Women in power: Female city leaders and regional economic development in China

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Abstract

This paper investigates whether female leadership leads to significantly different outcomes in terms of economic development, financial leverage, sectional employment, and social issues. By using data mining and machine learning text analysis algorithm, we collect 994 Chinese prefectural city party secretaries' resume data and their 270,202 news reports with 281 prefectural cities economy data from 2006 to 2016. We find that cities governed by female municipal secretaries are associated with weaker economic performance in terms of GDP growth rate, fixed asset investment as well as real estate growth. Female leaders tended to undertake significantly less leverage, indicated by less loan, lower loan-deposit ratio and lower employment growth in the finance industry. However, female leadership appears to promote employment in the culture and education industries, and improve the medical facility, education, and environmental protection during their jurisdiction. The text analysis of municipal secretary's news provides direct evidence of female municipal secretary's personal characteristics of greater compassionate, higher environmental awareness, lower aggressiveness, and higher reliability. The results remain robust after a series of endogenous and alternative hypotheses tests. Our study sheds a light on the potential inception of behavioral regional economics, and prominently improves the text analysis algorithm by identifying the people's actions and wills.

Keywords: Gender, Female Government Leader, Economic Development, Behavioral Regional Economics

1. Introduction

Leadership is a gendered concept. In recent years, a great deal of attention in economics, both empirical and experimental, has focused on understanding the role of women as leaders. Several empirical studies find evidence that the gender of the leaders affects policy decisions and outcomes in earnings quality (Krishnan and Parsons, 2008; Faccio et al, 2016), stock trading behavior (Barber and Odean, 2001), the mutual fund industry (Dwyer et al, 2002), start-up firms (Verheul and Thurik, 2001), mergers and acquisitions (Levi et al, 2014) and cooperate performance in competitive environments (Amore and Garofalo, 2016), etc. They find female leaders are more risk-averse, prudential and reluctant to engage in tournaments-like competitive interactions (Croson and Gneezy, 2009). Several experimental studies suggest that the choices women make once in power may be more socially oriented than those of men (Eckel and Grossman, 1998; Andreoni and Vesterlund, 2001; Gneezy et al., 2003). However, the current studies on gender differences of leadership are either utilizing the public economic or financial data to prove the potential connection between female leaders and their performance as the CEO, director or executive; or relying on survey measures or laboratory experiments, focusing on the female leaders' decision making and risk-taking.

Both previous studies have their merits, as well as drawbacks. For instance, gender is an intrinsic and steady demographic feature; it's almost impossible to evaluate the different extent of feminine characteristics or presume a large scale of exogenous change across female leaders, therefore, the endogenous problem in the current empirical studies of gender heterogeneities is hard to settle. On the other hand, the gender-related experimental studies may encourage participants to reproduce their conventional assumptions about appropriate, normative behaviors for men and women and thus, the findings may end up reinforcing common gender stereotypes even more sever (Rhode, 2003).

We contribute to the female leadership literature by introducing the behavior and thought analysis of leaders we proposed, into empirical studies. By using data mining and machine learning text analysis algorithm, we collect 994 Chinese prefectural city party secretaries' resume data and their 270,202 news reports over 643 newspapers from 2006 to 2016. Togethering with 281 prefectural cities economy data from various resources, we present not only a comprehensive analysis of female municipal secretary's impact on various aspects of economic development, but also a vivid portrait about the gender differences in management style and development preference among female and male local government leaders in China. Therefore, both the endogenous problem in empirical studies and arbitrary problem in experimental studies have been settled by the direct evidence of female leaders' action and talk from their substantial news reports.

We choose to set up our study in China, since the power of the key decision-maker in local government is believed as more centralized and distinguished than other countries. Different from the official governance system in western countries, the

Chinese subordinate level regional leaders have ultimate authority in political decision making since China's highly top-down political structure (Xu, 2011). In modern Chinese politics, a Party Committee Secretary, commonly translated as Party Secretary, party chief, is the leader of the Communist Party of China (CPC) organization in a province, city, county, or other administrative regions. The Communist Party is responsible for the formulation of policies, and the government is responsible for its day-to-day execution. At every level of jurisdiction, the party secretary is the de facto highest official, and the governor (province) / mayor (city) / magistrate (county) is the second-highest-ranking official and serves alongside the party secretary. We then focus our analysis of female government leaders on the municipal party secretary (we use municipal secretary for short) level. Because compared to the mayor, the municipal secretary is the ultimate decision-maker and possesses the supreme power in a city in China's regional politic system. The female mayor is highly possibly subject to the male municipal secretary in the patriarchal society of China. Therefore, we believe the female municipal secretary in China can fully display their will during their jurisdiction in the city, and the gender difference between female and male municipal secretary in China is more prominent and exogenous in this setting.

In this paper, firstly, we find the city with female municipal secretary grows more slowly and invest less in fixed assets. The weaker economy performance may origin from the female municipal secretary's lower intention in developing real estate investment and construction land. Secondly, the city with female municipal secretary has lower employment in the finance industry, a lower loan-deposit ratio and less likely to issue debt, which indicates the female municipal secretary undertakes significantly less regional leverage and financial risk. Thirdly, we find that the female municipal secretary has a significantly negative impact on the annual growth rate of the employment in agriculture and mining industry, but the significant positive influence on the annual growth rate of the employment in culture, sports and entertainment; and education. Fourthly, we find female municipal secretary is much more likely to increase the hospital number, the total number of books in the public library, the number of students in primary school, and the area of green space. At last, in the text analysis of municipal secretary's news, we find female municipal secretary participates in more comforting and visiting local citizen activities; less likely expresses the economy opinion, whereas more likely expresses the environment, and culture opinion; less likely to use the aggressive and ambiguous word. These results (e.g. improving the medical facility, education, and environment protection), to some extent, reflect that women more compassionate than men (Kahn, 1992) and thus make their focus points on regional development more humane care.

We conduct a series of additional tests to rule out any lingering concerns: At first, by introducing the year dummies of pre-her-jurisdiction and post-her-jurisdiction, we perform the parallel test of female municipal secretary's inauguration and departure Difference-in-Difference (DID) study, and prove that the city has no significant difference in GDP growth, land auction and financial leverage before and after female municipal secretary's jurisdiction. Second, we use the Probit model of the municipal secretary's delegation and demonstrate that there is no significant difference in the

initial state of GDP growth, investment, real estate, and finance development before the female municipal secretary's delegation. Third, the dismission of the corrupt officer is sudden and unexpected, since the Chinese national government possesses the ultimate powers of appointment, evaluation, promotion, and dismissal of its subordinate level regional leaders (Xu, 2011). We consider the sub-sample of the sudden departure municipal secretary's successors as an exogenous group to further identify the effect of female municipal secretaries, and we find female municipal secretary is unenthusiastic to increase the regional leverage and the GDP growth rate even with a shorter tenure after the predecessors' sudden departure. Fourth, we also test the propensity of female municipal secretaries getting promotion and bribe. The results suggest female municipal secretaries are very hard to get promotion, they also have less propensity of bribe comparing with the male counterparts which are consistent with their risk-averse attitude. The lower expectation of career promotion for female secretaries may lead to less intention in joining the "Regional Tournament Competition" (defined by Chen et al., 2005; Li and Zhou, 2005). They can decline the competitive impulse and develop the sector they care, such as: medication, education and environment protection. The results are still robust after the 2SLS and PSM tests. The female municipal secretaries, therefore, seem to be more compassionate, reliable and humane compared with the male counterparts.

We believe we make the following prominent contributions in this paper: At first, we initially propose behavior and thought analysis through data mining and machine learning text analysis algorithm in politicians' news reports. With a series of sophisticated and technology advanced algorithms such as, the hidden Markov models (HMMs) to tokenize the test and tag the Part-of-Speech (POS) of each word; the Cascaded Linear Model (CLM) with the perceptron algorithm to identify the name and action of government leaders in each news; the Convolutional Neural Networks (CNN) model to classify the government leaders' opinions, we largely improve the utilization and comprehension of formal text materials, i.e. politician news, which is a promising direction for future text analysis studies to provide more direct evidence on people's actions and wills, should substantially improve the reliability and authenticity of people related empirical studies. Secondly, we firstly introduce the gender leader related theories in behavioral finance into regional economics. We find that the heterogeneities in regional government leaders can generate an enormous heterogeneous impact on regional economic development as well as the leaders' heterogeneities in the firm. Gender is an intuitive and apparent demographic feature. There are numerous personal traits of government leaders waiting to test in the future regional economics studies, such as working backgrounds, traumatic experiences, professional skills, and so on. Thirdly, our study also shed a light on the counterfactual evidence of the "Regional Tournament Competition" in the Chinese regional politic system. When a group of regional government leaders with clear expectations of the low propensity of promotion, i.e. the female municipal secretary, they will decrease the competitive behavior, refuse the temptation of bribe and develop the sector they care to ensure a decent retirement. This suggests, even in the background of fierce regional government competition, the regional government leaders in China still have the choice to perform their best interests.

This counterfactual evidence is important not only for understanding the politicians' behavior and thought theoretically, but also for personnel appointment in government system practice in China.

The rest of the paper proceeds as follows: the second section develops our motivation and hypotheses; the third describes the data source and machine learning test analysis algorithm; the fourth section presents the empirical result and analysis; the fifth section is the text analysis of municipal secretaries' agenda, concern, and personality; the sixth section is the robustness check of the identification and alternative hypothesis. The last is the conclusion and discussion.

2. Literature Review

2.1 Gender differences in leadership and performance

Numerous literature has observed gender differences in leadership. There are two undisputed facts concerning female leaders. First, female leaders are few. When Katherine Graham became the first woman CEO of a Fortune 500 firm (The Washington Post Co.) in 1972, she represented just 0.2% of that population (Mohan, 2014). Forty two years later, in 2014, only 4.8% of the Fortune 500 are led by women (Faccio et al., 2016), which is interestingly coincident with the 4.4% female municipal secretary share across 994 municipal secretaries in 281 prefectural cities from 2006-2016 in China. Second, women are more risk-averse than men in the vast majority of environments and tasks, as well as they become leaders (Byrnes et al., 1999; Eckel and Grossman, 2008; Croson and Gneezy, 2009). However, whether female leaders' scarcity and risk-averse attitude towards a better performance is a rarely explored empirical question without a unanimous answer.

Most of the previous female leaders' performance literature focuses on the firm growth and value (Carter, Simkins, & Simpson, 2003; Erhardt, Werbel, & Shrader, 2003). A thread of these literature studies the female leaders' heterogeneous impact on star-up and SMEs. The results show that women entrepreneurs are more risk-averse than male entrepreneurs and this makes women entrepreneurs be less inclined to access the external source of funds (Sexton and Bowman-Upton, 1990; Orhan, 2001; Watson, 2006; Coleman and Robb, 2009; Hulten 2012). Therefore, female-owned firms are generally smaller (in terms of both profit and assets) than male-owned firms (Cliff, 1998; Watson, 2002). The women-owned businesses do not grow as quickly as those owned by men, and women-owned SMEs have less external capital when compared to male-owned SMEs. (Coleman and Robb, 2009; Hulten 2012). To explain this, it has been argued that loan applications from women owners are relatively more likely to be rejected due to discrimination (Fay and Williams, 1993; Verheul and Thurik, 2001). Robb and Wolken (2002) argue that gender-based differences in loans may be driven by demand rather than supply, female-owned firms are significantly less likely to use commercial banks for their financial services. Female-owned firms report relatively lower levels of leverage as compared to male-owned firms (Watson, 2006). Whereas,

lower leverage in women-owned start-ups also display a higher likelihood of survival (Weber and Zulehner, 2010).

The star-up and SMEs studies show the female leaders' negative influence on the growing speed of their pre-mature companies, because of their risk-averse attitude to credit allocation and external finance. However, the female leaders' influence is more controversial when we investigate the female leaders' performance in mature and public-listed companies. Using a sample of 300 Fortune 1000 firms, Farrell and Hersch (2005) find a positive correlation between females on corporate boards and return on assets. Dwyer et al. (2003) find that gender diversity in management could enhance performance for firms seeking growth. Smith et al. (2006), using a sample of Danish firms, also document a positive gender-firm performance effect concerning a variety of accounting-based performance measures. Krishnan and Parsons (2008) use Fortune 500 companies' data and find that firms with gender diversity in senior management are associated with higher earnings quality. Gul et al. (2011) find gender diversity improves stock price informativeness through the mechanism of increased public disclosure in large firms and by encouraging private information collection in small firms. Liu et al. (2014) find that firm performance is positively related to board gender diversity, especially to the presence of female executive directors, over 2000 listed Chinese firms for the period 1999–2011. Examining M&A data for S&P 1500 companies, Levi et al. (2014) find that firms with female directors are less likely to make acquisitions, and if they do, they pay lower bid premiums. Based on Amadeus Top 250,000 companies' data in Europe, Faccio et al (2016) find firms run by female CEOs have lower leverage, less volatile earnings, and a higher chance of survival than otherwise similar firms run by male CEOs.

However, a thread of literature also documents female leaders' negative influence on the mature or public-listed firms. Using Fortune 500 firms during the 1990s, Farrell and Hersch (2005) show that there is no wealth effect associated with the announcement of a female director being added to the board. Campbell and Minguez-Vera (2008), based on a sample of Spanish firms, find no clear relationship between female board representation and corporate value, while Adams and Ferreira (2009) provide evidence that CEO turnover correlates more strongly with poor performance when the board of directors is more gender-diverse. Haslam et al. (2010) find that there is no association between female directors among the FTSE 100 companies in the UK and measurement of operating performance (return on assets and return on equity), while there is a negative association between women's presence on boards and stock market performance. Ahern and Dittmar (2012) document that the introduction of mandatory board member gender quotas led to an increase in acquisitions and performance deterioration in Norwegian publicly traded firms. Huang and Kisgen (2013) find the firm with female top executives grow more slowly and are less likely to make acquisitions or issue debt. Matsa and Miller (2013) further show that the presence of more female directors on Norwegian corporate boards is associated with fewer employee layoffs, higher labor costs, and lower profits.

Although there is no unanimous agreement on the female leaders' influence of firm performance yet, the female leadership characteristics of higher risk-aversion (Sexton

and Bowman-Upton, 1990; Orhan, 2001; Watson, 2006; Coleman and Robb, 2009; Hulten 2012), more cautious and better self-discipline (Huang and Kisgen, 2013; Gul et al., 2011; Levi et al., 2014; Liu et al., 2014; Krishnan and Parsons, 2008; Faccio et al, 2016), and higher survival rate (Weber and Zulehner, 2010; Faccio et al, 2016) is obviously accepted as common knowledge in corporate finance. However, when it turns to the regional economy, less is known about the impact of female government leaders on the regional economic growth and development under their jurisdiction. Does female leadership characteristics in firm performance also can parallelly be found in the female politicians of the regional governments' top leader? To the best of our knowledge, this is the first empirical economics paper investigating the female government top leaders' economic development performance and heterogeneities with a substantial economy and personal news dataset.

2.2 Regional tournament competition and investment-led growth in China

A sizable number of studies highlight the critical role of Chinese local governments in promoting regional economic development by offering essential inputs, such as land, political connections, initial collective assets and human capital to attract foreign and private investment and nourish local industry; helping local enterprise in getting loan or securing bonds; and providing political protection for these firms against the central government's predatory behavior(Chang and Wang, 1994; Walder, 1995; Che and Qian, 1998; Jin et al., 1998; Jin, Qian and Weingast, 2005; Xu, 2011; Cull et al., 2017). Regional decentralized authoritarian and performance-based political promotion system are two intrinsic mechanisms in motivating local officials to devote their full attention and energy to enhancing regional economic growth.

In a regional decentralized authoritarian regime, every region is controlled by the central government politically, whereas each local government controls major functions within its jurisdiction, such as employment creation, social welfare provision, finance allocation, industry development, and so on (Xu, 2011). The provincial / municipal / county party secretary and the governor (province) / mayor (city) / magistrate (county) as different levels of regional government leaders are the two highest commanders in each level of the local government system, having the absolute authority in strategy selection and decision making. Abundant field studies have shown that regional government leaders deeply involved in almost every aspect of local economy development, such as hiring and deciding the compensation of top managers in local state-owned enterprises, the establishment or closing of firms, the mobilization of investment capital, the cultivation of advantageous industry, etc (Walder, 1995). They also participate extensively in carrying out these decisions, especially when these decisions are promising in increasing local fiscal income.

While local governments obtain highly autonomous economic power, the central government maintains its influence on regional officials' incentives by determining their career paths (Landry, 2008; Xu, 2011). Each level of local government officials (provinces, municipalities, counties, and townships) would exert their best efforts to

strike a superior GDP growth and compete against each other for a higher performance ranking, which becomes an essential part of evaluations for determining the promotion of local government official (Maskin, Qian and Xu, 2000; Chen, Li and Zhou, 2005; Li and Zhou, 2005; Fan and Wei, 2006). The government leaders of cities acting as "market-oriented agents" who compete fiercely with each other in the same province (Walder, 1995).

On the other hand, China has been the typical case of igniting the economy with tremendous government spending and investment (Zilibotti, 2017). Investment contributed around one-half of China's GDP growth in the 2000s (Ahuja and Nabar, 2012). In 2007-2008, the world economy was severely hit by the global financial crisis, the Chinese economy, suffered a significant drop in the growth, from 12 percent in 2007 to 8 percent in 2008. In response, the Chinese national government launched a massive four trillion-yuan stimulus package in November 2008. The program funds, amounting to about 11 percent of China's annual GDP, were mostly to be spent on transportation and infrastructure projects in 2009 and 2010. By 2014, the investment rate stood at 48 percent of GDP, which is probably the highest investment rate of any country in the world (Bai et al., 2016). Chen et al. (2019) find the regional government leaders with financial working experience could significantly raise the regional loan and GDP growth, they argue that locating more financial resource and increasing regional investment are the decisive factors in the development of regional economy, as well as the government leaders' promotion opportunity. Therefore, the regional government leaders have sufficient motivation to increase regional finance leverage and stimulate investment to pursue a superior economy performance to earn promotion ultimately.

2.3 Hypotheses development

Studies in both economics and finance conclude males and females exhibit robust and significant differences in risk preference: females are more risk-averse than males. The female leaders' risk-averse decision-making has been proved in plenty of situations, such as more conservative stock trading and mutual fund managing (Barber and Odean, 2001; Dwyer et al., 2002); lower leverage (Sexton and Bowman-Upton, 1990; Orhan, 2001; Watson, 2006; Watson and Newby, 2009; Coleman and Robb, 2009; Hulten, 2012; Huang and Kisgen, 2013); more cautious in mergers and acquisitions (Huang and Kisgen, 2013; Levi et al, 2014); higher earnings quality (Krishnan and Parsons, 2008; Gul, et al., 2011; Faccio et al, 2016), etc. Croson and Gneezy (2009) review the literature on gender differences in economic and psychology experiments. They argue that females' risk aversion attitude is deeply rooted in biology nature: genetic and hormonal differences could cause women to be less competitive and more risk-averse than men (Colarelli et al, 2006). Thus, we have good reasons to believe that female government leaders are more risk-averse and less competitive than males as female CEOs or directors in firms. Based on the above, our first null hypothesis is proposed:

Hypothesis 1. Female municipal secretaries are more risk-averse than males, and

this risk attitude is also reflected in their political decisions.

