0.054***	-0.054***				
	(0.005)	(0.005)				
Provincial experience	0.161***	0.162***	0.160***	0.164***	0.172***	0.169***
	(0.043)	(0.043)	(0.043)	(0.043)	(0.043)	(0.042)
Tenure	0.028**	0.028**	0.003	0.006	0.012	0.016
	(0.011)	(0.011)	(0.012)	(0.012)	(0.012)	(0.011)
Leader effect × (Age > threshold)			0.533	0.464	0.956**	0.530
			(0.393)	(0.395)	(0.386)	(0.439)
Age > threshold			-0.261***	-0.275***	-0.348***	-0.422***
			(0.041)	(0.040)	(0.042)	(0.047)
Observations	4189	4189	4189	4189	4189	4189
Adjusted R^2						

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Ordered probit model. Dependent variable is an ordered categorical promotion variable. Province and year fixed effects. Standard errors are clustered at the prefecture level.

Table 15: Reanalysis of Table 6, Yao and Zhang (2015)

	(1)	(2) Threshold: 49	(3) Threshold: 50	(4) Threshold: 51	(5) Threshold: 52
Leader effect	-0.588	-0.035	-0.015	-0.071	-0.017
	(0.640)	(0.096)	(0.091)	(0.086)	(0.082)
Leader effect × Age	0.012				
	(0.013)				
Age	-0.006***				
	(0.001)				
Provincial experience	0.051***	0.051***	0.052***	0.053***	0.052***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Tenure	0.025***	0.023***	0.023***	0.023***	0.024***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Leader effect × (Age > threshold)		0.112	0.082	0.224**	0.110
		(0.111)	(0.110)	(0.111)	(0.116)
Age > threshold		-0.044***	-0.037***	-0.042***	-0.048***
		(0.012)	(0.012)	(0.012)	(0.012)
Observations	5403	5403	5403	5403	5403

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Joint estimation of linear-linear model. Dependent variable is a dummy promotion variable. Province and year fixed effects. The original Yao and Zhang code incorrectly used a categorical promotion variable, instead of a dummy variable; however, this does not substantively affect the results.

Table 16: Reanalysis of Table 7, Yao and Zhang (2015)

	(1)	(2) Threshold: 49	(3) Threshold: 50	(4) Threshold: 51	(5) Threshold: 52
Leader effect	-1.714	-0.203	-0.145	-0.325	-0.137
	(2.367)	(0.357)	(0.338)	(0.320)	(0.306)
Leader effect × Age	0.036				
	(0.047)				
Age	-0.054***				
	(0.005)				
Provincial experience	0.162***	0.160***	0.164***	0.172***	0.169***
	(0.045)	(0.045)	(0.045)	(0.045)	(0.045)
Tenure	0.028**	0.003	0.006	0.012	0.016
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Leader effect × (Age > threshold)		0.543	0.467	0.958**	0.538
		(0.413)	(0.409)	(0.417)	(0.435)
Age > threshold		-0.261***	-0.275***	-0.348***	-0.422***
		(0.044)	(0.044)	(0.045)	(0.047)
Observations	5403	5403	5403	5403	5403

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Joint estimation of linear-ordered-probit model. Dependent variable is an ordered categorical promotion variable. Province and year fixed effects.

C Li et al. (2019)

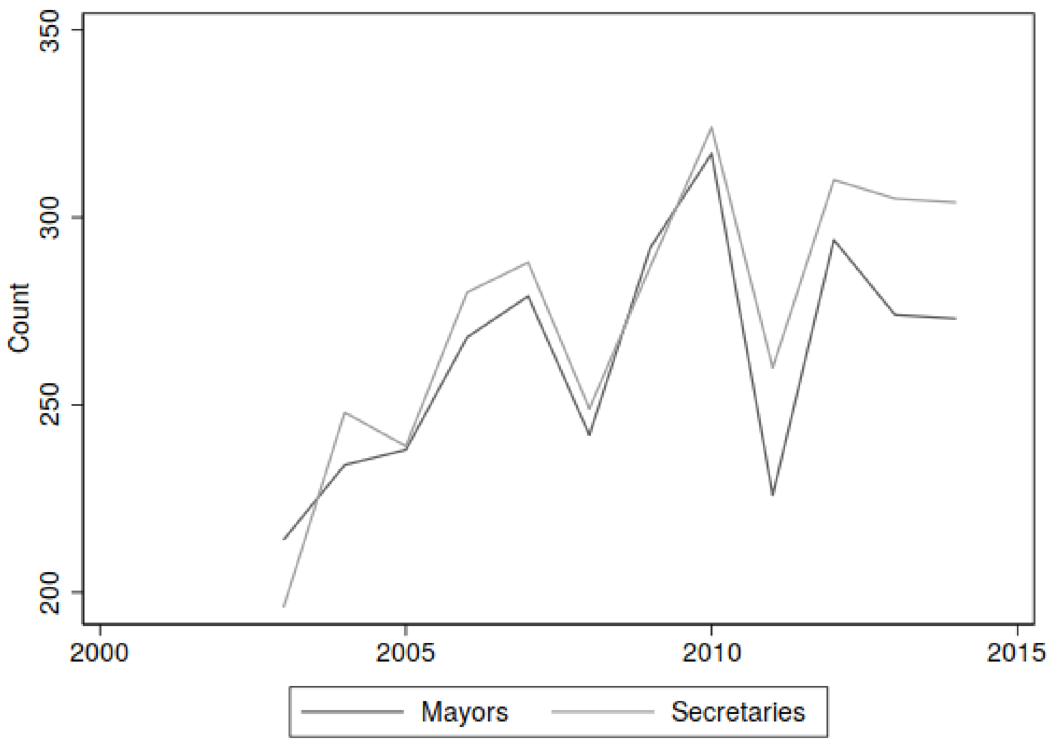
Table 17: Replication of Table 5 (Li et al., 2019): logit model

	(1)	(2)	(3)	(4)
Growth rate (annual)	0.172	-15.56*		
	(1.315)	(9.205)		
Annual growth × target		148.5*		
		(83.50)		
Growth rate (cumulative)			1.766	-8.445
			(1.802)	(10.48)
Cumulative growth × target				98.11
				(102.5)
Observations	4635	4635	4635	4635
Province-year FE	Yes	Yes	Yes	Yes

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Logit estimation of $Promotion_{ijpt} = \beta_1 Growth_{ijpt} + \beta_2 Growth_{ijpt} \times Target_{pt} + \lambda X_{ijpt} + \epsilon_{ijpt}$. Province-year fixed effects. Standard errors clustered at the province-year level. Covariates: mayor/secretary FE, *Age* and Age^2, *Tenure*, and *Education*.

Figure 12: Sample size: Li et al. (2019)



Note: There are 333 prefecture-level jurisdictions in China.

D Chen and Kung (2019)

Table 18: Verification of Table IX, Chen and Kung (2019)

	(1)	(2)	(3)	(4)
Princeling Purchase (=1)	0.093	-0.008		
	(0.108)	(0.011)		
Princeling Discounts			0.012	
			(0.008)	
Area of Land Purchased				0.000
				(0.047)
Factional Ties	-0.027	-0.014	-0.021	-0.026
	(0.101)	(0.010)	(0.101)	(0.101)
GDP Growth	2.798***	0.365***	2.726***	2.771***
	(0.761)	(0.076)	(0.761)	(0.770)
Tax Revenue Growth	1.097**	0.064	1.087**	1.074**
	(0.523)	(0.052)	(0.523)	(0.524)
Observations	2569	2569	2568	2568
Adjusted R^2		0.374		

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Direct replication of Columns 7-10 in Table IX in Chen and Kung (2019). Dependent variable is *Promotion*. Prefecture and year fixed effects. Standard errors are not clustered. Covariates: log GDP per capita, log population, Age and Age^2, and Education.