Prior literature finds that female leaders' risk-averse attitude significantly decreases the firms' leverage (Robb and Wolken, 2002; Watson, 2006; Weber and Zulehner, 2010; Faccio et al., 2016). However, lower external financial support triggering lower growth speed (Coleman and Robb, 2009; Hulten 2012) and smaller profit and asset scale (Cliff, 1998; Watson, 2002) of female-owned SMEs. Meanwhile, many studies also find the negative associations between the female directors and the corporate accounting or stock performance (Adams and Ferreira, 2009; Haslam et al., 2010; Ahern and Dittmar, 2012; Huang and Kisgen, 2013; Matsa and Miller, 2013). Additionally, females also perceive less competitively than males. Gneezy et al. (2003) find that when females and males compete against one another, females underperform males. They conclude that females either dislike competition or females feel less competent than their male competitors, thereby weakening their performance in mixed tournaments. Similar results also can be found in the studies of Colarelli (2006); Niederle and Vesterlund (2007); Campbell (2013); Datta Gupta et al., (2013), etc. Based on these findings and insights, the female municipal secretary may also be reluctant to participate in the Regional Tournament Competition and strike for the rare opportunity of promotion with the male competitors. The female municipal secretary's higher risk aversion hypothesis also leads to lower financial leverage and less investment, suggesting a lower economy performance in the end. Therefore, we extend our study to the economic performance of the city with female municipal secretaries and develop the following null hypothesis:

Hypothesis 2: Economic performances of the cities governed by female municipal secretaries on average are weaker than cities governed by male municipal secretaries.

Numerous researches have proven that male and female leaders behaved differently in various situations. In order to present more direct and intuitive evidence in the characteristics of the female municipal secretary's leadership, we introduce the sociolinguistic methodology to manifest the female municipal secretary's preference and personality. From the corpus linguistics perspective, male politicians have been found to use more articles, nouns, long words, swear words, and numbers, while female politicians have been found to use more personal pronouns, verbs, and emotion words (Koppel et al., 2003; Newman et al., 2008), and male politicians are more likely to use competitive style and female politicians are more likely to use cooperative or consensual style of speech (Eckert & McConnell-Ginet, 1992; Coates, 1993; Holmes, 1995; Weatherall, 2002; Griswold, 2007; Wodak, 2008; Yu, 2013). Besides, many researchers (Carrol et al., 1991; Thomas, 1994; Lovenduski, 1996; Norris, 1996; Hansen, 1997) find that female politicians stress different issues than male politicians; the female politician is more focusing on children and the elderly, education, social issues and so on. Because women leaders are usually considered to be having —feminine characteristics and tend to be more conservative, more altruistic, less aggressive and donating more charity than their male counterparts (Williams, 2003; Croson & Gneezy, 2009; Huang and Kisgen, 2013), we propose our hypothesis that:

Hypothesis 3: Female municipal secretaries are more caring about social issues and negatively associated with the aggressive word in their opinion.

3. Research Design

3.1 Data Resource

We focus our analysis of female government leaders on the municipal secretary. Because compared to the mayor, the secretary is the ultimate decision-maker and possesses the supreme power in a city in China's local politic system. The female mayor is highly possibly subject to the male municipal secretary in the patriarchal society of China. Therefore, only the female municipal secretary can fully display their will during their jurisdiction in the city. The data used in this study cover 994 prefectural city party secretaries who served in 281 Chinese prefectural cities from 2006-2016[1]. We collect the municipal secretaries' personal information from CSMAR database. The CSMAR database contains the prefectural city leaders' detailed personal information about their age, gender, education, and work experience. When there is two or more appointment of secretaries in a city in one year, we count the months of each regional leaders' jurisdiction in that year and select the longest one. We set the dummy variable $Female_{i,t}$ as 1 if the secretary is female and 0 if the secretary is male.

We match the municipal secretaries' position information with the city's economy data by the city name and year. Economic data is collected from the relevant issues of the China City Statistical Yearbook published by the National Bureau of Statistics. We also collect the innovation patent data from the Patent Search and Analysis System (PSAS) provided by the State Intellectual Property Office of China (SIPO); the land auction data from CSMAR; the local government bond, Chengtou bond data from WIND. In order to directly manifest female municipal secretary's heterogeneous traits and development preference, we use the web-crawling program scan the China newspaper database in CNKI by the keyword of "secretary's name + the city name + the year of secretary's jurisdiction" in full text and collect 270,202 municipal secretary's news over 643 newspapers from 2006 to 2016. With substantial effort invested in data mining and structuring, we are allowed to present not only a comprehensive analysis of female municipal secretary's impact on various aspects of economic development in China, but also a vivid portrait about the gender differences in management style and development preference among female and male local government leaders.

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[1] In order to maintain the consistency of the administrative levels of cities, we excluded 4 provincial-level city, Beijing, Shanghai, Chongqing and Tianjin from our study.

3.2 Test Analysis Methodology

New technologies have made vast quantities of digital text available. The information encoded in the text is a rich complement to the more structured data, and recent years have seen an explosion of empirical economics research using text as data. (Gentzkow, Kelly and Taddy, 2019). For examples: in finance, text from financial news, social media, company filings, and central bank statements is used to predict asset price movements and the fluctuation of financial market (Tetlock, 2007; Bollen et al., 2011; Loughran and McDonald, 2011; Lucca and Trebbi, 2011; Jegadeesh and Wu, 2013; Wisniewski and Lambe, 2013; Brogaard and Detzel, 2015; Manela and Moreira, 2015; Hansen, McMahon, and Prat, 2017). In macroeconomics, the text is used to estimate the effects of policy uncertainty and forecast the business cycle (Baker et al., 2016; Davis, 2016; Shapiro, Sudhof, and Wilson, 2018; Thorsrud, 2018). In media economics, text from news and social media is used to study the drivers and effects of political slant (Groseclose and Milyo, 2005; Gentzkow and Shapiro, 2010; Taddy, 2013). In industrial organization and marketing, text from advertisements, product reviews, and descriptions are used to study the drivers of consumer decision making and industry classification (Hoberg and Phillips, 2015; Hoberg and Phillips, 2017). In political economy, text from politicians' speeches is used to categorize the political topics and study the dynamics of debate (Grimmer, 2010; Quinn et al., 2010). However, there is no previous study analyzing the text from the aspect of the government leaders' behavior and thought in empirical economics at now. In this paper, we use three categories of variables to manifest the female municipal secretary's agenda, concern, and personality. Figure 1 is the process of text analysis on local government leaders' news.

——Figure 1 here——

3.2.1 Locate the government leader's agenda

We firstly introduce the behavior analysis into regional economics by extracting and scrutinizing the agenda information from the municipal secretary's news, which allows us to show the difference in the development preference between female and male municipal secretary. The text analysis process of municipal secretary's behavior is given as below:

At first, we organize an audit team of 18 students at Hunan University running a large-scale human audit study. Compared with other types of text, the municipal secretary's news is very formal and highly structuralized. Most of the news theme is distinctly elucidated at the beginning of the news. We select the combination of the following three sentences as the central sentences of each news:

1. The first sentence of each news;

2. The first sentence including date or time, such as yesterday, the day before yesterday, 2015/9/20, last Friday, and so on;
3. The first sentence including the municipal secretary's name.

If the first or second sentence including all the features above, we denote the first three sentences as the central sentences of the news in order. Therefore, the central sentences help us to locate the time, the municipal secretary's actions, and the theme of each news.

Second, we construct two dictionaries to identify a specific kind of activity. One is the predicate dictionary, which is associating with government leaders' actions, such as visit / investigate / examine / explore, etc., in the visiting activities. Another one is the object dictionary, which is associating with the action's target. We use more specific words in the object dictionary. For example, if we want to locate the news of government leader visiting the school or education institutional, we use the word of education institutions such as kindergarten, school, college, university, etc., and people who work in the education sector, such as professor, teacher, etc. Our algorithm requires the target news at least have one word in each dictionary in central sentences so that we can locate the government leaders' specific behavior precisely.

Third, we conducted an extensive audit study to ensure the accuracy of government leaders' target activity. Working under close supervision, Teams of Hunan University students underwent a training process and then carefully read the selected news to make sure the news is exactly about the specific behavior we want to locate. We also use the predicate dictionary and object dictionary separately, to check whether there are applicable words we missed, and adjust two dictionaries in sequence until we find there is no wrong or miss target activity in the end.

3.2.2 Tag the government leader's opinion

In order to manifest the concern of government leaders during their jurisdiction, we use a series of Natural Language Processing (NLP) algorithms to extract the government leaders' opinion in the news, and then use the Chairman Xi' speech database as the training set to classify all the government leaders' opinion in each news into 6 categories: party affairs, economy, society, environment, culture, and politics. The specific opinion classification process is given below:

At first, we use the hidden Markov models (HMMs), proposed by Stratos, Collins, and Hsu (2016), to tokenize the test and tag the Part-of-Speech (POS) of each word., Because there is no blank between the word in Chinese, word segmentation and part-of-speech (POS) tagging are important tasks in computer processing of Chinese. With Stratos, Collins, and Hsu (2016)'s HMMs algorithm, we can separate the word appropriately and predict the most likely tag given all the sentences in the entire news database. The probability of a word x given tag h is computed as:

$$p(x|h) = \frac{\exp(w^\top \phi(x,h))}{\sum_{x \in [n]} \exp(w^\top \phi(x,h))} \tag{1}$$

Where [*n*] is a set of observation states. [*m*] is a set of hidden states. $\pi(h)$ is the probability of generating $h \in [m]$. The model maintains a miniature log-linear model with a weight vector *w* and a feature function ϕ. The model can be trained by maximizing the likelihood of observed sequences, which helps us to prepare the fundamental corpus for our further analysis.

Second, we use the Cascaded Linear Model (CLM) with the perceptron algorithm in natural language processing (NLP), proposed by Jiang et al. (2008), to identify the name and action of government leaders in each news. Under this model, many knowledge sources that may be intractable to be incorporated into the perceptron directly can be utilized effectively in the outside-layer linear model. Therefore, we create a dictionary of opinion expression of government leaders, togethering with the name list of government leaders as the knowledge sources to incorporate into the perceptron to help us to identify the opinion of the government leaders in each news.

——Figure 2 here——

Third, after we identified the government leaders' opinion in each news, we use the Convolutional Neural Networks (CNN) model, proposed by Kim (2014), to classify all the government leaders' opinions. The model architecture is shown in Figure 1. The whole article can be divided into several sentences, a sentence of length n (use padding or cutting) is represented as a matrix $x_{1:n} = x_1 + x_2 + \cdots + x_n$ .So article can be transformed into a $n_s \times n \times k$ 3D matrix (n_s represents the number of sentences). The different filters are applied to the 3D matrix to produce several feature maps. We then apply a max-over-time pooling operation over the feature map to capture the most important feature. The features generated by CNN that can be used to represent articles input to the classical classification algorithm. We use Chairman Xi' speech database as the training set. Chairman Xi's speech database officially gives 8 tags for Chairman Xi's each speech: party affairs, economy, society, environment, culture, politics, national defense, and diplomacy. Because the prefectural cities government leaders usually have little connection to the national defense and diplomacy, so we only use Chairman Xi's speech of party affairs, economy, society, environment, culture, and politics as the training set. After training, the Convolutional Neural Networks (CNN) classifies all the government leaders' opinions in each news into 6 categories: party affairs, economy, society, environment, culture, and politics.

——Figure 3 here——

Forth, we divide the student audit team into two teams and randomly select 10,000 news with government leader opinion to ask students whether the tag of opinion given by the Convolutional Neural Networks (CNN) classification is suitable. Two team members evaluate the tag independently, and we find the two teams give 93.1% tags

the consistent results with the Convolutional Neural Networks (CNN) classification, which demonstrates the validation of Convolutional Neural Networks (CNN) classification.

3.2.3 Measure the tone of the government leader's opinion

Following by You et al. (2018)'s seminal work; we construct a word list to identify the government leader's speaking style and personality. Since the positive and negative word in the financial news article in You et al. (2018)'s study is not applicable in the analysis of government leader's opinion directly, and with our best knowledge, there is no previous text analysis literature present aggressive / conservative dictionary in Chinese for the moment. We use the following steps to construct our own aggressive / conservative dictionary. Firstly, we delete the words obvious only use in the financial article such as stock rise/fall, market fluctuation, etc., in You et al. (2018)'s positive / negative dictionary. Secondly, we manually categorize the rest of positive/negative words in You et al. (2018)'s positive/negative dictionary into aggressive / conservative if it is suitable. Thirdly, we tokenize the text corpus of the entire newspaper database, categorize all the words by their property, rank the highest frequency of 1000 words in adjective, verb, and noun separately. And then, we scrutinize these 3000 words, add them to the aggressive or conservative word dictionary if they have the aggressive / conservative meaning. Finally, we make our own word list of 389 aggressive words and 505 conservative words. The definite words and ambiguous words are identical from financial news to municipal secretary's news; therefore, we can use the 388 definite words and 178 ambiguous words directly in You et al. (2018)'s study. We calculate the word frequency of aggressive / conservative / definite / ambiguous by the sum number of aggressive / conservative / definite / ambiguous word used in each government leader's opinion divided the sum number of municipal secretary's news with opinions in each year.

3.3 Descriptive Statistics

Table 1 shows the different personal characteristics between female and male municipal secretaries. Female municipal secretary is only 4.4% across 281 prefectural cities from 2006-2016, which is interestingly coincident with 4.8% of the female CEOs in Fortune 500 in 2014 (Faccio et al., 2016). The average age of female municipal secretary is 50.4, more than one year smaller than the average age of male municipal secretary, 51.6. At the same time, the average tenure of female municipal secretary is 2.86 years, and the average tenure of male municipal secretary is 3.04 years. 93.19% of female municipal secretary has a master or Ph.D. degree, which is much higher than the male municipal secretary's 76.84% master or Ph.D. degree. Since the Chinese central government officially installed a mandatory retirement system in the 1980s that the high-level government leaders are required to retire at the age of 65 (Li and Zhou, 2005), age becomes one of the most unneglectable factors in deciding Chinese

government officials' promotion. Although the younger age and better education level of female municipal secretary endorse their endeavor and excellence, the female municipal secretary's distribution and tenure remain at a low level.

——Table 1 here——

Table 2 presents the descriptive statistics test of the variable in the regional economic development, land auction, finance sector, Chengtou bond and control variables across female and male municipal secretary groups. The mean of the GDP growth rate in the female municipal secretary's city is 1.68% lower than the male municipal secretary's city with a significant level of 1% in t-test. The mean of the natural logarithm of total planned construction land ($LnPlanland_{i,t}$), the natural logarithm of total planned construction building area ($LnPlanarea_{i,t}$), the natural logarithm of total sold land ($LnSoldland_{i,t}$), the natural logarithm of total sold construction building area ($LnSoldarea_{i,t}$), the natural logarithm of the sum number of employee in finance sector ($LnFinEmploy_{i,t}$), the sum of labor, capital and depreciation rate ($(n+g+\delta)_{i,t}$), all significantly lower in the cities with female municipal secretary. On the contrary, the natural logarithm of GDP per capita ($LnGDPPA_{i,t-1}$) is significantly higher in the cities with the female municipal secretary, which rejects the potential interpretation that the cities with female municipal secretary have a lower initial economic development condition.

——Table 2 here——

4. Empirical Results of female municipal secretaries' influence on regional economy and social issues

4.1 Regional economic growth

Table 3 provides evidence on the relation between 281 prefectural cities' economic growth and the presence of the female municipal secretary. The female municipal secretary is negatively associated with regional GDP and GDP growth rate. The coefficient on GDP growth rate ($GDPrate_{i,t}$) in column (2), is 0.747 with a significant level of 5%, suggesting that, after control municipal secretary's personal trait of age, tenure, and education level, the average growth rate in female municipal secretaries' cities is significantly lower than male municipal secretaries'. The result remains robust after we control the GDP per capita ($LnGDPPA_{i,t-1}$), public fiscal expenditure ($LnPublic_{i,t}$), labor, capital and depreciation rate ($(n+g+\delta)_{i,t}$), regional infrastructure

level ($LnRoad_{i,t}$), human capital level ($Highedu_{i,t}$), and economic prospects ($Unemprt_{i,t}$) in column (4). The coefficient of $Female_{i,t}$ on GDP growth rate is -0.647 (p < 0.10) in column (4) implies that the growth rate in female municipal secretaries' cities is 0.647% lower than male municipal secretaries' in average, which is an unneglectable gap requiring further analysis.

——Table 3 here——

4.2 Regional economy consumption, innovation, and investment

To assess the reason of female municipal secretary cities' economic underperformance, we evaluate the relationship of female municipal secretary with regional economy consumption, innovation, and investment. The results in Table 4 show that female municipal secretary has no negative influence on regional consumption and innovation, whereas female municipal secretary is significantly related to the natural logarithm of total investment in fixed assets ($LnFixinv_{i,t}$). The coefficient of female municipal secretary on $LnFixinv_{i,t}$ in column (2) is a statistically significant -0.091, suggesting that, after controlled municipal secretary's personal trait, the city and year fixed effects, the average total investment in fixed assets in female municipal secretaries' cities is significantly 9.1% lower than their male competitors.

As it is known to all that the real estate boom played a critical role in China's economic development, and the real estate sector is too important to fail (Song and Xiong, 2018). However, the coefficient of female municipal secretary on the natural logarithm of total investment in the real estate sector ($LnRealestate_{i,t}$) is -0.13 with a significant level of 5%. Comparing with the male municipal secretary, the investment in the real estate sector is rather small in the female municipal secretary's jurisdiction, which may be an important reason for the female municipal secretary's economic underperformance.

——Table 4 here——

4.3 Regional land auction

One prominent characteristic of the Chinese regional political system is the Regional Tournament Competition (Li and Zhou, 2005). The promotion of local politicians is based principally on local economic performance, such as GDP growth, which, in turn, is driven mainly by investment (Gao, Ru, and Tang, 2018). To outperform others, local officials need to build up local infrastructures and provide resources to attract businesses and investments. However, the female municipal

secretary has a significantly negative impact on the regional fixed asset investment, especially on the real estate investment. In order to investigate the reason for lower fixed and real estate investment, we test the impact of female municipal secretary on local land auction.

——Table 5 here——

Since local governments are monopolistic land suppliers and the municipal secretary is the highest leader in a local city, how many and how much to sell in the regional land auction manifests the municipal secretary's will. Table 4 presents the results of the female municipal secretary's impact on the regional land auction. After controlling municipal secretary's personal trait, the city and year fixed effects, the female municipal secretary is significantly negatively associated with the total planned construction land ($LnPlanland_{i,t}$), the total planned construction building area ($LnPlanarea_{i,t}$), the total sold land ($LnSoldland_{i,t}$) and the total sold construction building area ($LnSoldarea_{i,t}$). Not only the sold land and construction building area but also the planned land and planned building area are significantly smaller in the female municipal secretaries' city implies female municipal secretaries' prudence and risk-aversion development attitude.

4.4 Finance sector development and the issuance of Chengtou bond

Previous studies show that bank credit was allocated disproportionately to financing investment in real estate and heavy industries to stimulate the Chinese regional economy (Chen et al.,2016; Gao, Ru and Tang, 2018; Song and Xiong, 2018). Table 4 and 5 have shown that real estate investment and land development is comparatively lower during the female municipal secretary's jurisdiction. To further test the female municipal secretary's risk attitude, we estimate the influence of the female municipal secretary on regional finance sector development and the issuance of Chengtou bond.

——Table 6 here——

Table 6 shows the female municipal secretary's influence on the finance sector development. The coefficient on the loan balance ($LnLoan_{i,t}$) in the column (1), finance sector's employee ($LnFinemp_{i,t}$) in column (3), and the ratio of loan to deposit ($Loanratio_{i,t}$) in column (4), is statistically significant -0.046, -0.019 and -0.022, respectively. This means, after control the municipal secretary's personal trait of age, tenure, and education level, the average loan, the finance sector employee and the ratio of loan to deposit is 4.6%, 1.9% and 2.2% less in the female municipal secretary' city,

respectively. The less loan, lower employment in the finance industry, and lower loan-deposit ratio indicate female municipal secretary undertakes significantly less regional leverage and financial risk, which is a clear indication that female leaders are more conservative and risk-averse than their male counterparts.

——Table 7 here——

Table 7 reports the regression results about the impact of female municipal secretary on the issuance of regional Chengtou bond. We use the probit model to estimate the influence of female municipal secretary on the issuance of regional Chengtou bond in Column (1), and the effect of female municipal secretary to Chengtou bond issuance is insignificant. The coefficient of the sum value of the Chengtou bond ($LnBondsize_{i,t}$) is -0.328, at 5% significant level, suggesting the issuance size of the Chengtou bond is significantly less in the female municipal secretary's city. The weighted average length of Chengtou bond ($Length_{i,t}$), the weighted average coupon interest rate ($Coupon_{i,t}$), the market yield to maturity spread ($Yeildspd_{i,t}$), are all negatively but insignificantly associated with female municipal secretary, indicating female municipal secretaries' prudence in local government debt issuance and lower local government debt risk under their jurisdiction.

4.5 Sectional employment

To comprehensively manifest the female municipal secretary's impact on regional employment, we calculate the annual sectional employment growth rate with the municipal secretary's tenure across 19 sectors from the China City Statistical Yearbook. We use each sector's employee number in the last year to divide the employee number one year before the municipal secretary's jurisdiction and take the square of the ratio by the year length of his/her tenure and subtract one in the end. Table 8 presents the results in which the female municipal secretary has a statistically significant influence. The significantly negative coefficient in the annual growth rate of the employment in agriculture ($Agrgrt_{i,t}$), mining ($Mingrt_{i,t}$), and finance ($Fingrt_{i,t}$) suggesting the female municipal secretary is prominently reluctant to develop the agriculture and mining sector. On the contrary, the significantly positive coefficient in the annual growth rate of the employment in culture, sports and entertainment ($Culgrt_{i,t}$), and education ($Edugrt_{i,t}$) indicating that during the female municipal secretary's jurisdiction, the culture and education industry is thriving under the female municipal secretary's unneglectable support.

——Table 8 here——

4.6 Female municipal secretary's other contribution

To further test the female municipal secretary's preference for regional employment, we calculate the annual growth rate with the municipal secretary's tenure across 87 indicators from the China City Statistical Yearbook. Table 8 presents the results in which the female municipal secretary has a statistically significant influence. During female municipal secretary's jurisdiction, female municipal secretary can significantly raise the annual growth rate of foreign-funded enterprises' gross industrial output value ($FDIgrt_{i,t}$), the hospital number ($Hospitalgrt_{i,t}$), the total number of book in the public library ($Bookgrt_{i,t}$), the number of student in primary school ($Eschoolgrt_{i,t}$), the area of green land ($Greenlandgrt_{i,t}$). The positive association in foreign-funded enterprises' gross industrial output value ($FDIgrt_{i,t}$) may origin from female leaders' better skill in communication and social connection. Despite the lower economic growth rate, the female municipal secretary strikes more energy on improving the medical facility, education, and environment protection, which is consistent with our hypothesis that female municipal secretary caring more about the people's livelihood than their male counterparts.

——Table 9 here——

5. The text analysis of municipal secretaries' agenda, concern, and personality

By utilizing the test analysis approach discussed in section 3.2, we establish 3 categories of text-based variables to manifest the female municipal secretary's agenda, concerns, and personality. According to our dataset, 87.6% city government leaders' news come from the local city's daily newspaper from 2006-2016. However, not all the cities have daily newspaper, and some of city daily newspaper haven't been collected into CNKI newspaper database yet. To maintain the reliability of our study, we delete the sample which the annual news number is less than 30, and there are 1809 city-year observations in the end. Table 10 presents the descriptive statistics about the municipal secretary's news we collected from the CNKI newspaper database. We can find that the average number of municipal secretary's news is 123.2 for female municipal secretary and 143.6 for male municipal secretary, suggesting female municipal secretary's prudence and low-key attitude. Because the female municipal secretary's news is significantly lower than male municipal secretary's, we use the share of the municipal secretary's activity and the share of municipal secretary's opinion tag rather than the sum number of these two variables to show the differences in female municipal secretary's development preference and concerns. Panel C illustrates the share of the

municipal secretary's different opinion tags to the sum news number. The economy tag ($TagEcon_{i,t}$) is overwhelmingly large, and it is 50.41% in the female municipal secretary's opinions and 54.51% in male municipal secretary's. This also provides a shred of direct evidence for the Regional Tournament Theory that the economic growth performance is the key measure to evaluate the government officials' contribution and decide their promotion. Therefore, the economy is what the municipal secretary cares about and talks about the most. Besides, the society / environment / culture tag is significantly larger in the female municipal secretary's tag than the male secretary's, suggesting the female municipal secretary is more concerning about the society / environment / culture issue during their jurisdiction.

——Table 10 here——

5.1 Female municipal secretary's agenda share

The results in Table 8-9 show that female municipal secretary is significantly related to the development of education, medical care, culture, and environment protection. Therefore, we identify the municipal secretary's activities of investigating in school ($AdgSchool_{i,t}$), investigating in school hospital ($AgdHospt_{i,t}$), joining culture festival or ceremony ($AgdCultr_{i,t}$), and comforting the local citizen ($AgdComf_{i,t}$) to show female municipal secretary's preference in developing education, medical care and culture industry, as well as their mercy and kindness. Table 11 presents the result in the feature of the female municipal secretary's agenda, the coefficients of the female municipal secretary are positive in all of 4 variables. The coefficient in the share of comforting the local citizen ($AgdComf_{i,t}$) to the sum news is 0.682, at 5% significant level, which implies female municipal secretary participates in more comforting and visiting local citizen activities. The agenda share regression results show that the female municipal secretary participates in more education, culture, and comforting activities.

——Table 11 here——

5.2 Female municipal secretary's opinion tag

Trained by Chairman Xi's speech database, our algorithm can tag the municipal secretary's opinion in each news. *TagParty_{i,t}* / *TagEcon_{i,t}* / *TagSociety_{i,t}* / *TagEnvir_{i,t}* / *TagCultr_{i,t}* / *TagPolitic_{i,t}* is share of the municipal secretary's opinion with *Party / Economy / Society / Environment / Culture / Politic tag*. The results in Table 8-9 show that the female municipal secretary is significantly negatively related to the economy tag (*TagEcon_{i,t}*), indicating that the share of female municipal secretary's economy

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opinion is significantly less than the male municipal secretary. On the contrary, the female municipal secretary's opinion share is significantly larger in environment and culture, which is consistent with the other performance in Table 9. Considering the mean share of the economy is overwhelmingly larger than the other tags in Table 10, although the decrease in the economy tag in the female municipal secretary's opinion is 4.1% comparing with male municipal secretary's opinion tag, however, gives the way to the concern for environment protection and culture activities.

——Table 12 here——

5.3 Female municipal secretary's speaking style

Table 13 presents the result of the female municipal secretary's sentiment word frequency. Female municipal secretary is significantly negatively associated with aggressive word frequency, which means female municipal secretary is less likely to use the aggressive and competitive word, such as transcend, compete, unbeatable, defeat, stunning, top third, and so on. It is very interesting that the female municipal secretary also unlikely to use the ambiguous word; the coefficient of the ambiguous word is -0.504 with a significant level of 5%. The previous linguistic study shows that Chinese politician is very good at talking vaguely. The ambiguous word they used can create a useful buffer zone for their promise and the result, which helps them to earn a more favorable situation. However, the lower frequency of the ambiguous words in the female municipal secretary's opinion elucidates that communication and promise are more direct and reliable in the female municipal secretary's speech.

——Table 13 here——

6. Identification and alternative hypotheses

6.1 Unobserved municipal secretary heterogeneity

City municipal secretary might be correlated with other omitted variables on the secretary-level. For instance, the municipal secretary might have a different education or general leadership skills that drive our findings. One advantage of our data set is that we observe detailed biographical information on the municipal secretary, including their educational background and employment history. This allows us to include additional controls. We add age, tenure, a set of education dummies, controlling for

educational background (high school, associate, bachelor, master and Ph.D degree), In all our tests in Tables 3 to 9 we control for municipal secretary characteristics, alleviating the concern that female could be proxying for the development preference on medical facility, education, culture, and environment protection.

6.2 The Difference-in-Difference (DID) study of female municipal secretary's inauguration and departure

To clearly identify the female municipal secretary's heterogeneous impact on regional economic development, we innovatively define the sample of female municipal secretary's jurisdiction ($Female_{i,t}$=1) as the treatment group, and the sample without female municipal secretary's jurisdiction as the comparison group ($Female_{i,t}$=0). Since the female municipal secretary's jurisdiction is usually not only one year, we define the first year of female municipal secretary's jurisdiction, i.e., her inauguration, as $FMStart_{i,t}$=1 and the others are $FMStart_{i,t}$=0. Parallelly, we define the last year of female municipal secretary's jurisdiction, i.e., her departure, as $FMEnd_{i,t}$=1 and the others are $FMEnd_{i,t}$=0. Therefore, $FMStart_{i,t}$ is the very beginning of the female municipal secretary's treatment effect, and $FMEnd_{i,t}$ is the end of it. By introducing the year dummies of pre-her-jurisdiction, $FMStart_{i,t-1}$, $FMStart_{i,t-2}$, and the year dummies of post-her-jurisdiction, $FMEnd_{i,t+1}$, $FMEnd_{i,t+2}$, we perform the parallel test of Difference-in-Difference (DID) study of female municipal secretary's inauguration and departure as below:

——Table 14 here——

As shown in Table 14, all the coefficients of $Female_{i,t-2} \times FMStart_{i,t-2}$, $Female_{i,t-1} \times FMStart_{i,t-1}$ from column (1) to (4) are insignificant, suggesting before the female municipal secretary's inauguration, the pre-her-jurisdiction city has no significant difference in GDP growth rate ($GDPrate_{i,t}$), the planned construction building area ($LnPlanarea_{i,t}$), the sold construction building area ($LnSoldarea_{i,t}$), the ratio of the loan to deposit balance of the local financial institutions ($Loanratio_{i,t}$) to the other city with male secretary. Meanwhile, all the coefficients of $Female_{i,t+1} \times FMEnd_{i,t+1}$, $Female_{i,t+2} \times FMEnd_{i,t+2}$ from column (1) to (4) are insignificant, indicating that after the female municipal secretary's departure, the post-her-jurisdiction city has no significant difference in GDP growth, land auction and financial leverage to the other city with the male secretary, too. The insignificant post-her-jurisdiction effect further demonstrates our initial assumption that the regional leaders have ultimate authority in political decision making (Xu, 2011): After the predecessor government leaders' leave, his/her unique influence and development preference has promptly been swiped by his/her

successor.

6.3 Endogenous secretary-city matching

The endogenous matching between secretary and city may also could drive our findings. For instance, it could be the case that the lower growth rate city with the male municipal secretary for a long time and the central or provincial government decides to delegate a female municipal secretary to break this deadlock. Therefore, the negative association between the female municipal secretary and GDP, investment, and finance development might be the long-lasting effect of the male predecessor's underperformance rather than the female municipal secretary's style and influence. In Table 14 we use the Probit model to analyze the propensity of delegating a female municipal secretary with different economic variables in one year before the secretary's delegation. All 6 coefficients are insignificantly related to the female municipal secretary which means there is no significant difference in the initial state of GDP growth, investment, real estate, and finance development before the female municipal secretary's delegation. According to this result, there is no clear matching phenomenon in the delegation of municipal secretary.

——Table 15 here——

6.4 "Exogenous" turnovers: evidence from "the bribe and sudden departure" secretary

Different from the official governance system in western countries, the Chinese national government possesses the ultimate powers of appointment, evaluation, promotion, and dismissal of its subordinate level regional leaders (Xu, 2011). Under this ultimate political centralization, the dismission of the bribe officer is prompt and unexpected. The news of bribing mayor or secretary has been suddenly taking away by the prosecutor's office from his/her worksite, or meeting room is not unusual to see. Since there is no sign of arresting the bribing officials before in case of their resistance or escape, the sudden departure of predecessor officials leaves the delegation of a successor to become cursory and quickly. The same situation also can find in the cases of municipal secretary's resignation or death by accident or suicide or illness. Therefore, we manually collect the data of 994 municipal secretaries' next position and locate the municipal secretary who suddenly drops their job because of bribe or resignation or death. We consider the sub-sample of the sudden departure municipal secretary's successors as an exogenous group to further identify the effect of female municipal secretaries.

According to our dataset, there are 56 municipal secretaries suddenly drop their job from 2006-2016, 50 because of bribe, 4 because of resignation, and 2 because of death. The average tenure of the sudden departure municipal secretary's successors is 2.05 years, much lower than the average tenure of the entire municipal secretary group 2.91 years. This may because the cursory delegation is hard to satisfy, and the central or provincial government has to find a more appropriate secretary in a short time. The significantly lower average tenure of the sudden departure municipal secretary's successors strengthens our exogeneity assumption of the sudden departure secretary's successors. Table 15 presents the result of the female municipal secretary's impact in the sample of the sudden departure secretary's successors. Although only 115 observation, the female municipal secretary is still significant negatively related with GDP growth rate in column (1) and loan to deposit ratio in column (5), which is a strong evidence that female municipal secretary is reluctant to increase the regional leverage and lower the GDP growth rate even with a shorter tenure in a cursory delegation.

6.5 The future career of female municipal secretary

Under China's highly top-down political structure, the municipal secretary has ultimate authority in the decision making and allocating the economic resources within the city. The average population of 281 prefectural cities in 2016 is 4.26 million in China, which means the municipal secretary is the top leader of 4.26 million people on average. It is not hard to imagine the difficulty of a female municipal secretary getting promotion and taking the responsibility of the people more than that number in the patriarchal society of China. Table 16 uses the Probit model test the propensity of a female municipal secretary getting promotion and bribe. We use the manually collected next position data of the municipal secretary and define the dummy variable $Promotion_{i,t}$ as 1 if the administration level of the position is higher than the current position in Chinese administrative ranks, and 0 the otherwise. We also define the dummy variable $Bribe_{i,t}$ as 1 if the secretary municipal has been arrested or legally punished during his/her jurisdiction, and 0 the otherwise. The coefficient of female municipal secretary in promotion is significantly negative in column (1) with the municipal secretary's personal trait. After control the municipal secretary's economic performance $AnnGDPrate_{i,t}$, and the initial local economic variable one year before the female municipal secretary's delegation, the value of coefficient even more negative in column (2), suggesting no matter how good or bad the economic performance female municipal secretary is, it is very hard for female municipal secretary to get promotion in the end. In column (3) and (4), we can find female municipal secretary has less propensity of bribe comparing with the male secretary, which is consistent with our

hypothesis that female municipal secretary is more conservative and risk aversion. The less local loan stimulation and land auction in the female municipal secretary's jurisdiction also mean better self-discipline and prudence which leads to less propensity of bribe. From the results in Table 15, the female municipal secretary may also have the expectation that it's very hard for her to get promotion no matter how hard they tried. Rather than jump into the competition of Regional tournament competition (Chen, Li and Zhou, 2005; Li and Zhou, 2005) and stimulate the economy with every means, the female secretaries are more wise to decline the competitive impulse, refuse the temptation of bribe and develop the sector they care, such as: medication, education and environment protection.

——Table 17 here——

6.6 The similar results of the female mayor

Although in China's regional political system, the mayor is subject to the municipal secretary, the mayor is still the second top leader in a region, which suggests the female mayor still could exert the "female" effect as the female municipal secretary somehow. Table 17 shows the results of the female mayor's impact on regional economic growth, investment, finance employment, and debt issuance. Despite the coefficient of GDP growth, investment, finance employment, Chengtou bond size, and length is insignificant, but the effect of female mayor is homogeneous negative associated with regional economic growth and finance leverage comparing with the female municipal secretary. This illustrates the female mayors have the same precautious and risk aversion developing attitude as female municipal secretaries, but their will and attitude maybe cannot be fully displayed because of the mayor's subjective role to the municipal secretary.

——Table 18 here——

6.7 The Heckman 2SLS regression

Whether selecting the female officer as the municipal party secretary in a specific city is determined by the provincial government or central government, it is normally an exogenous event that is not affected by the local city. But the process of appointing a new municipal city secretary is very confidential and we cannot entirely deny the effect of invisible factors. Gul et al. (2011) find the ratio of the number of companies hiring female directors to the sum number of the companies in the same industry can significantly affect the other company's decision to hire female directors. With an identical mechanism, if the female municipal secretary satisfied the provincial or

central government's goal and achieved a good performance in environmental protection or the other social issues under her jurisdiction. It can attract the attention of the provincial and central governments, and then appoint more female municipal secretary in the same province. Therefore, the share of the cities governed by the female municipal secretary in the same province in last year (*Femaleshare$_{i,t-1}$*) may have an unneglectable influence on the personnel appointments of this province but has no specific impact on different cities' economic growth, this indicator can be served as a good instrumental variable.

——Table 19 here——

Columns (1) of Table 18 report the first-stage regression results. The IVs *Femaleshare$_{i,t-1}$* is significantly related to the appointment of female municipal secretary. Specifically, the city in the province having more female municipal secretaries are more likely to appoint a female municipal secretary in the next year. In the second-stage regression, the results reported in column (2) suggest that the negative relationship between the female municipal secretary and regional GDP growth continues to hold after correcting for potential invisible factors bias.