Table 19: Replication of Table IX, Chen and Kung (2019): corrected promotion variable

	(1)	(2)	(3)	(4)
Princeling Purchase (=1)	0.042	-0.018**		
	(0.127)	(0.009)		
Princeling Discounts			0.007	
			(0.009)	
Area of Land Purchased				0.025
				(0.054)
Factional Ties	0.135	-0.003	0.140	0.148
	(0.119)	(0.008)	(0.119)	(0.119)
GDP Growth	2.836***	0.223***	2.783***	2.759***
	(0.873)	(0.062)	(0.875)	(0.885)
Tax Revenue Growth	0.845	0.008	0.841	0.911
	(0.594)	(0.043)	(0.594)	(0.596)
Observations	2565	2565	2564	2564
Adjusted R^2		0.050		

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Reanalysis of Columns 7-10 in Table IX in Chen and Kung (2019). Dependent variable is *Promotion* from Chen and Kung, with data errors corrected. Prefecture and year fixed effects. Standard errors are not clustered. Covariates: log GDP per capita, log population, Age and Age^2, and Education.

Table 20: Replication of Table IX, Chen and Kung (2019): promotion definition 1

	Ordered probit	LPM
	(1)	(2)
GDP Growth	-0.346	-0.062
	(0.752)	(0.130)
Observations	2549	2549
Adjusted R^2		0.004

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Reanalysis of mayor results from Table IX in Chen and Kung (2019). Dependent variable is *Promotion* from my data, using definition 1. Prefecture and year fixed effects. Standard errors clustered at the prefecture level. Covariates: tax revenue growth, log GDP per capita, and log population.

Table 21: Replication of Table IX, Chen and Kung (2019): promotion definition 3

	Ordered probit	LPM
	(1)	(2)
GDP Growth	-0.432	-0.075
	(0.689)	(0.133)
Observations	2549	2549
Adjusted R^2		0.011

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Reanalysis of mayor results from Table IX in Chen and Kung (2019). Dependent variable is *Promotion* from my data, using definition 3. Prefecture and year fixed effects. Standard errors clustered at the prefecture level. Covariates: tax revenue growth, log GDP per capita, and log population.

Table 22: Replication of Table IX, Chen and Kung (2019): promotion definition 4

	Ordered probit	LPM
	(1)	(2)
GDP Growth	0.238	0.086
	(0.672)	(0.148)
Observations	2549	2549
Adjusted R^2		0.017

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Reanalysis of mayor results from Table IX in Chen and Kung (2019). Dependent variable is *Promotion* from my data, using definition 4. Prefecture and year fixed effects. Standard errors clustered at the prefecture level. Covariates: tax revenue growth, log GDP per capita, and log population.

E Landry et al. (2018)

Table 23: Direct replication: province leaders

	Secretary				Governor			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP growth	0.169**	0.136	0.168	0.087	-0.190***	-0.179***	-0.318***	-0.283***
	(0.082)	(0.080)	(0.137)	(0.124)	(0.067)	(0.064)	(0.114)	(0.101)
Connection	-0.001	-0.016	-0.001	-0.007	0.237*	0.216	0.258*	0.231*
	(0.082)	(0.059)	(0.086)	(0.067)	(0.133)	(0.134)	(0.130)	(0.131)
Growth × Connection			0.002	0.079			0.196	0.159
			(0.158)	(0.160)			(0.161)	(0.163)
Observations	65	65	65	65	67	67	67	67
Politician covariates	No	Yes	No	Yes	No	Yes	No	Yes

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Direct replication of Columns 1-4 in Tables 5-6 from Landry et al. (2018). Year fixed effects. Standard errors clustered at the province level. The governor results have one fewer observation than in the original, because *reghdfe* drops one singleton observation.

Table 24: Direct replication: prefecture leaders

	Secretary				Mayor			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP growth	0.025	0.016	0.017	0.010	0.020	0.017	0.003	0.001
	(0.032)	(0.034)	(0.042)	(0.042)	(0.032)	(0.032)	(0.043)	(0.045)
Connection	-0.016	0.030	-0.015	0.030	0.035	0.041	0.036	0.041
	(0.042)	(0.052)	(0.043)	(0.052)	(0.039)	(0.041)	(0.039)	(0.041)
Growth × Connection			0.020	0.015			0.038	0.037
			(0.064)	(0.066)			(0.061)	(0.061)
Observations	663	605	663	605	772	725	772	725
Politician covariates	No	Yes	No	Yes	No	Yes	No	Yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Direct replication of Columns 5-8 in Tables 5-6 from Landry et al. (2018). Province and year fixed effects. Standard errors clustered at the prefecture level. Each regression has one fewer observation than in the original, because *reghdfe* drops one singleton observation.