6.8 The Propensity Score Matching

We use Propensity Score Matching (PSM) to further "correct" the potential selection bias. At first, we make regression of the female municipal secretary by all the control variables of city economy status plus the regional debt level to get the propensity score of the observations. By using this score, we then match the female municipal secretary with the male municipal secretary. As can be seen in Table 19, Column (1) and Column (2) show the difference before matching and after matching—— after matching, the impact of all the city economy variables become insignificant, indicating that our pairing is valid and the cities with female and male municipal secretary are more comparable than the original samples. Column (3)-(5) in Table 10 gives regression results after pairing: the impact of female municipal secretary to GDP growth rate (β=-0.626, $p < 0.05$), the finance industry's employment (β=-0.028, $p < 0.1$), the loan to deposition ratio (β=-0.055, $p < 0.01$) still significantly negative. Overall, after controlling the cities' different economic status, our previous results still hold.

——Table 20 here——

7. Conclusion

This paper firstly introduces the gender leader related theories in behavioral finance into regional economics and presents a behavior and thought analysis to the heterogeneities of female government leaders on the regional economic development and social issues. By using data mining and several innovative mechanical learning text analysis algorithms, we collect 994 Chinese prefectural city party municipal secretaries' resume data and their 270,202 news reports over 643 newspapers from 2006 to 2016. After matching the 281 prefectural cities economy data with the municipal secretaries' name and their jurisdiction year, we comprehensively evaluate the female municipal secretaries' impact on regional economic development, financial leverage, sectional employment, and a series of social issue indicators. We find, firstly, the cities governed by female municipal secretaries are significantly associated with weaker economic performance in terms of GDP growth rate, fixed asset investment as well as real estate growth, compared with those governed by male officials. Secondly, we find the cities governed by female municipal secretary tended to undertake significantly less leverage, indicated by less loan, lower loan-deposit ratio, and lower employment share in the finance industry, which is a clear mechanism that female leaders are more conservative and risk-averse than their male counterparts. Thirdly, the female municipal secretary appears to increase the employment in the culture and education industries, whereas decrease the employment in agriculture and mining industry. Fourthly, the female municipal secretary is significantly positively associated with the annual growth rate of the hospital number, the total number of books in the public library, the number of students in primary school and the area of green space, suggesting female municipal secretary's unneglectable endeavor in improving the medical facility, education, and environment protection during their jurisdiction. At last, in the text analysis of municipal secretary's news, we find female municipal secretary participates in more visiting and comforting local citizen activities; less likely expresses the economy opinion, whereas more likely expresses the environment, and culture opinion; less likely to use the aggressive and ambiguous word. These results reflect that the female municipal secretaries seem to be more compassionate, humane and reliable compared with the male counterparts.

Overall, our study complements three threads of studies. Firstly, we extend the applicability of female leadership theory from behavioral finance into regional economics. This paper is a preliminary attempt to study the impact of local officials' personal traits on the heterogeneity of regional economic development. The subsequent research can continue to explore the impact of regional government leaders' other characteristics or experience on the regional economic development, and even develop a new research direction, i.e., behavioral regional economics. Secondly, although there is an explosion of empirical economics research using text as data in recent years, few text analysis studies extract the data of people's behavior and opinion before. With a series of sophisticated and technology advanced algorithms, this paper largely improves the utilization and comprehension of formal text materials, i.e. politician news, which

sheds a light in identifying the direct evidence of people's actions and wills, especially for the managerial heterogeneity studies in behavioral finance. Thirdly, our study also provides valuable counterfactual empirical evidence for the China economic growth theory, such as the regional tournament theory (Chen et al., 2005; Li and Zhou, 2005) and investment-led growth theory (Zilibotti, 2017). The female municipal secretary's weaker economic performance is directly linking to lower land development and regional financial leverage, indicating that promoting land development and locating financial resource are decisive factors in the development of regional economy in China.

In practice, this article also has meaningful enlightenment for the Chinese government's personnel appointment system. In 2013, the Organization Department of the Central Committee of the Communist Party of China announced a modified performance assessment scheme. Subsequently, besides GDP growth, other factors, such as environmental protection, would also be considered in promotion decisions (Gao et al., 2018). More attention is paid to sustainable development since Jinping Xi became the Chairman of China. Chairman Xi has launched a series of policies to rebalance the economy, including pushing forward on improving air quality, reducing financial leverage, alleviating poverty, and spearheading a massive anti-corruption campaign within the Communist Party. The female government leaders' developing preference of lower leverage, more compassionate, and more environment-friendly, in addition of their incorruptness, makes a perfect match for the new politic trend in China. We are hoping more and more female politicians could achieve more critical positions and make their unique contribution to the development of society in the future.

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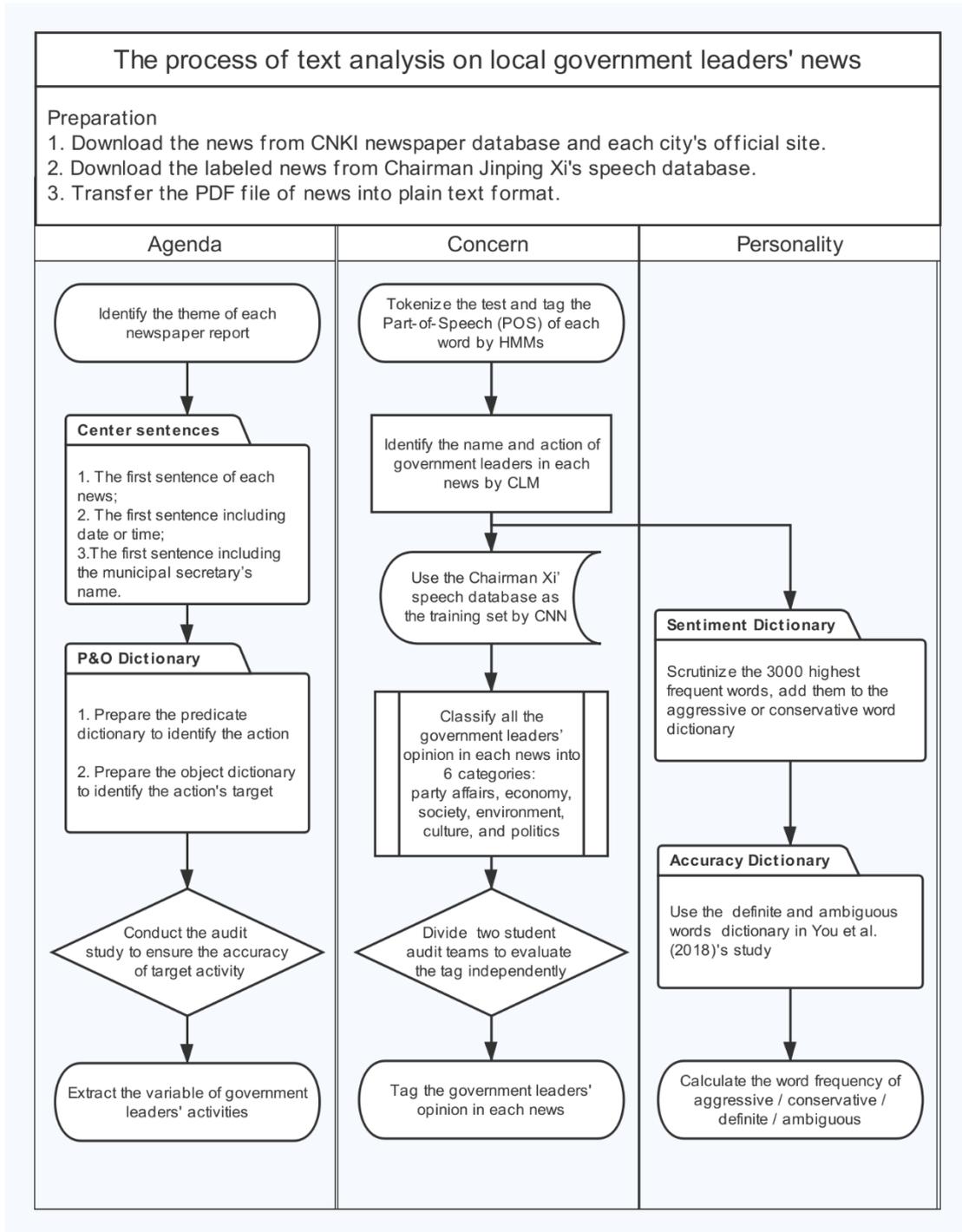
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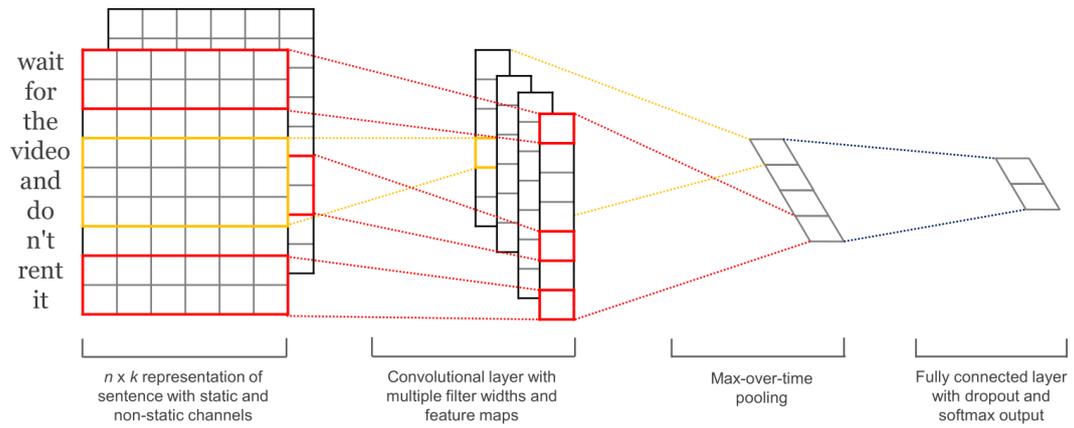Figure 1: The process of text analysis on government leaders' news

The process of text analysis on local government leaders' news

Preparation
1. Download the news from CNKI newspaper database and each city's official site.
2. Download the labeled news from Chairman Jinping Xi's speech database.
3. Transfer the PDF file of news into plain text format.

Agenda	Concern	Personality
Identify the theme of each newspaper report	Tokenize the test and tag the Part-of-Speech (POS) of each word by HMMs	
Center sentences 1. The first sentence of each news; 2. The first sentence including date or time; 3. The first sentence including the municipal secretary's name.	Identify the name and action of government leaders in each news by CLM	
P&O Dictionary 1. Prepare the predicate dictionary to identify the action 2. Prepare the object dictionary to identify the action's target	Use the Chairman Xi' speech database as the training set by CNN	**Sentiment Dictionary** Scrutinize the 3000 highest frequent words, add them to the aggressive or conservative word dictionary
Conduct the audit study to ensure the accuracy of target activity	Classify all the government leaders' opinion in each news into 6 categories: party affairs, economy, society, environment, culture, and politics	**Accuracy Dictionary** Use the definite and ambiguous words dictionary in You et al. (2018)'s study
Extract the variable of government leaders' activities	Divide two student audit teams to evaluate the tag independently	Calculate the word frequency of aggressive / conservative / definite / ambiguous
	Tag the government leaders' opinion in each news	

Source: The authors' original composition.

Figure 2: Structure of Cascaded Linear Model
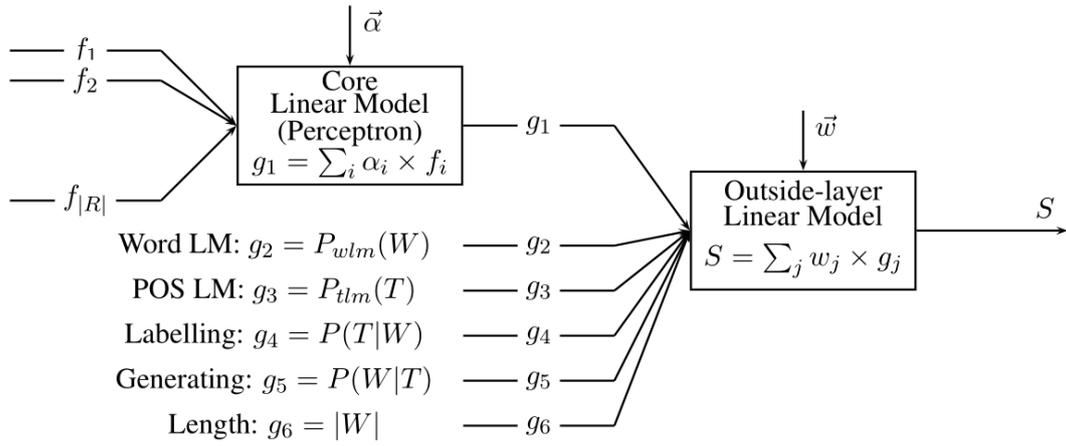
Source: Jiang, W., Huang, L., Liu, Q., & Lü, Y. (2008, June). A cascaded linear model for joint chinese word segmentation and part-of-speech tagging. In Proceedings of ACL-08: HLT (pp. 897-904).

Note: |R| denotes the scale of the feature space of the core perceptron.

Figure 3. Model architecture with two channels for an example sentence.

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n x *k* representation of sentence with static and non-static channels

Convolutional layer with multiple filter widths and feature maps

Max-over-time pooling

Fully connected layer with dropout and softmax output

Source: Kim, Y. (2014). Convolutional neural networks for sentence classification. arXiv preprint arXiv:1408.5882.

Table.1 Distribution of female municipal secretary in China, 2006-2016

		Male		Female		Sum	
		Num	%	Num	%	Num	%
Age							
	30-39	0	0.00%	0	0.00%	0	0.00%
	40-49	227	23.89%	14	31.82%	241	24.25%
	50-59	720	75.79%	30	68.18%	750	75.45%
	60+	3	0.32%	0	0.00%	3	0.30%
	Sum	950	100.00%	44	100.00%	994	100.00%
Tenure							
	1 year	169	17.79%	8	18.18%	177	17.81%
	2 years	283	29.79%	13	29.55%	296	29.78%
	3 years	134	14.11%	8	18.18%	142	14.29%
	4 years	180	18.95%	9	20.45%	189	19.01%
	5 years and more	184	19.37%	6	13.64%	190	19.11%
	Sum	950	100.00%	44	100.00%	994	100.00%
Education							
	Highschool	2	0.21%	0	0.00%	2	0.20%
	Associate	18	1.89%	0	0.00%	18	1.81%
	Bachelor	200	21.05%	3	6.81%	203	20.42%
	Master	541	56.95%	35	79.55%	576	57.95%
	Ph.D	189	19.89%	6	13.64%	195	19.62%
	Sum	950	100.00%	44	100.00%	994	100.00%

Source: CSMAR Chinese government officials resume database, and the author's calculation.

Table.2 Descriptive statistics on the female municipal secretary, economic development of 278 cities in China, 2006-2016

	$Female_{i,t}=1$					$Female_{i,t}=0$					t-test
	Obs	Mean	Std.Dev	Min	Max	Obs	Mean	Std.Dev	Min	Max	Difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(2)-(7)
Panel A. Dependent Variable: Economy Development											
$LnGDP_{i,t}$	126	6.51	0.84	4.93	8.85	2,884	6.65	0.90	4.69	8.85	-0.132
$GDPrate_{i,t}$	126	10.10	3.93	-0.40	17.00	2,884	11.78	3.82	-0.40	21.30	-1.678***
$LnConsume_{i,t}$	126	14.65	0.90	13.01	17.13	2,884	14.76	1.03	12.37	17.13	-0.109
$LnFixInv_{i,t}$	126	15.36	0.90	13.17	17.46	2,884	15.42	0.95	13.17	17.47	-0.062
$LnPatent_{i,t}$	126	6.30	1.70	2.40	10.48	2,884	6.02	1.99	0.00	10.48	0.284
$LnRealestate_{i,t}$	126	12.82	1.15	10.17	15.90	2,884	13.00	1.25	9.98	15.90	-0.184
Panel B. Dependent Variable: Land Auction											
$LnPlanland_{i,t}$	107	16.10	1.21	12.61	18.24	2,147	16.43	1.12	9.96	19.23	-0.335***
$LnPlanarea_{i,t}$	107	16.57	1.28	12.96	18.70	2,147	16.88	1.43	0.00	19.70	-0.308**
$LnSolddeal_{i,t}$	107	4.89	1.25	1.10	7.07	2,147	5.06	1.17	1.10	7.94	-0.173
$LnSoldland_{i,t}$	107	15.11	1.48	8.71	17.47	2,147	15.47	1.26	6.56	18.44	-0.352***
$LnSoldarea_{i,t}$	107	15.56	1.54	9.31	17.88	2,147	15.90	1.63	0.00	18.85	-0.338**
Panel C. Dependent Variable: Financial Sector Development											
$LnLoan_{i,t}$	126	15.38	0.95	13.80	18.54	2,884	15.50	1.12	13.37	18.54	-0.115
$LnDeposit_{i,t}$	126	15.91	0.88	14.37	18.80	2,884	15.99	1.03	13.95	18.80	-0.081
$LnFinemp_{i,t}$	126	0.65	0.31	0.15	1.69	2,884	0.79	0.42	0.15	2.14	-0.137***
$Loanratio_{i,t}$	126	0.61	0.15	0.29	1.09	2,884	0.63	0.17	0.29	1.09	-0.023
Panel C. Dependent Variable: Chengtou Bond											
$Issue_{i,t}$	126	0.43	0.50	0.00	1.00	2,076	0.38	0.49	0.00	1.00	0.052
$LnBondsize_{i,t}$	126	1.25	1.61	0.00	5.62	2,076	1.15	1.63	0.00	5.62	0.097
$Length_{i,t}$	126	2.75	3.27	0.00	8.39	2,076	2.35	3.12	0.00	8.39	0.403
$Coupon_{i,t}(\%)$	126	2.61	3.18	0.00	10.00	2,076	2.19	3.03	0.00	10.00	0.419
$Yieldspd_{i,t}(\%)$	126	1.80	9.81	0.00	83.61	2,076	1.03	7.98	-1.00	148.90	0.768
Panel D. Control Variable											
$Highedu_{i,t}(\%)$	126	0.01	0.02	0.00	0.11	2,884	0.02	0.02	0.00	0.11	-0.003
$LnPublic_{i,t}$	126	13.86	0.72	12.15	15.90	2,884	13.97	0.78	12.14	15.98	-0.111
$LnRoad_{i,t}$	126	2.31	0.59	0.91	3.61	2,884	2.23	0.58	0.61	3.61	0.075
$LnGDPPA_{i,t-1}$	126	10.08	0.61	8.54	11.42	2,884	9.92	0.67	8.40	11.43	0.162***
$(n+g+\delta)_{i,t}(\%)$	126	0.60	0.52	-0.32	2.26	2,884	0.68	0.49	-0.32	2.26	-0.085*
$Unemprt_{i,t}(\%)$	126	0.65	0.41	0.12	1.87	2,884	0.60	0.40	0.11	2.20	0.049

Data Resources: CSMAR Chinese government officials resume database, the annual China City Statistical Yearbook (2007-2017), and the author's calculation.

Table.3 The impact of female municipal secretary on local economic development

	(1)	(2)	(3)	(4)
	$LnGDP_{i,t}$	$GDPrate_{i,t}$	$LnGDP_{i,t}$	$GDPrate_{i,t}$
$Female_{i,t}$	-0.027	-0.747**	-0.020	-0.647*
	(-1.24)	(-2.08)	(-0.98)	(-1.94)
$Age_{i,t}$	0.032	0.615	0.021	0.508
	(1.44)	(1.28)	(1.12)	(1.17)
$Age_{i,t}^2$	-0.000	-0.006	-0.000	-0.005
	(-1.36)	(-1.25)	(-1.05)	(-1.14)
$Tenure_{i,t}$	-0.001	-0.018	-0.001	-0.005
	(-0.37)	(-0.52)	(-0.31)	(-0.16)
$Associatedegree_{i,t}$	-0.143*	-3.682***	-0.103	-3.582***
	(-1.67)	(-5.58)	(-1.35)	(-4.95)
$Bachelordegree_{i,t}$	-0.159**	-2.882***	-0.132*	-3.131***
	(-2.09)	(-7.71)	(-1.88)	(-6.34)
$Masterdegree_{i,t}$	-0.166**	-2.840***	-0.136*	-3.082***
	(-2.18)	(-7.67)	(-1.92)	(-6.23)
$PhDdegree_{i,t}$	-0.162**	-2.704***	-0.132*	-2.938***
	(-2.08)	(-6.59)	(-1.81)	(-5.53)
$LnGDPPA_{i,t-1}$				-2.432***
				(-3.16)
$LnPublic_{i,t}$			0.382***	5.197***
			(8.23)	(5.74)
$LnRoad_{i,t}$			0.031	-0.416
			(1.61)	(-1.65)
$(n+g+\delta)_{i,t}$			0.019**	0.568***
			(2.19)	(3.14)
$Highedu_{i,t}$			0.532	9.271
			(0.64)	(0.54)
$Unemprt_{i,t}$			-0.018	-0.096
			(-1.17)	(-0.36)
$Constant$	5.361***	0.746	0.558	-41.126***
	(9.11)	(0.06)	(0.73)	(-2.63)
Year Effects	Yes	Yes	Yes	Yes
City Effects	Yes	Yes	Yes	Yes
N	3010	3010	3010	3010
Adj. R^2	0.871	0.588	0.895	0.622

Note: $LnGDP_{i,t}$ is the natural logarithm of GDP. $GDPrate_{i,t}$ is the GDP growth rate. $Female_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary is female and 0 is male. $Age_{i,t}$ is the municipal secretary's age. $Tenure_{i,t}$ is the number of year as municipal secretary in the current position. $Associatedegree_{i,t}$ / $Bachelordegree_{i,t}$ / $Masterdegree_{i,t}$ / $PHDdegree_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary has an Associate / Bachelor / Master / Ph.D degree. The municipal secretaries with a high school degree are omitted in the regressions as reference group. $LnGDPPA_{i,t-1}$ is the natural logarithm of GDP per capita with one year lag. $LnPublic_{i,t}$ is the natural logarithm of public fiscal expenditure, control for

the impact of government fiscal expenditure. *LnRoad$_{i,t}$* is the natural logarithm of the paved road area per capita, control for the regional infrastructure level. *(n+g+δ)$_{i,t}$* is the sum of natural growth rate of population (n), the exogenous rate of technical progress (g), and depreciation rate (δ). Following Mankiw et al. (1992), we assume that g+δ is constant and equals 0.05. *Highedu$_{i,t}$*, is the share of the urban population enrolled in colleges and universities, control for the regional human capital level. *Unemprt$_{i,t}$* is the unemployment rate, control for the economic prospects. All the regressions in this table include city and year fixed effects and cluster standard errors at the city level.

t statistics in parentheses, $^{*}\,p < 0.10$, $^{**}\,p < 0.05$, $^{***}\,p < 0.01$.

Table.4 The impact of female municipal secretary on local economic development

	(1)	(2)	(3)	(4)	(5)
	$LnConsume_{i,t}$	$LnFixinv_{i,t}$	$LnPatent_{i,t}$	$LnFixinv_{i,t}$	$LnRealestate_{i,t}$
$Female_{i,t}$	0.007	-0.091**	0.004	-0.069	-0.130**
	(0.50)	(-1.98)	(0.05)	(-1.58)	(-2.27)
$Age_{i,t}$	0.019	0.073	-0.046	0.047	0.000
	(0.73)	(1.55)	(-0.50)	(1.09)	(0.00)
$Age_{i,t}^2$	-0.000	-0.001	0.000	-0.000	0.000
	(-0.66)	(-1.51)	(0.54)	(-1.07)	(0.04)
$Tenure_{i,t}$	0.002	-0.001	-0.021**	-0.001	-0.011**
	(0.88)	(-0.12)	(-2.32)	(-0.20)	(-2.03)
$Associatedegree_{i,t}$	0.051	-0.158	-0.114	-0.013	-0.112
	(0.80)	(-1.00)	(-0.53)	(-0.08)	(-1.34)
$Bachelordegree_{i,t}$	-0.037	-0.242	-0.185	-0.110	-0.166***
	(-1.09)	(-1.56)	(-0.88)	(-0.68)	(-2.70)
$Masterdegree_{i,t}$	-0.025	-0.203	-0.184	-0.062	-0.105
	(-0.72)	(-1.31)	(-0.87)	(-0.38)	(-1.59)
$PhDdegree_{i,t}$	-0.025	-0.218	-0.207	-0.076	-0.124*
	(-0.72)	(-1.40)	(-0.96)	(-0.47)	(-1.74)
$LnGDPPA_{i,t-1}$				0.452***	0.234*
				(5.36)	(1.84)
$LnPublic_{i,t}$				0.590***	0.431***
				(7.51)	(4.65)
$LnRoad_{i,t}$				-0.005	0.027
				(-0.16)	(0.56)
$(n+g+\delta)_{i,t}$				-0.001	0.052*
				(-0.05)	(1.77)
$Highedu_{i,t}$				-0.913	0.546
				(-0.59)	(0.23)
$Unemprt_{i,t}$				-0.054*	-0.119*
				(-1.88)	(-1.88)
$Constant$	13.608***	12.816***	5.913**	1.468	4.212*
	(19.88)	(10.50)	(2.48)	(0.90)	(1.76)
Year Effects	Yes	Yes	Yes	Yes	Yes
City Effects	Yes	Yes	Yes	Yes	Yes
N	3010	3010	3010	3010	3010
Adj. R^2	0.905	0.833	0.811	0.869	0.728

Note: *LnConsume_{i,t}* is the natural logarithm of total retail sales of consumer goods. *LnFixinv_{i,t}* is the natural logarithm of total investment in fixed assets. *LnPatent_{i,t}* is the natural logarithm of sum patents. *LnRealestate_{i,t}* is the natural logarithm of total investment in real estate sector. *Female_{i,t}* is the dummy variable, equal to 1 if the municipal secretary is female and 0 is male. *Age_{i,t}* is the municipal secretary's age. *Tenure_{i,t}* is the number of years as municipal secretary in the current position. *Associatedegree_{i,t}* / *Bachelordegree_{i,t}* / *Masterdegree_{i,t}* / *PHDdegree_{i,t}* is the dummy variable, equal to 1 if the municipal secretary has an Associate / Bachelor / Master / Ph.D degree. The municipal secretaries with a high school

degree are omitted in the regressions as reference group. *LnGDPPA*$_{i,t-1}$ is the natural logarithm of GDP per capita in the last year. *LnPublic*$_{i,t}$ is the natural logarithm of public fiscal expenditure, control for the impact of government fiscal expenditure. *LnRoad*$_{i,t}$ is the natural logarithm of the paved road area per capita, control for the regional infrastructure level. *(n+g+δ)*$_{i,t}$ is the sum of natural growth rate of population (n), the exogenous rate of technical progress (g), and depreciation rate (δ). Following Mankiw et al. (1992), we assume that g+δ is constant and equals 0.05. *Highedu*$_{i,t}$, is the share of the urban population enrolled in colleges and universities, control for the regional human capital level. *Unemprt*$_{i,t}$ is the unemployment rate, control for the economic prospects. All the regressions in this table include city and year fixed effects and cluster standard errors at the city level.

t statistics in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table.5 The impact of female municipal secretary on regional land auction

	(1)	(2)	(3)	(4)	(5)
	$LnPlanland_{i,t}$	$LnPlanarea_{i,t}$	$LnSolddeal_{i,t}$	$LnSoldland_{i,t}$	$LnSoldarea_{i,t}$
$Female_{i,t}$	-0.178*	-0.238**	-0.107	-0.259*	-0.324**
	(-1.76)	(-2.36)	(-1.22)	(-1.92)	(-2.39)
$Age_{i,t}$	0.034	0.022	0.030	0.164	0.272
	(0.24)	(0.10)	(0.22)	(0.88)	(0.95)
$Age_{i,t}^2$	-0.000	-0.000	-0.000	-0.002	-0.002
	(-0.22)	(-0.08)	(-0.21)	(-0.88)	(-0.90)
$Tenure_{i,t}$	-0.015	-0.017	-0.005	-0.012	-0.007
	(-1.17)	(-0.99)	(-0.42)	(-0.82)	(-0.38)
$Associatedegree_{i,t}$	-0.068	-0.770	0.060	-0.045	-0.670
	(-0.39)	(-1.36)	(0.34)	(-0.26)	(-1.30)
$Bachelordegree_{i,t}$	-0.014	-0.120	-0.049	-0.000	-0.071
	(-0.21)	(-1.42)	(-0.72)	(-0.00)	(-0.68)
$Masterdegree_{i,t}$	-0.003	0.059	0.002	-0.008	0.081
	(-0.05)	(0.71)	(0.04)	(-0.12)	(0.85)
$LnGDPPA_{i,t-1}$	0.994***	1.046***	0.872***	1.037***	1.281***
	(4.11)	(3.30)	(3.54)	(3.86)	(2.94)
$LnPublic_{i,t}$	0.671***	0.741***	0.583***	0.746***	0.920***
	(3.76)	(3.10)	(3.06)	(3.62)	(3.15)
$LnRoad_{i,t}$	-0.075	-0.052	-0.001	-0.026	-0.042
	(-0.73)	(-0.34)	(-0.01)	(-0.24)	(-0.26)
$(n+g+\delta)_{i,t}$	-0.118**	-0.128*	-0.165***	-0.168***	-0.148*
	(-2.51)	(-1.68)	(-3.20)	(-3.00)	(-1.79)
$Highedu_{i,t}$	-7.201	-10.065	-12.043**	-10.412	-4.070
	(-0.96)	(-1.33)	(-2.12)	(-1.43)	(-0.34)
$Unemprt_{i,t}$	0.003	0.108	-0.015	0.038	0.225
	(0.04)	(0.81)	(-0.20)	(0.42)	(1.52)
Constant	-4.033	-5.465	-13.457***	-10.097*	-18.239*
	(-0.93)	(-0.82)	(-3.03)	(-1.83)	(-1.90)
Year Effects	Yes	Yes	Yes	Yes	Yes
City Effects	Yes	Yes	Yes	Yes	Yes
N	2254	2254	2254	2254	2254
Adj. R^2	0.580	0.418	0.653	0.528	0.386

Note: $LnPlanland_{i,t}$ is the natural logarithm of total planned construction land. $LnPlanarea_{i,t}$ is the natural logarithm of total planned construction building area. $LnSolddeal_{i,t}$ is the natural logarithm of total sold land deal. $LnSoldland_{i,t}$ is the natural logarithm of total sold land. $LnSoldarea_{i,t}$ is the natural logarithm of total sold construction building area. $Female_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary is female and 0 is male. $Age_{i,t}$ is the municipal secretary's age. $Tenure_{i,t}$ is the number of years as municipal secretary in the current position. $Associatedegree_{i,t}$ / $Bachelordegree_{i,t}$ / $Masterdegree_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary has an Associate / Bachelor / Master / Ph.D degree. Since there is no municipal secretary's degree is high school in land development sample, the municipal secretaries with a Ph.d degree are omitted in the regressions as reference group. $LnGDPPA_{i,t-}$

$_{I}$ is the natural logarithm of GDP per capita in the last year. *LnPublic$_{i,t}$* is the natural logarithm of public fiscal expenditure, control for the impact of government fiscal expenditure. *LnRoad$_{i,t}$* is the natural logarithm of the paved road area per capita, control for the regional infrastructure level. *(n+g+δ)$_{i,t}$* is the sum of natural growth rate of population (n), the exogenous rate of technical progress (g), and depreciation rate (δ). Following Mankiw et al. (1992), we assume that g+δ is constant and equals 0.05. *Highedu$_{i,t}$*, is the share of the urban population enrolled in colleges and universities, control for the regional human capital level. *Unemprt$_{i,t}$* is the unemployment rate, control for the economic prospects. All the regressions in this table include city and year fixed effects and cluster standard errors at the city level.

t statistics in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table.6 The impact of female municipal secretary on finance sector development

	(1)	(2)	(3)	(4)
	$LnLoan_{i,t}$	$LnDeposit_{i,t}$	$LnFinemp_{i,t}$	$Loanratio_{i,t}$
$Female_{i,t}$	-0.046*	-0.002	-0.019*	-0.022*
	(-1.74)	(-0.13)	(-1.83)	(-1.67)
$Age_{i,t}$	-0.033	-0.013	0.011	-0.013
	(-1.13)	(-0.76)	(0.69)	(-0.77)
$Age_{i,t}^2$	0.000	0.000	-0.000	0.000
	(1.14)	(0.80)	(-0.69)	(0.74)
$Tenure_{i,t}$	0.002	-0.001	0.000	0.002*
	(0.64)	(-0.95)	(0.33)	(1.94)
$Associatedegree_{i,t}$	0.019	-0.039*	-0.039	-0.009
	(0.15)	(-1.91)	(-1.07)	(-0.09)
$Bachelordegree_{i,t}$	0.035	-0.061***	-0.072**	-0.003
	(0.29)	(-3.52)	(-2.13)	(-0.03)
$Masterdegree_{i,t}$	0.042	-0.059***	-0.069**	0.000
	(0.35)	(-3.23)	(-2.02)	(0.00)
$PhDdegree_{i,t}$	0.039	-0.068***	-0.084**	0.005
	(0.32)	(-3.41)	(-2.39)	(0.05)
$LnGDPPA_{i,t-1}$	0.108*	0.198***	-0.061**	-0.048**
	(1.83)	(5.19)	(-2.18)	(-2.10)
$LnPublic_{i,t}$	0.256***	0.259***	0.040**	0.020
	(5.87)	(7.80)	(2.15)	(1.24)
$LnRoad_{i,t}$	0.047**	0.022*	0.000	0.016*
	(2.41)	(1.78)	(0.02)	(1.70)
$(n+g+\delta)_{i,t}$	0.003	0.022***	0.020***	-0.008
	(0.23)	(2.76)	(2.81)	(-0.90)
$Highedu_{i,t}$	2.079	0.413	3.093***	1.333**
	(1.22)	(0.36)	(4.59)	(2.40)
$Unemprt_{i,t}$	0.025	-0.002	0.008	0.015
	(1.10)	(-0.09)	(0.59)	(1.11)
Constant	11.118***	10.414***	0.449	1.095**
	(10.67)	(15.69)	(0.81)	(2.18)
Year Effects	Yes	Yes	Yes	Yes
City Effects	Yes	Yes	Yes	Yes
N	3010	3010	3010	3010
Adj. R^2	0.865	0.964	0.493	0.135

Note: $LnLoan_{i,t}$ is the natural logarithm of the loan balance of the local financial institutions. $LnDeposit_{i,t}$ is the natural logarithm of the deposit balance of the local financial institutions. $LnFinemp_{i,t}$ is the natural logarithm of the sum number of employee in finance sector. $Loanratio_{i,t}$ is the ratio of the loan balance to the deposit balance of the local financial institutions. $Female_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary is female and 0 is male. $Age_{i,t}$ is the municipal secretary's age. $Tenure_{i,t}$ is the number of years as municipal secretary in the current position. $Associatedegree_{i,t}$ / $Bachelordegree_{i,t}$ / $Masterdegree_{i,t}$ / $PhDdegree_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary has an

Associate / Bachelor / Master / Ph.D degree. The municipal secretaries with a high school degree are omitted in the regressions as reference group. $LnGDPPA_{i,t-1}$ is the natural logarithm of GDP per capita in the last year. $LnPublic_{i,t}$ is the natural logarithm of public fiscal expenditure, control for the impact of government fiscal expenditure. $LnRoad_{i,t}$ is the natural logarithm of the paved road area per capita, control for the regional infrastructure level. $(n+g+\delta)_{i,t}$ is the sum of natural growth rate of population (n), the exogenous rate of technical progress (g), and depreciation rate (δ). Following Mankiw et al. (1992), we assume that $g+\delta$ is constant and equals 0.05. $Highedu_{i,t}$, is the share of the urban population enrolled in colleges and universities, control for the regional human capital level. $Unemprt_{i,t}$ is the unemployment rate, control for the economic prospects. All the regressions in this table include city and year fixed effects and cluster standard errors at the city level.

t statistics in parentheses, $^{*} p < 0.10$, $^{**} p < 0.05$, $^{***} p < 0.01$.