Table 25: Direct replication: county leaders

	Secretary				Mayor			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP growth	0.041***	0.044***	0.048***	0.047***	0.035***	0.037***	0.041***	0.046***
	(0.011)	(0.014)	(0.014)	(0.017)	(0.010)	(0.012)	(0.013)	(0.016)
Connection	-0.056***	-0.014	-0.056***	-0.014	0.048***	0.033*	0.048***	0.032*
	(0.018)	(0.023)	(0.018)	(0.023)	(0.015)	(0.019)	(0.015)	(0.019)
Growth × Connection			-0.020	-0.010			-0.014	-0.022
			(0.024)	(0.030)			(0.020)	(0.023)
Observations	4648	3438	4648	3438	5623	3844	5623	3844
Adjusted R^2	0.096	0.094	0.096	0.094	0.040	0.050	0.040	0.050
Politician covariates	No	Yes	No	Yes	No	Yes	No	Yes

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Direct replication of Columns 5-8 in Tables 5-6 from Landry et al. (2018). Prefecture and year fixed effects. Standard errors clustered at the county level. The sample size is smaller than in the original, because *reghdfe* drops singleton observations.

F Lorentzen and Lu (2018)

Figure 13: Lorentzen and Lu (2018), Table 4

Table 4: Promotion patterns at the prefectural level [a]

	D.V. Promotion (1=Yes; 0=No)			
	(1)	(2)	(3)	(4)
Provincial General Office	0.156**	0.214***	0.208***	0.207***
	(0.0732)	(0.0711)	(0.0710)	(0.0709)
Other provincial departments	0.0709	0.0901*	0.0887*	0.0891*
	(0.0455)	(0.0510)	(0.0501)	(0.0498)
Provincial Communist Youth League (CYL)	0.0466	0.0873	0.0845	0.0850
	(0.0772)	(0.0903)	(0.0891)	(0.0888)
Tiger territories * Provincial General Office		-0.550***	-0.556***	-0.560***
		(0.166)	(0.171)	(0.160)
Tiger territories * Other provincial departments		-0.235***	-0.249***	-0.245***
		(0.0603)	(0.0552)	(0.0585)
Tiger territories * Provincial CYL		-0.414*	-0.415*	-0.471**
		(0.206)	(0.215)	(0.207)
Relative GDP growth rate			0.0182	0.0243**
			(0.0114)	(0.0114)
Tiger territories * Relative GDP growth rate				-0.0875**
				(0.0352)
Control variables	Y	Y	Y	Y
Provincial FE	Y	Y	Y	Y
Observations	549	549	548	548
R-squared	0.188	0.206	0.208	0.212

[a] Control variables are ln(age), squared ln(age), gender, ln(tenure), positions (prefectural party secretary or mayor), and the dummy of provincial capital city. The prefectural city of Aba(zhou) is dropped from the sample in columns (3) and (4) because the 2008 Sichuan earthquake was a major negative shock to its GDP. Robust standard errors are in parentheses, clustered at the provincial level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 26: Nonmeritocratic promotion in Tiger provinces? Promotion definition 1

	(1)	(2)	(3)
GDP growth	1.322*	1.415*	1.651**
	(0.722)	(0.724)	(0.757)
Growth × Tiger province	-1.515	-1.739	-1.429
	(1.192)	(1.199)	(1.265)
Age		0.526***	0.555***
		(0.119)	(0.119)
Age squared		-0.005***	-0.006***
		(0.001)	(0.001)
Sex		0.062	0.069
		(0.093)	(0.088)
Home prefecture		-0.002	0.018
		(0.117)	(0.113)
Connection		-0.011	0.003
		(0.064)	(0.062)
Initial GDP			0.011
			(0.041)
Initial Population			0.110**
			(0.049)
Observations	423	416	416
Adjusted R^2	0.049	0.108	0.130
Province FE	Yes	Yes	Yes
Mayor covariates	No	Yes	Yes
Prefecture covariates	No	No	Yes

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: spell-level data for mayors with spells starting after 2005 and ending before 2013. *Tiger province* is a dummy variable for Shanxi, Jiangxi, and Sichuan. Standard errors clustered at the prefecture level.