Table.7 The impact of female municipal secretary on Chengtou bond

	(1)	(2)	(3)	(4)	(5)
	$Issue_{i,t}$	$LnBondsize_{i,t}$	$Length_{i,t}$	$Coupon_{i,t}$	$Yeildspd_{i,t}$
$Female_{i,t}$	0.031	-0.328**	-0.039	-0.289	-1.193
	(0.20)	(-2.36)	(-0.11)	(-0.94)	(-0.87)
$Age_{i,t}$	0.154	-0.000	0.423	0.621	2.024
	(0.61)	(-0.00)	(0.92)	(1.45)	(0.92)
$Age_{i,t}{}^2$	-0.001	0.000	-0.004	-0.006	-0.019
	(-0.60)	(0.07)	(-0.89)	(-1.40)	(-0.91)
$Tenure_{i,t}$	0.006	0.005	0.012	-0.017	0.358**
	(0.32)	(0.27)	(0.27)	(-0.43)	(2.18)
$Associatedegree_{i,t}$	-0.295	-0.185	-0.315	-0.245	-2.360
	(-1.39)	(-0.83)	(-0.69)	(-0.55)	(-0.71)
$Bachelordegree_{i,t}$	-0.043	-0.131	-0.080	-0.107	-0.734
	(-0.42)	(-1.34)	(-0.35)	(-0.52)	(-1.37)
$Masterdegree_{i,t}$	0.023	-0.100	0.030	0.036	-1.210**
	(0.28)	(-1.44)	(0.16)	(0.22)	(-2.17)
$LnGDPPA_{i,t-1}$	0.407***	0.184	1.599**	0.449	-0.708
	(3.95)	(0.58)	(2.17)	(0.65)	(-0.25)
$LnPublic_{i,t}$	0.875***	0.488**	1.259**	0.845**	4.808
	(9.68)	(2.22)	(2.58)	(2.01)	(1.02)
$LnRoad_{i,t}$	0.071	0.012	0.330	0.383	-2.022*
	(0.85)	(0.08)	(0.95)	(1.11)	(-1.78)
$(n+g+\delta)_{i,t}$	-0.039	0.184**	0.200	0.277	-0.299
	(-0.52)	(2.41)	(1.03)	(1.47)	(-0.94)
$Highedu_{i,t}$	9.807***	13.647	-19.640	-16.483	3.126
	(2.89)	(1.63)	(-0.98)	(-0.93)	(0.07)
$Unemprt_{i,t}$	0.183	-0.018	0.158	0.198	-0.573
	(1.51)	(-0.14)	(0.48)	(0.66)	(-0.58)
$Constant$	-20.785***	-7.229	-43.408***	-31.390**	-104.638
	(-2.97)	(-1.23)	(-3.05)	(-2.34)	(-1.31)
Year Effects	Yes	Yes	Yes	Yes	Yes
City Effects	Yes	Yes	Yes	Yes	Yes
N	2181	2181	2181	2181	2181
Adj/Pseudo. R^2	0.279	0.310	0.121	0.203	0.041

Note: $Issue_{i,t}$ is the dummy variable of the issuance of Chengtou bond, equal to 1 if the city issue Chengtou bond in the year. $LnBondsize_{i,t}$ is the natural logarithm of the sum value of Chengtou bond issued in the year. $Rating_{i,t}$ is the weighted average initial credit rating of Chengtou bond, we transfer BBB- to 1 and AAA to 11, each grade rises 1 score in the calculation. $Length_{i,t}$ is the natural logarithm of the weighted average length of Chengtou bond. $Coupon_{i,t}$ is the weighted average coupon interest rate of Chengtou bond. $Yeildspd_{i,t}$ is the market yield to maturity spread with national government bond. $Female_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary is female and 0 is male. $Age_{i,t}$ is the municipal secretary's age. $Tenure_{i,t}$ is the number of years as municipal secretary in the current position. $Associatedegree_{i,t}$ / $Bachelordegree_{i,t}$ / $Masterdegree_{i,t}$ / $PhDdegree_{i,t}$ is the dummy variable,

equal to 1 if the municipal secretary has an Associate / Bachelor / Master / Ph.D degree. Since there is no municipal secretary's degree is high school in Chengtou bond sample, the municipal secretaries with a high school degree are omitted in the regressions as reference group. *LnGDPPA$_{i,t-1}$* is the natural logarithm of GDP per capita in the last year. *LnPublic$_{i,t}$* is the natural logarithm of public fiscal expenditure, control for the impact of government fiscal expenditure. *LnRoad$_{i,t}$* is the natural logarithm of the paved road area per capita, control for the regional infrastructure level. *(n+g+δ)$_{i,t}$* is the sum of natural growth rate of population (n), the exogenous rate of technical progress (g), and depreciation rate (δ). Following Mankiw et al. (1992), we assume that g+δ is constant and equals 0.05. *Highedu$_{i,t}$*, is the share of the urban population enrolled in colleges and universities, control for the regional human capital level. *Unemprt$_{i,t}$* is the unemployment rate, control for the economic prospects. All the regressions in this table include city and year fixed effects and cluster standard errors at the city level.

t statistics in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table.8 The impact of female municipal secretary on regional section employment

	(1)	(2)	(3)	(4)	(5)
	$Agrgrt_{i,t}$	$Mingrt_{i,t}$	$Fingrt_{i,t}$	$Culgrt_{i,t}$	$Edugrt_{i,t}$
$Female_{i,t}$	-0.115**	-0.114***	-0.019**	0.036*	0.027*
	(-2.49)	(-2.87)	(-2.38)	(1.85)	(1.90)
$Age_{i,t}$	0.053	0.075	-0.008	0.003	0.019
	(0.78)	(0.87)	(-0.38)	(0.09)	(1.03)
$Age_{i,t}{}^2$	-0.000	-0.001	0.000	-0.000	-0.000
	(-0.73)	(-0.95)	(0.35)	(-0.08)	(-1.04)
$Tenure_{i,t}$	-0.009	0.012	-0.001	-0.001	0.002
	(-1.13)	(1.45)	(-0.86)	(-0.39)	(1.36)
$Bachelordegree_{i,t}$	0.023	0.144	-0.023	0.011	-0.003
	(0.33)	(1.62)	(-1.35)	(0.26)	(-0.20)
$Masterdegree_{i,t}$	-0.010	0.132	-0.008	0.015	0.000
	(-0.14)	(1.52)	(-0.48)	(0.34)	(0.01)
$PhDdegree_{i,t}$	0.002	0.103	-0.022	0.007	-0.009
	(0.02)	(1.11)	(-1.23)	(0.17)	(-0.53)
$LnGDPPA_{i,0}$	0.016	0.043	0.012**	0.009	0.003
	(0.50)	(1.39)	(2.10)	(0.91)	(0.54)
$LnPublic_{i,0}$	-0.036	0.019	-0.006	-0.009	0.004
	(-1.32)	(0.61)	(-0.94)	(-1.07)	(0.80)
$LnRoad_{i,0}$	0.014	-0.015	-0.002	0.008	0.008
	(0.38)	(-0.45)	(-0.38)	(0.78)	(1.34)
$(n+g+\delta)_{i,0}$	-0.015	0.016	0.005	0.000	0.009
	(-0.59)	(0.56)	(0.91)	(0.03)	(1.44)
$Highedu_{i,0}$	-0.235	-1.047	0.557***	0.057	-0.041
	(-0.35)	(-1.34)	(2.94)	(0.24)	(-0.34)
$Unemprt_{i,0}$	-0.030	-0.019	-0.008	-0.022	0.004
	(-0.62)	(-0.54)	(-1.09)	(-1.63)	(0.53)
$Constant$	-1.087	-2.555	0.261	-0.078	-0.589
	(-0.59)	(-1.10)	(0.46)	(-0.08)	(-1.18)
Year Effects	Yes	Yes	Yes	Yes	Yes
City Effects	No	No	No	No	No
N	782	580	911	911	911
Adj. R^2	-0.003	0.020	0.038	-0.000	0.011

Note: $Agrgrt_{i,t}$ / $Mingrt_{i,t}$ / $Fingrt_{i,t}$ / $Culgrt_{i,t}$ / $Edugrt_{i,t}$ is the annual growth rate of agriculture / mining / finance / culture / education sector normalize by the length of municipal secretary's tenure. $Female_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary is female and 0 is male. $Age_{i,t}$ is the municipal secretary's age. $Tenure_{i,t}$ is the number of years as municipal secretary in the current position. $Associatedegree_{i,t}$ / $Bachelordegree_{i,t}$ / $Masterdegree_{i,t}$ / $PhDdegree_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary has an Associate / Bachelor / Master / Ph.D degree. The municipal secretaries with an associate college degree are omitted in the regressions as reference group. $LnGDPPA_{i,0}$ is the natural logarithm of GDP per capita in the last year before new municipal secretary's inauguration. $LnPublic_{i,0}$ is the natural logarithm of public fiscal expenditure in the last year before new municipal

secretary's inauguration, control for the impact of government fiscal expenditure. *LnRoad$_{i,0}$* is the natural logarithm of the paved road area per capita in the last year before new municipal secretary's inauguration, control for the regional infrastructure level. *(n+g+δ)$_{i,0}$* is the sum of natural growth rate of population (n), the exogenous rate of technical progress (g), and depreciation rate (*δ*). Following Mankiw et al. (1992), we assume that g+δ is constant and equals 0.05. *Highedu$_{i,0}$* is the share of the urban population enrolled in colleges and universities in the last year before new municipal secretary's inauguration, control for the regional human capital level. *Unemprt$_{i,0}$* is the unemployment rate in the last year before new municipal secretary's inauguration, control for the economic prospects. All the regressions in this table include city and year fixed effects and cluster standard errors at the city level.

t statistics in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table.9 The impact of female municipal secretary on FDI, medical facility, education and environment protection

	(1)	(2)	(3)	(4)	(5)
	$FDIgrt_{i,t}$	$Hospitalgrt_{i,t}$	$Bookgrt_{i,t}$	$Pschoolgrt_{i,t}$	$Greenlandgrt_{i,t}$
$Female_{i,t}$	0.124*	0.117**	0.063**	0.033**	0.078*
	(1.89)	(2.15)	(1.99)	(2.16)	(1.73)
$Age_{i,t}$	0.020	0.071*	-0.009	-0.016	0.015
	(0.28)	(1.83)	(-0.21)	(-0.91)	(0.33)
$Age_{i,t}^2$	-0.000	-0.001*	0.000	0.000	-0.000
	(-0.27)	(-1.80)	(0.15)	(0.93)	(-0.35)
$Tenure_{i,t}$	0.023***	-0.013***	-0.000	0.000	0.006*
	(2.85)	(-3.19)	(-0.15)	(0.19)	(1.82)
$Bachelordegree_{i,t}$	-0.060	-0.049	-0.026	0.004	0.041
	(-0.43)	(-0.60)	(-0.90)	(0.24)	(1.33)
$Masterdegree_{i,t}$	-0.061	-0.038	-0.018	0.003	0.043
	(-0.44)	(-0.47)	(-0.60)	(0.19)	(1.45)
$PhDdegree_{i,t}$	-0.053	-0.051	-0.024	0.012	0.041
	(-0.38)	(-0.63)	(-0.78)	(0.73)	(1.34)
$LnGDPPA_{i,0}$	-0.141	-0.292	-0.466	-0.076	-0.187
	(-0.24)	(-0.89)	(-1.14)	(-0.53)	(-0.59)
$LnPublic_{i,0}$	-0.007	0.000	0.012	0.017***	0.008
	(-0.27)	(0.01)	(1.28)	(3.29)	(1.10)
$LnRoad_{i,0}$	-0.004	0.036*	0.001	0.029***	-0.023*
	(-0.13)	(1.73)	(0.13)	(5.07)	(-1.73)
$(n+g+\delta)_{i,0}$	-0.028	-0.010	0.025**	-0.004	0.004
	(-1.04)	(-0.48)	(2.25)	(-0.75)	(0.29)
$Highedu_{i,0}$	0.041*	0.018	0.009	0.035***	0.017*
	(1.72)	(1.12)	(0.81)	(5.19)	(1.65)
$Unemprt_{i,0}$	0.018	-0.010	-0.015	-0.001	-0.017
	(0.37)	(-0.49)	(-0.90)	(-0.09)	(-0.96)
Constant	0.132	-1.711	-0.017	0.144	-0.405
	(0.07)	(-1.65)	(-0.01)	(0.30)	(-0.33)
Year Effects	Yes	Yes	Yes	Yes	Yes
City Effects	No	No	No	No	No
N	816	897	897	910	897
Adj. R^2	0.176	0.035	0.028	0.184	0.040

Note: *Hospitalgrt$_{i,t}$ / Bookgrt$_{i,t}$ / FDIgrt$_{i,t}$ / Eschoolgrt$_{i,t}$ / Greenlandgrt$_{i,t}$* is the annual growth rate of hospital number / total number of book in the public library / foreign funded enterprises' gross industrial output value/ the number of student in primary school / area of green land, normalize by the length of municipal secretary's tenure. *Female$_{i,t}$* is the dummy variable, equal to 1 if the municipal secretary is female and 0 is male. *Age$_{i,t}$* is the municipal secretary's age. *Tenure$_{i,t}$* is the number of years as municipal secretary in the current position. *Bachelordegree$_{i,t}$/ Masterdegree$_{i,t}$/ PhDdegree$_{i,t}$* is the dummy variable, equal to 1 if the municipal secretary has an Bachelor / Master / Ph.D degree. The municipal secretaries with an associate college degree are omitted in the regressions as reference group. *LnGDPPA$_{i,0}$* is the

natural logarithm of GDP per capita in the last year before new municipal secretary's inauguration. *LnPublic$_{i,0}$* is the natural logarithm of public fiscal expenditure in the last year before new municipal secretary's inauguration, control for the impact of government fiscal expenditure. *LnRoad$_{i,0}$* is the natural logarithm of the paved road area per capita in the last year before new municipal secretary's inauguration, control for the regional infrastructure level. *(n+g+δ)$_{i,0}$* is the sum of natural growth rate of population (n), the exogenous rate of technical progress (g), and depreciation rate ($δ$). Following Mankiw et al. (1992), we assume that g+δ is constant and equals 0.05. *Highedu$_{i,0}$* is the share of the urban population enrolled in colleges and universities in the last year before new municipal secretary's inauguration, control for the regional human capital level. *Unemprt$_{i,0}$* is the unemployment rate in the last year before new municipal secretary's inauguration, control for the economic prospects. All the regressions in this table include city and year fixed effects and cluster standard errors at the city level.

t statistics in parentheses, [*] $p < 0.10$, [**] $p < 0.05$, [***] $p < 0.01$.

Table.10 Descriptive statistics on the municipal secretary's news report of 281 cities in China, 2006-2016

	$Female_{i,t}=1$						$Female_{i,t}=0$						t-test
	N	Mean	P10	P25	P75	P90	N	Mean	P10	P25	P75	P90	Difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(2)-(8)
Panel A: The sum news number													
$ReportNum_{i,t}$	70	123.21	49	86	153	199	1739	143.63	66	94	183	233	-20.417**
$OpinionNum_{i,t}$	70	102.44	42.5	66	133	160	1739	118.69	53	77	151	195	-16.244**
Panel B: The share of different activities to the sum news number													
$AgdSchool_{i,t}$(%)	70	9.59	2.24	3.92	11.11	24.97	1739	7.62	2.09	3.49	8.77	15.82	1.967**
$AgdHospt_{i,t}$(%)	70	2.96	0.90	1.59	3.92	5.59	1739	3.14	0.72	1.52	4.35	6.19	-0.177
$AgdCultr_{i,t}$(%)	70	0.42	0.00	0.00	0.75	1.24	1739	0.28	0.00	0.00	0.37	0.97	0.144*
$AgdComf_{i,t}$(%)	70	2.18	0.00	0.84	2.91	4.59	1739	1.50	0.00	0.53	2.17	3.17	0.675***
Panel C: The share of different opinion tags to the sum news number													
$TagParty_{i,t}$(%)	70	2.35	0.00	0.00	3.66	5.22	1739	2.28	0.00	0.85	3.27	5.00	0.074
$TagEcon_{i,t}$(%)	70	50.41	33.01	41.03	59.87	63.65	1739	54.51	37.88	46.64	62.96	68.93	-4.100***
$TagSociety_{i,t}$(%)	70	16.13	6.46	9.05	20.37	30.66	1739	13.49	6.39	9.09	16.48	21.28	2.645***
$TagEvir_{i,t}$(%)	70	1.88	0.00	0.00	2.86	4.51	1739	1.22	0.00	0.00	1.49	3.08	0.657**
$TagCultr_{i,t}$(%)	70	13.47	6.39	9.17	16.33	20.07	1739	12.10	5.61	8.00	14.94	19.27	1.374*
$TagPolitic_{i,t}$(%)	70	18.63	9.76	12.80	22.95	30.16	1739	18.69	9.09	12.77	23.73	29.79	-0.058
Panel D: The frequency of different sentimental word to the sum news with opinion													
$AggressFreq_{i,t}$	70	4.47	2.74	3.15	5.00	6.80	1739	5.19	3.00	3.73	6.18	7.90	-0.727***
$ConservFreq_{i,t}$	70	0.40	0.18	0.24	0.54	0.71	1739	0.35	0.16	0.21	0.44	0.57	0.059**
$DefiniteFreq_{i,t}$	70	10.55	6.90	7.98	11.89	15.92	1739	9.88	6.32	7.60	11.46	14.03	0.667
$AmbigFreq_{i,t}$	70	2.04	1.17	1.39	2.44	3.14	1739	2.31	1.20	1.58	2.79	3.65	-0.268**

Table.11 The share of female municipal secretary's agenda

	(1)	(2)	(3)	(4)
	$AdgSchool_{i,t}$	$AgdHospt_{i,t}$	$AgdCultr_{i,t}$	$AgdComf_{i,t}$
$Female_{i,t}$	0.570	0.031	0.097	0.682**
	(1.37)	(0.09)	(1.12)	(2.59)
$Age_{i,t}$	0.639	-0.272	-0.028	-0.122
	(0.91)	(-0.59)	(-0.24)	(-0.42)
$Age_{i,t}^2$	-0.006	0.003	0.000	0.001
	(-0.89)	(0.61)	(0.32)	(0.42)
$Tenure_{i,t}$	0.096	-0.061	-0.006	0.049**
	(1.48)	(-1.51)	(-0.46)	(2.19)
$Associatedegree_{i,t}$	5.726***	0.276	-0.120	-1.313***
	(6.26)	(0.46)	(-0.70)	(-4.19)
$Bachelordegree_{i,t}$	2.844***	0.224	0.022	-2.160***
	(3.27)	(0.43)	(0.16)	(-7.86)
$Masterdegree_{i,t}$	2.530***	0.365	0.143	-1.958***
	(3.03)	(0.76)	(1.08)	(-7.43)
$PhDdegree_{i,t}$	2.386**	0.035	0.134	-2.116***
	(2.54)	(0.07)	(1.00)	(-7.88)
$LnGDPPA_{i,t-1}$	1.886*	-0.785	0.412***	0.857**
	(1.81)	(-1.18)	(2.67)	(2.19)
$LnPublic_{i,t}$	-1.669**	0.615	-0.153	-0.512*
	(-2.02)	(1.23)	(-1.49)	(-1.74)
$LnRoad_{i,t}$	0.963*	-0.057	-0.005	0.115
	(1.90)	(-0.23)	(-0.08)	(0.70)
$(n+g+\delta)_{i,t}$	-0.036	-0.182	0.045	-0.172
	(-0.11)	(-1.06)	(0.77)	(-1.21)
$Highedu_{i,t}$	-10.522	35.772**	8.755	-15.142**
	(-0.49)	(2.51)	(1.61)	(-2.13)
$Unemprt_{i,t}$	0.408	0.092	0.029	-0.420***
	(0.77)	(0.29)	(0.37)	(-2.81)
$Constant$	-9.803	9.284	-1.469	5.455
	(-0.45)	(0.67)	(-0.46)	(0.62)
Year Effects	Yes	Yes	Yes	Yes
City Effects	Yes	Yes	Yes	Yes
N	1809	1809	1809	1809
Adj. R^2	0.756	0.084	0.015	0.103

Note: $AgdSchool_{i,t}$ / $AgdHospt_{i,t}$ / $AgdCulture_{i,t}$ / $AgdComf_{i,t}$ is the share of the activity that the municipal secretary participates in of investigating school / investigating hospital / culture / comfort the local citizen, to the sum number of the municipal secretary's new in a year. $Female_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary is female and 0 is male. $Age_{i,t}$ is the municipal secretary's age. $Tenure_{i,t}$ is the number of years as municipal secretary in the current position. $Associatedegree_{i,t}$ / $Bachelordegree_{i,t}$ / $Masterdegree_{i,t}$ / $Ph.Ddegree_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary has an Associate / Bachelor / Master / Ph.D degree. Since there is no municipal secretary's degree is high school

in land development sample, the municipal secretaries with a Ph.d degree are omitted in the regressions as reference group. $LnGDPPA_{i,t-1}$ is the natural logarithm of GDP per capita in the last year. $LnPublic_{i,t}$ is the natural logarithm of public fiscal expenditure, control for the impact of government fiscal expenditure. $LnRoad_{i,t}$ is the natural logarithm of the paved road area per capita, control for the regional infrastructure level. $(n+g+\delta)_{i,t}$ is the sum of natural growth rate of population (n), the exogenous rate of technical progress (g), and depreciation rate (δ). Following Mankiw et al. (1992), we assume that $g+\delta$ is constant and equals 0.05. $Highedu_{i,t}$, is the share of the urban population enrolled in colleges and universities, control for the regional human capital level. $Unemprt_{i,t}$ is the unemployment rate, control for the economic prospects. All the regressions in this table include city and year fixed effects and cluster standard errors at the city level.

t statistics in parentheses, $^{*} p < 0.10$, $^{**} p < 0.05$, $^{***} p < 0.01$.

Table.12 The sentiment word frequency of female municipal secretary

	(1)	(2)	(3)	(4)	(5)	(6)
	$TagParty_{i,t}$	$TagEcon_{i,t}$	$TagSociety_{i,t}$	$TagEnvir_{i,t}$	$TagCultr_{i,t}$	$TagPolitic_{i,t}$
$Female_{i,t}$	-0.148	-3.425**	1.055	0.652**	2.145*	-0.367
	(-0.55)	(-2.33)	(0.90)	(2.32)	(1.75)	(-0.36)
$Age_{i,t}$	0.106	-2.890	-0.187	0.102	1.566	1.520
	(0.29)	(-1.56)	(-0.18)	(0.27)	(1.19)	(1.17)
$Age_{i,t}{}^2$	-0.001	0.028	0.002	-0.001	-0.015	-0.015
	(-0.28)	(1.59)	(0.21)	(-0.29)	(-1.21)	(-1 .18)
$Tenure_{i,t}$	0.085***	-0.283**	0.123	0.026	0.004	0.169
	(2.92)	(-2.05)	(1.28)	(0.54)	(0.04)	(1.42)
$Associatedegree_{i,t}$	-0.732*	-1.937	8.272***	-1.196**	-5.499**	0.684
	(-1.97)	(-0.87)	(6.00)	(-2.48)	(-2.32)	(0.37)
$Bachelordegree_{i,t}$	-0.393	0.149	6.700***	-1.593***	-3.301**	-1.472
	(-1.11)	(0.08)	(5.57)	(-4.07)	(-2.24)	(-0.89)
$Masterdegree_{i,t}$	-0.390	0.048	7.150***	-1.827***	-3.282**	-1.379
	(-1.13)	(0.03)	(6.45)	(-4.42)	(-2.19)	(-0.89)
$PhDdegree_{i,t}$	-0.559	0.284	7.420***	-1.704***	-2.887**	-1.850
	(-1.47)	(0.16)	(6.65)	(-3.58)	(-1.99)	(-1.15)
$LnGDPPA_{i,t-1}$	0.018	-1.652	2.454	-1.730**	-0.897	2.692
	(0.03)	(-0.53)	(1.05)	(-2.36)	(-0.45)	(1.16)
$LnPublic_{i,t}$	-0.962**	-0.129	0.398	1.360*	0.918	-1.165
	(-2.29)	(-0.06)	(0.25)	(1.91)	(0.68)	(-0.79)
$LnRoad_{i,t}$	-0.146	-3.308***	1.611**	-0.390	0.993	1.065
	(-0.58)	(-2.72)	(2.13)	(-1.36)	(1.07)	(1.02)
$(n+g+\delta)_{i,t}$	0.099	0.400	0.144	0.113	0.660	-0.811
	(0.56)	(0.49)	(0.28)	(0.67)	(0.91)	(-1.35)
$Highedu_{i,t}$	-22.721**	38.561	-72.372	36.838	-8.363	44.284
	(-2.44)	(0.62)	(-1.14)	(1.32)	(-0.25)	(1.32)
$Unemprt_{i,t}$	0.287	1.140	-1.400**	-0.075	-0.318	-0.187
	(1.33)	(0.92)	(-2.17)	(-0.30)	(-0.50)	(-0.22)
$Constant$	12.392	152.610***	-21.368	-1.850	-31.023	-28.754
	(1.13)	(2.77)	(-0.62)	(-0.16)	(-0.80)	(-0.73)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes
City Effects	Yes	Yes	Yes	Yes	Yes	Yes
N	1809	1809	1809	1809	1809	1809
adj. R^2	0.179	0.382	0.179	0.111	0.005	0.252

Note: *TagParty$_{i,t}$ / TagEcon$_{i,t}$ / TagSociety$_{i,t}$ / TagEnvir$_{i,t}$ / TagCultr$_{i,t}$ / TagPolitic$_{i,t}$* is share of the municipal secretary's opinion with *Party / Economy / Society / Environment / Culture / Politic tag* which we use the text classification algorithm in Section 3.2 and the training sample is collected from Chairman JinPing Xi's Speech database. *Female$_{i,t}$* is the dummy variable, equal to 1 if the municipal secretary is female and 0 is male. *Age$_{i,t}$* is the municipal secretary's age. *Tenure$_{i,t}$* is the number of years as municipal secretary in the current position. *Associatedegree$_{i,t}$ / Bachelordegree$_{i,t}$ / Masterdegree$_{i,t}$ /*

Ph.Ddegree$_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary has an Associate / Bachelor / Master / Ph.D degree. Since there is no municipal secretary's degree is high school in land development sample, the municipal secretaries with a Ph.d degree are omitted in the regressions as reference group. *LnGDPPA*$_{i,t-1}$ is the natural logarithm of GDP per capita in the last year. *LnPublic*$_{i,t}$ is the natural logarithm of public fiscal expenditure, control for the impact of government fiscal expenditure. *LnRoad*$_{i,t}$ is the natural logarithm of the paved road area per capita, control for the regional infrastructure level. *(n+g+δ)*$_{i,t}$ is the sum of natural growth rate of population (n), the exogenous rate of technical progress (g), and depreciation rate (δ). Following Mankiw et al. (1992), we assume that g+δ is constant and equals 0.05. *Highedu*$_{i,t}$, is the share of the urban population enrolled in colleges and universities, control for the regional human capital level. *Unemprt*$_{i,t}$ is the unemployment rate, control for the economic prospects. All the regressions in this table include city and year fixed effects and cluster standard errors at the city level.

t statistics in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table.13 The sentiment word frequency of female municipal secretary

	(1)	(2)	(3)	(4)
	$AggressFreq_{i,t}$	$ConservFreq_{i,t}$	$DefiniteFreq_{i,t}$	$AmbigFreq_{i,t}$
$Female_{i,t}$	-0.777*	0.024	-0.255	-0.504**
	(-1.78)	(0.58)	(-0.40)	(-2.38)
$Age_{i,t}$	0.049	-0.019	0.356	-0.047
	(0.12)	(-0.52)	(0.62)	(-0.27)
$Age_{i,t}^2$	0.000	0.000	-0.002	0.001
	(0.04)	(0.67)	(-0.43)	(0.31)
$Tenure_{i,t}$	-0.022	0.001	0.009	-0.001
	(-0.64)	(0.16)	(0.16)	(-0.06)
$Associatedegree_{i,t}$	-0.706*	-0.204***	-3.252***	-2.355***
	(-1.67)	(-4.64)	(-4.12)	(-10.84)
$Bachelordegree_{i,t}$	-0.010	-0.173***	-3.070***	-2.097***
	(-0.02)	(-4.16)	(-4.34)	(-9.61)
$Masterdegree_{i,t}$	0.200	-0.157***	-2.372***	-2.044***
	(0.47)	(-4.14)	(-3.55)	(-9.56)
$PhDdegree_{i,t}$	0.291	-0.145***	-2.582***	-2.000***
	(0.66)	(-3.46)	(-3.61)	(-9.01)
$LnGDPPA_{i,t-1}$	0.141	0.009	0.430	-0.019
	(0.23)	(0.14)	(0.41)	(-0.05)
$LnPublic_{i,t}$	-0.104	-0.011	0.254	-0.196
	(-0.24)	(-0.27)	(0.35)	(-0.86)
$LnRoad_{i,t}$	-0.017	0.015	0.285	0.065
	(-0.08)	(0.71)	(0.70)	(0.57)
$(n+g+\delta)_{i,t}$	0.248	0.021	0.135	0.100
	(1.62)	(1.36)	(0.49)	(1.25)
$Highedu_{i,t}$	16.349	0.174	15.607	1.178
	(1.29)	(0.16)	(0.82)	(0.16)
$Unemprt_{i,t}$	-0.119	-0.020	-0.413	-0.018
	(-0.44)	(-0.69)	(-0.99)	(-0.11)
$Constant$	4.348	0.971	-5.591	8.772*
	(0.40)	(0.91)	(-0.31)	(1.67)
Year Effects	Yes	Yes	Yes	Yes
City Effects	Yes	Yes	Yes	Yes
N	1809	1809	1809	1809
Adj. R^2	0.337	0.042	0.180	0.206

Note: $AggressFreq_{i,t}$ / $ConservFreq_{i,t}$ / $DefiniteFreq_{i,t}$ / $AmbigFreq_{i,t}$ is the word frequency of *Aggressive / Conservative / Definite / Ambiguous* word that the municipal secretary used in their opinion, which is calculated by the sum number of *Aggressive / Conservative / Definite / Ambiguous* word dividing the sum number of news with opinion in the year. The word dictionary is referring from You et al. (2018)'s paper. *Female$_{i,t}$* is the dummy variable, equal to 1 if the municipal secretary is female and 0 is male. *Age$_{i,t}$* is the municipal secretary's age. *Tenure$_{i,t}$* is the number of years as municipal secretary in the current position. *Associatedegree$_{i,t}$* / *Bachelordegree$_{i,t}$* / *Masterdegree$_{i,t}$* / *Ph.Ddegree$_{i,t}$* is the dummy

variable, equal to 1 if the municipal secretary has an Associate / Bachelor / Master / Ph.D degree. Since there is no municipal secretary's degree is high school in land development sample, the municipal secretaries with a Ph.d degree are omitted in the regressions as reference group. *LnGDPPA*$_{i,t-1}$ is the natural logarithm of GDP per capita in the last year. *LnPublic*$_{i,t}$ is the natural logarithm of public fiscal expenditure, control for the impact of government fiscal expenditure. *LnRoad*$_{i,t}$ is the natural logarithm of the paved road area per capita, control for the regional infrastructure level. *(n+g+δ)*$_{i,t}$ is the sum of natural growth rate of population (n), the exogenous rate of technical progress (g), and depreciation rate (δ). Following Mankiw et al. (1992), we assume that g+δ is constant and equals 0.05. *Highedu*$_{i,t}$, is the share of the urban population enrolled in colleges and universities, control for the regional human capital level. *Unemprt*$_{i,t}$ is the unemployment rate, control for the economic prospects. All the regressions in this table include city and year fixed effects and cluster standard errors at the city level.

t statistics in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table.14 The Difference-in-Difference (DID) study of female municipal secretary's inauguration and departure

	(1)	(2)	(3)	(4)
	$GDPrate_{i,t}$	$LnPlanarea_{i,t}$	$LnSoldarea_{i,t}$	$Loanratio_{i,t}$
$Female_{i,t-2}×FMStart_{i,t-2}$	0.478	-0.018	-0.043	-0.002
	(1.08)	(-0.12)	(-0.26)	(-0.11)
$Female_{i,t-1}×FMStart_{i,t-1}$	-0.582	-0.159	-0.229	-0.005
	(-1.27)	(-1.16)	(-1.39)	(-0.31)
$Female_{i,t}$	-0.668*	-0.257**	-0.354**	-0.026*
	(-1.70)	(-2.14)	(-2.21)	(-1.80)
$Female_{i,t+1}×FMEnd_{i,t+1}$	-0.199	-0.134	-0.138	-0.021
	(-0.28)	(-1.21)	(-1.06)	(-0.98)
$Female_{i,t+2}×FMEnd_{i,t+2}$	0.201	-0.082	-0.109	0.022
	(0.36)	(-0.68)	(-0.92)	(0.64)
Personal Characteristics Control	Yes	Yes	Yes	Yes
City Economy Control	Yes	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes	Yes
City Effects	Yes	Yes	Yes	Yes
N	2690	2156	2156	2690
Adj. R^2	0.621	0.451	0.405	0.146

Note: $GDPrate_{i,t}$ is the GDP growth rate. $LnPlanarea_{i,t}$ is the natural logarithm of total planned construction building area. $LnSoldarea_{i,t}$ is the natural logarithm of total sold construction building area. $Loanratio_{i,t}$ is the ratio of the loan balance to the deposit balance of the local financial institutions. $Female_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary is female and 0 is male. $FMStart_{i,t-1}$ is one year before the first year of female municipal secretary's jurisdiction, i.e., the female municipal secretary's inauguration. $FMEnd_{i,t-1}$ is one year after the last year of female municipal secretary's jurisdiction, i.e., the female municipal secretary's departure. This table is controlled municipal secretary's personal characteristics variables and the city economic variables as the other tables.

t statistics in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table.15 The delegation propensity of municipal secretary

	(1)	(2)	(3)	(4)	(5)	(6)
	$Female_{i,t}$	$Female_{i,t}$	$Female_{i,t}$	$Female_{i,t}$	$Female_{i,t}$	$Female_{i,t}$
$LnGDPrate_{i,t-1}$	-0.026					
	(-1.01)					
$LnFixinv_{i,t-1}$		0.394				
		(1.64)				
$LnRealestate_{i,t-1}$			-0.002			
			(-0.02)			
$LnLoan_{i,t-1}$				0.267		
				(1.33)		
$LnFinemp_{i,t-1}$					-0.036	
					(-0.10)	
$Loanratio_{i,t-1}$						-0.463
						(-0.92)
$LnGDPPA_{i,t-1}$	0.124	-0.071	0.114	-0.012	0.114	0.137
	(0.64)	(-0.33)	(0.62)	(-0.06)	(0.57)	(0.70)
$LnPublic_{i,t-1}$	-0.362**	-0.757**	-0.361	-0.653**	-0.348	-0.371**
	(-2.51)	(-2.45)	(-1.61)	(-2.43)	(-1.46)	(-2.53)
$LnRoad_{i,t-1}$	1.183	0.817	1.109	-1.538	1.208	1.542
	(0.21)	(0.14)	(0.19)	(-0.25)	(0.21)	(0.28)
$(n+g+\delta)_{i,t-1}$	0.071	0.096	0.093	0.075	0.093	0.107
	(0.40)	(0.52)	(0.50)	(0.41)	(0.52)	(0.59)
$Highedu_{i,t-1}$	-0.199	-0.239	-0.221	-0.211	-0.222	-0.220
	(-1.03)	(-1.22)	(-1.14)	(-1.08)	(-1.16)	(-1.13)
$Unemprt_{i,t-1}$	-0.137	-0.019	-0.136	-0.074	-0.136	-0.144
	(-0.55)	(-0.08)	(-0.55)	(-0.30)	(-0.54)	(-0.59)
Constant	1.790	2.605	1.515	2.533	1.330	1.650
	(0.71)	(0.94)	(0.58)	(0.97)	(0.37)	(0.64)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes
City Effects	No	No	No	No	No	No
N	694	694	694	694	694	694
Pesudo R^2	0.060	0.065	0.057	0.064	0.057	0.060

Note: $Female_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary is female and 0 is male. $LnLoan_{i,t}$ is the natural logarithm of the loan balance of the local financial institutions. $LnFinemp_{i,t}$ is the natural logarithm of the sum number of employee in finance sector. $Loanratio_{i,t}$ is the ratio of the loan balance to the deposit balance of the local financial institutions. $Age_{i,t}$ is the municipal secretary's age. $Tenure_{i,t}$ is the number of years as municipal secretary in the current position. $Associatedegree_{i,t}$ / $Bachelordegree_{i,t}$ / $Masterdegree_{i,t}$ / $PhDdegree_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary has an Associate / Bachelor / Master / Ph.D degree. The municipal secretaries with a high school degree are omitted in the regressions as reference group. $LnGDPPA_{i,t-1}$ is the natural logarithm of GDP per capita in the last year. $LnPublic_{i,t}$ is the natural logarithm of public fiscal expenditure, control for the impact of government fiscal expenditure. $LnRoad_{i,t}$ is the natural logarithm of the paved road area per capita, control for the regional infrastructure level. $(n+g+\delta)_{i,t}$ is the sum of natural growth rate of

population (n), the exogenous rate of technical progress (g), and depreciation rate (δ). Following Mankiw et al. (1992), we assume that g+δ is constant and equals 0.05. *Highedu$_{i,t}$*, is the share of the urban population enrolled in colleges and universities, control for the regional human capital level. *Unemprt$_{i,t}$* is the unemployment rate, control for the economic prospects. All the regressions in this table include city and year fixed effects and cluster standard errors at the city level.

t statistics in parentheses, $^{*}\, p < 0.10$, $^{**}\, p < 0.05$, $^{***}\, p < 0.01$.