Table 27: Nonmeritocratic promotion in Tiger provinces? Promotion definition 3

	(1)	(2)	(3)
GDP growth	0.404	0.484	0.721
	(0.696)	(0.767)	(0.744)
Growth × Tiger province	-0.186	-0.452	-0.017
	(1.356)	(1.391)	(1.441)
Age		0.272**	0.294**
		(0.134)	(0.132)
Age squared		-0.003**	-0.003**
		(0.001)	(0.001)
Sex		0.114	0.132
		(0.089)	(0.086)
Home prefecture		-0.134	-0.206*
		(0.111)	(0.110)
Connection		-0.050	-0.040
		(0.065)	(0.064)
Initial GDP			0.069*
			(0.039)
Initial Population			0.102**
			(0.046)
Observations	423	416	416
Adjusted R^2	0.020	0.050	0.077
Province FE	Yes	Yes	Yes
Mayor covariates	No	Yes	Yes
Prefecture covariates	No	No	Yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: spell-level data for mayors with spells starting after 2005 and ending before 2013. *Tiger province* is a dummy variable for Shanxi, Jiangxi, and Sichuan. Standard errors clustered at the prefecture level.

Table 28: Nonmeritocratic promotion in Tiger provinces? Promotion definition 4

	(1)	(2)	(3)
GDP growth	0.303	0.394	0.487
	(0.614)	(0.628)	(0.624)
Growth × Tiger province	-0.494	-0.575	-0.298
	(1.398)	(1.266)	(1.303)
Age		0.352**	0.373**
		(0.149)	(0.149)
Age squared		-0.004**	-0.004**
		(0.001)	(0.001)
Sex		0.073	0.081
		(0.079)	(0.079)
Home prefecture		0.016	0.003
		(0.075)	(0.083)
Connection		-0.040	-0.034
		(0.055)	(0.055)
Initial GDP			0.042
			(0.032)
Initial Population			0.053
			(0.039)
Observations	423	416	416
Adjusted R^2	-0.002	0.016	0.020
Province FE	Yes	Yes	Yes
Mayor covariates	No	Yes	Yes
Prefecture covariates	No	No	Yes

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: spell-level data for mayors with spells starting after 2005 and ending before 2013. *Tiger province* is a dummy variable for Shanxi, Jiangxi, and Sichuan. Standard errors clustered at the prefecture level.

Table 29: Tiger provinces: cumulative average GDP growth

	(1)	(2)	(3)	(4)	(5)	(6)
GDP growth	-0.129	-0.061	-0.002	-0.178	-0.231	-0.156
	(0.148)	(0.152)	(0.158)	(0.211)	(0.201)	(0.200)
Growth × Tiger province	0.028	0.200	0.229	0.103	0.239	0.261
	(0.330)	(0.316)	(0.327)	(0.381)	(0.376)	(0.376)
Age		0.175***	0.181***		0.236***	0.247***
		(0.041)	(0.041)		(0.075)	(0.075)
Age squared		-0.002***	-0.002***		-0.002***	-0.003***
		(0.000)	(0.000)		(0.001)	(0.001)
Sex		0.014	0.017		0.013	0.008
		(0.033)	(0.033)		(0.043)	(0.044)
Home prefecture		-0.082***	-0.072**		-0.081**	-0.070*
		(0.028)	(0.030)		(0.040)	(0.042)
Connection		-0.037	-0.037		-0.025	-0.020
		(0.030)	(0.030)		(0.049)	(0.049)
Initial GDP			-0.032**			0.017
			(0.013)			(0.022)
Initial Population			0.041***			0.008
			(0.016)			(0.023)
Observations	2198	2164	2156	1062	1060	1060
Adjusted R^2	0.094	0.169	0.170	0.282	0.300	0.299
Province-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Mayor covariates	No	Yes	Yes	No	Yes	Yes
Prefecture covariates	No	No	Yes	No	No	Yes

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Columns (1)-(3) restrict the sample to 2006-2012. Columns (4)-(6) further restrict the sample to mayors with spells starting after 2005 and ending before 2013. *Tiger province* is a dummy variable for Shanxi, Jiangxi, and Sichuan. Standard errors clustered at the prefecture level.