Table.16 The sample of the sudden departure municipal secretary's successors

	(1)	(2)	(3)	(4)	(5)
	$GDPrate_{i,t}$	$GDPrate_{i,t}$	$LnRealestate_{i,t}$	$LnLoan_{i,t}$	$Loanratio_{i,t}$
$Female_{i,t}$	-1.941**	-1.637	-0.181	-0.157	-0.080*
	(-2.07)	(-1.60)	(-1.12)	(-1.25)	(-1.80)
$Age_{i,t}$	3.102***	4.211***	0.290	0.727***	0.353***
	(2.64)	(2.99)	(0.97)	(3.52)	(3.49)
$Age_{i,t}^2$	-0.031***	-0.041***	-0.003	-0.007***	-0.003***
	(-2.73)	(-3.03)	(-1.02)	(-3.69)	(-3.60)
$Tenure_{i,t}$	0.630***	0.574***	0.113***	0.115***	0.038***
	(4.26)	(3.71)	(2.71)	(3.86)	(2.76)
$Masterdegree_{i,t}$	-0.126	-0.299	0.562***	0.201**	0.064
	(-0.19)	(-0.52)	(4.07)	(2.09)	(1.49)
$PhDdegree_{i,t}$	-1.148	-1.373*	0.446**	-0.018	0.022
	(-1.20)	(-1.95)	(2.61)	(-0.13)	(0.36)
$LnGDPPA_{i,t-1}$		0.135	6.286***	9.167***	1.222*
		(0.01)	(3.07)	(5.50)	(1.83)
$LnPublic_{i,t}$		2.020***	1.442***	1.154***	0.032
		(4.57)	(14.18)	(18.24)	(0.92)
$LnRoad_{i,t}$		-2.038***	0.275**	0.171**	0.026
		(-3.94)	(2.06)	(2.22)	(0.55)
$(n+g+\delta)_{i,t}$		-0.484	0.122	0.292***	0.030
		(-0.76)	(0.96)	(3.59)	(0.62)
$Highedu_{i,t}$		0.679	0.184	0.048	-0.009
		(1.24)	(1.60)	(0.63)	(-0.30)
$Unemprt_{i,t}$		-0.040	-0.055	0.066	-0.058
		(-0.06)	(-0.41)	(0.68)	(-1.53)
Constant	-64.285**	-113.621***	-16.197*	-21.579***	-8.945***
	(-2.11)	(-2.86)	(-1.96)	(-3.67)	(-3.14)
Year Effects	Yes	Yes	Yes	Yes	Yes
City Effects	No	No	No	No	No
N	115	115	115	115	115
Adj. R^2	0.582	0.697	0.836	0.904	0.192

Note: $GDPrate_{i,t}$ is the GDP growth rate. $LnRealestate_{i,t}$ is the natural logarithm of total investment in real estate development. $LnLoan_{i,t}$ is the natural logarithm of the loan balance of the local financial institutions. $Loanratio_{i,t}$ is the ratio of the loan balance to the deposit balance of the local financial institutions. $Female_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary is female and 0 is male. $Age_{i,t}$ is the municipal secretary's age. $Tenure_{i,t}$ is the number of years as municipal secretary in the current position. $Bachelordegree_{i,t}$ / $Masterdegree_{i,t}$ / $PhDdegree_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary has an Associate / Bachelor / Master / Ph.D degree. Since there is no municipal secretary's degree is high school or associate college in sudden department sample, the municipal secretaries with a high school degree are omitted in the regressions as reference group. $LnGDPPA_{i,t-1}$ is the natural logarithm of GDP per capita in the last year. $LnPublic_{i,t}$ is the natural logarithm of public fiscal expenditure, control for the impact of government fiscal expenditure. $LnRoad_{i,t}$ is the natural

logarithm of the paved road area per capita, control for the regional infrastructure level. *(n+g+δ)$_{i,t}$* is the sum of natural growth rate of population (n), the exogenous rate of technical progress (g), and depreciation rate (*δ*). Following Mankiw et al. (1992), we assume that g+δ is constant and equals 0.05. *Highedu$_{i,t}$*, is the share of the urban population enrolled in colleges and universities, control for the regional human capital level. *Unemprt$_{i,t}$* is the unemployment rate, control for the economic prospects. All the regressions in this table include city and year fixed effects and cluster standard errors at the city level.

t statistics in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table.17 The future career of female municipal secretary

	(1)	(2)	(3)	(4)
	$Promotion_{i,t}$	$Promotion_{i,t}$	$Bribe_{i,t}$	$Bribe_{i,t}$
$Female_{i,t}$	-0.471*	-0.500**	-0.261	-0.269
	(-1.90)	(-1.98)	(-0.52)	(-0.52)
$Age_{i,t}$	1.039***	1.315***	-0.335	-0.418
	(3.20)	(3.31)	(-0.75)	(-0.81)
$Age_{i,t}^2$	-0.011***	-0.014***	0.004	0.004
	(-3.64)	(-3.70)	(0.85)	(0.87)
$Tenure_{i,t}$	-0.019	-0.006	-0.055	-0.064
	(-0.70)	(-0.21)	(-1.14)	(-1.21)
$Bachelordegree_{i,t}$	-0.943	-0.046	-0.244	-0.406
	(-1.50)	(-0.27)	(-1.02)	(-1.48)
$Masterdegree_{i,t}$	-0.797	0.104	-0.014	-0.009
	(-1.27)	(0.79)	(-0.07)	(-0.05)
$PhDdegree_{i,t}$	-0.789	.	.	.
	(-1.25)	.	.	.
$AnnGDPrate_{i,t}$		0.537		-2.639
		(0.55)		(-1.60)
$LnGDPPA_{i,0}$		0.259**		-0.242
		(2.37)		(-1.44)
$LnPublic_{i,0}$		0.089		-0.050
		(0.90)		(-0.35)
$LnRoad_{i,0}$		-0.108		0.181
		(-0.97)		(1.03)
$(n+g+\delta)_{i,0}$		-0.092		-0.012
		(-0.78)		(-0.06)
$Highedu_{i,0}$		1.201		12.317***
		(0.36)		(3.04)
$Unemprt_{i,0}$		-0.079		-0.177
		(-0.51)		(-0.73)
$Constant$	-22.377***	-34.445***	6.352	11.291
	(-2.66)	(-3.26)	(0.54)	(0.79)
Year Effects	Yes	Yes	Yes	Yes
City Effects	No	No	No	No
N	951	872	949	872
Adj. R^2	0.035	0.028	0.176	0.184

Note: $Promotion_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary got promotion after his/her tenure. $Bribe_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary received bribe and punished during his/her jurisdiction. $Age_{i,t}$ is the municipal secretary's age. $Tenure_{i,t}$ is the number of years as municipal secretary in the current position. $Female_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary is female and 0 is male. $Age_{i,t}$ is the municipal secretary's age. $Tenure_{i,t}$ is the number of years as municipal secretary in the current position. $Bachelordegree_{i,t}$ / $Masterdegree_{i,t}$ / $PhDdegree_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary has an Bachelor / Master / Ph.D degree. The

municipal secretaries with an associate college degree are omitted in the regressions as reference group. $LnGDPPA_{i,0}$ is the natural logarithm of GDP per capita in the last year before new municipal secretary's inauguration. $LnPublic_{i,0}$ is the natural logarithm of public fiscal expenditure in the last year before new municipal secretary's inauguration, control for the impact of government fiscal expenditure. $LnRoad_{i,0}$ is the natural logarithm of the paved road area per capita in the last year before new municipal secretary's inauguration, control for the regional infrastructure level. $(n+g+\delta)_{i,0}$ is the sum of natural growth rate of population (n), the exogenous rate of technical progress (g), and depreciation rate (δ). Following Mankiw et al. (1992), we assume that g+δ is constant and equals 0.05. $Highedu_{i,0}$ is the share of the urban population enrolled in colleges and universities in the last year before new municipal secretary's inauguration, control for the regional human capital level. $Unemprt_{i,0}$ is the unemployment rate in the last year before new municipal secretary's inauguration, control for the economic prospects. All the regressions in this table include city and year fixed effects and cluster standard errors at the city level.

t statistics in parentheses, $^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$.

Table.18 The additional test of female mayor impact on regional economic development

	(1)	(2)	(3)	(4)	(5)
	$GDPrate_{i,t}$	$LnSolddeal_{i,t}$	$LnFinemp_{i,t}$	$LnBondsize_{i,t}$	$Length_{i,t}$
$FemaleMayor_{i,t}$	-0.291	-0.096	-0.005	-0.050	-0.176
	(-0.99)	(-1.22)	(-0.55)	(-0.48)	(-0.68)
$Age_{i,t}$	0.318	0.102	0.013	0.256	0.770**
	(0.94)	(0.96)	(0.93)	(1.64)	(1.99)
$Age_{i,t}^2$	-0.003	-0.001	-0.000	-0.002	-0.007*
	(-0.93)	(-0.90)	(-0.95)	(-1.56)	(-1.92)
$Tenure_{i,t}$	0.047	0.013	0.001	-0.007	0.014
	(1.31)	(1.11)	(0.67)	(-0.37)	(0.30)
$Associatedegree_{i,t}$	2.002***	0.301	-0.002	-0.194	0.795
	(3.17)	(1.54)	(-0.09)	(-0.95)	(0.90)
$Bachelordegree_{i,t}$	1.785***	0.004	0.021	0.186*	0.330
	(4.89)	(0.06)	(1.13)	(1.70)	(1.12)
$Masterdegree_{i,t}$	1.945***	0.029	0.008	0.042	0.001
	(5.38)	(0.52)	(0.44)	(0.49)	(0.01)
$PhDdegree_{i,t}$	1.831***	.	0.016	.	.
	(4.31)	.	(0.78)	.	.
$LnGDPPA_{i,t-1}$	-2.425***	0.856***	-0.060**	0.252	1.656**
	(-3.17)	(3.54)	(-2.10)	(0.80)	(2.25)
$LnPublic_{i,t}$	5.199***	0.543***	0.040**	0.488**	1.176**
	(5.67)	(2.80)	(2.14)	(2.22)	(2.43)
$LnRoad_{i,t}$	-0.451*	-0.001	0.002	0.024	0.326
	(-1.79)	(-0.01)	(0.19)	(0.16)	(0.95)
$(n+g+\delta)_{i,t}$	0.573***	-0.162***	0.021***	0.195**	0.218
	(3.18)	(-3.11)	(2.86)	(2.58)	(1.11)
$Highedu_{i,t}$	9.285	-12.605**	3.172***	16.039*	-17.353
	(0.53)	(-2.23)	(4.57)	(1.94)	(-0.90)
$Unemprt_{i,t}$	-0.085	-0.008	0.007	-0.006	0.154
	(-0.31)	(-0.10)	(0.53)	(-0.05)	(0.47)
$Constant$	-40.667***	-14.736***	0.317	-14.494***	-51.370***
	(-3.28)	(-3.62)	(0.66)	(-2.68)	(-4.13)
Year Effects	Yes	Yes	Yes	Yes	Yes
City Effects	Yes	Yes	Yes	Yes	Yes
N	3010	2254	3010	2181	2181
Adj. R^2	0.620	0.654	0.492	0.309	0.124

Note: $GDPrate_{i,t}$ is the GDP growth rate. $LnSolddeal_{i,t}$ is the natural logarithm of total sold land deal. $LnFinemp_{i,t}$ is the natural logarithm of the sum number of employee in finance sector.$LnBondsize_{i,t}$ is the natural logarithm of the sum value of Chengtou bond issued in the year. $Length_{i,t}$ is the natural logarithm of the weighted average length of Chengtou bond. $Female_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary is female and 0 is male. $Age_{i,t}$ is the municipal secretary's age. $Tenure_{i,t}$ is the number of years as municipal secretary in the current position. $Bachelordegree_{i,t}$ / $Masterdegree_{i,t}$ / $PhDdegree_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary has an Associate / Bachelor / Master / Ph.D

degree. Since there is no municipal secretary's degree is high school or associate college in sudden department sample, the municipal secretaries with a high school degree are omitted in the regressions as reference group. *LnGDPPA$_{i,t-1}$* is the natural logarithm of GDP per capita in the last year. *LnPublic$_{i,t}$* is the natural logarithm of public fiscal expenditure, control for the impact of government fiscal expenditure. *LnRoad$_{i,t}$* is the natural logarithm of the paved road area per capita, control for the regional infrastructure level. *(n+g+δ)$_{i,t}$* is the sum of natural growth rate of population (n), the exogenous rate of technical progress (g), and depreciation rate (δ). Following Mankiw et al. (1992), we assume that g+δ is constant and equals 0.05. *Highedu$_{i,t}$*, is the share of the urban population enrolled in colleges and universities, control for the regional human capital level. *Unemprt$_{i,t}$* is the unemployment rate, control for the economic prospects. All the regressions in this table include city and year fixed effects and cluster standard errors at the city level.

t statistics in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table.19 The Heckman 2SLS regression of the impact of female municipal secretary on regional economy growth

	First-Stage	Second-Stage
	(1)	(2)
	$Female_{i,t}$	$GDPrate_{i,t}$
$FemaleShare_{i,t}$	0.67***	
	(7.06)	
$Female_{i,t}$		-4.824**
		(-2.56)
$Age_{i,t}$	0.02	0.634*
	(0.73)	(1.80)
$Age_{i,t}^2$	0.00	-0.007**
	-(0.94)	(-1.99)
$Tenure_{i,t}$	0.00**	0.056*
	-(2.29)	(1.84)
$Associatedegree_{i,t}$	-0.07**	-1.544
	-(2.55)	(-1.61)
$Bachelordegree_{i,t}$	-0.06**	-0.756
	-(2.06)	(-0.90)
$Masterdegree_{i,t}$	-0.02	-0.599
	-(0.87)	(-0.72)
$PhDdegree_{i,t}$	-0.06**	-0.700
	-(2.05)	(-0.83)
$LnGDPPA_{i,t-1}$	0.02**	0.245*
	(2.05)	(1.79)
$LnPublic_{i,t}$	-0.04***	0.079
	-(5.25)	(0.63)
$LnRoad_{i,t}$	0.01*	-0.363***
	(1.89)	(-3.28)
$(n+g+\delta)_{i,t}$	-0.01	0.448***
	-(1.02)	(3.78)
$Highedu_{i,t}$	-0.11	1.877
	-(0.67)	(0.69)
$Unemprt_{i,t}$	0.00	-0.116
	(0.16)	(-0.75)
Constant	0.04	-2.805
	(0.07)	(-0.30)
Year Effects	Yes	Yes
City Effects	No	No
N	3010	3010
Adj. R^2	0.054	0.469

Note: $GDPrate_{i,t}$ is the GDP growth rate. $Femaleshare_{i,t-1}$ is the share of the cities governed by female municipal secretary in the same province in last year. $Female_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary is female and 0 is male. $Age_{i,t}$ is the municipal secretary's age. $Tenure_{i,t}$ is the

number of years as municipal secretary in the current position. *Bachelordegree$_{i,t}$* / *Masterdegree$_{i,t}$* / *PhDdegree$_{i,t}$* is the dummy variable, equal to 1 if the municipal secretary has an Associate / Bachelor / Master / Ph.D degree. Since there is no municipal secretary's degree is high school or associate college in sudden department sample, the municipal secretaries with a high school degree are omitted in the regressions as reference group. *LnGDPPA$_{i,t-1}$* is the natural logarithm of GDP per capita in the last year. *LnPublic$_{i,t}$* is the natural logarithm of public fiscal expenditure, control for the impact of government fiscal expenditure. *LnRoad$_{i,t}$* is the natural logarithm of the paved road area per capita, control for the regional infrastructure level. *(n+g+δ)$_{i,t}$* is the sum of natural growth rate of population (n), the exogenous rate of technical progress (g), and depreciation rate (δ). Following Mankiw et al. (1992), we assume that g+δ is constant and equals 0.05. *Highedu$_{i,t}$*, is the share of the urban population enrolled in colleges and universities, control for the regional human capital level. *Unemprt$_{i,t}$* is the unemployment rate, control for the economic prospects. All the regressions in this table include city and year fixed effects and cluster standard errors at the city level.

t statistics in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table.20 The PSM test of female secretary's impact on regional economic development

	(1)	(2)	(3)	(4)	(5)
	$Female_{i,t}$	$Female_{i,t}$	$GDPrate_{i,t}$	$LnFinemp_{i,t}$	$Loanratio_{i,t}$
$Female_{i,t}$			-0.626**	-0.028*	-0.055***
			(-2.29)	(-1.68)	(-3.99)
$Age_{i,t}$			-0.257	0.020	-0.022
			(-0.32)	(0.43)	(-0.55)
$Age_{i,t}{}^2$			0.002	-0.000	0.000
			(0.23)	(-0.40)	(0.46)
$Tenure_{i,t}$			0.076	-0.006	0.000
			(0.97)	(-1.59)	(0.10)
$Associatedegree_{i,t}$			.	.	.
			.	.	.
$Bachelordegree_{i,t}$			2.017**	-0.056	0.058
			(2.08)	(-0.71)	(0.70)
$Masterdegree_{i,t}$			2.003**	-0.069	0.060
			(2.12)	(-0.88)	(0.72)
$PhDdegree_{i,t}$			1.682*	-0.081	0.044
			(1.74)	(-1.00)	(0.52)
$LnGDPPA_{i,t-1}$	0.169	-0.027	0.174	0.034*	0.102***
	(0.77)	(-0.10)	(0.54)	(1.69)	(5.56)
$LnPublic_{i,t}$	-1.106***	-0.341	0.240	0.432***	-0.040***
	(-4.47)	(-1.04)	(0.94)	(26.07)	(-2.82)
$LnRoad_{i,t}$	0.121	0.102	-0.860***	0.026	0.028*
	(0.56)	(0.42)	(-3.37)	(1.40)	(1.93)
$(n+g+\delta)_{i,t}$	-0.380*	-0.067	1.539***	-0.045***	0.027**
	(-1.79)	(-0.30)	(5.68)	(-2.90)	(2.24)
$Highedu_{i,t}$	-8.885	-1.240	12.458*	3.629***	1.544***
	(-1.34)	(-0.16)	(1.94)	(5.67)	(3.17)
$Unemprt_{i,t}$	-0.032	-0.058	-0.343	0.015	-0.051**
	(-0.13)	(-0.22)	(-0.97)	(0.80)	(-2.53)
$LnLoan_{i,t}$	0.303	0.115			
	(1.63)	(0.47)			
Constant	4.803*	1.838	16.291	-5.831***	0.733
	(1.77)	(0.56)	(0.78)	(-4.58)	(0.69)
Year Effects	Yes	Yes	Yes	Yes	Yes
City Effects	No	No	No	No	No
N	3010	587	587	587	587
Adj. R^2	0.620	0.654	0.540	0.711	0.191

Note: $GDPrate_{i,t}$ is the GDP growth rate. $Loanratio_{i,t}$ is the ratio of the loan balance to the deposit balance of the local financial institutions. $LnFinemp_{i,t}$ is the natural logarithm of the sum number of employee in finance sector. $Female_{i,t}$ is the dummy variable, equal to 1 if the municipal secretary is female and 0 is male. $Age_{i,t}$ is the municipal secretary's age. $Tenure_{i,t}$ is the number of years as municipal secretary in the current position. $Bachelordegree_{i,t}$ / $Masterdegree_{i,t}$ / $PhDdegree_{i,t}$ is the dummy variable, equal to 1 if

the municipal secretary has an Associate / Bachelor / Master / Ph.D degree. Since there is no municipal secretary's degree is high school or associate college in sudden department sample, the municipal secretaries with a high school degree are omitted in the regressions as reference group. $LnGDPPA_{i,t-1}$ is the natural logarithm of GDP per capita in the last year. $LnPublic_{i,t}$ is the natural logarithm of public fiscal expenditure, control for the impact of government fiscal expenditure. $LnRoad_{i,t}$ is the natural logarithm of the paved road area per capita, control for the regional infrastructure level. $(n+g+\delta)_{i,t}$ is the sum of natural growth rate of population (n), the exogenous rate of technical progress (g), and depreciation rate (δ). Following Mankiw et al. (1992), we assume that g+δ is constant and equals 0.05. $Highedu_{i,t}$, is the share of the urban population enrolled in colleges and universities, control for the regional human capital level. $Unemprt_{i,t}$ is the unemployment rate, control for the economic prospects. All the regressions in this table include city and year fixed effects and cluster standard errors at the city level.

t statistics in parentheses, $^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$.

Appendix A: Chairman Xi' speech database

Website: http://jhsjk.people.cn/

Appendix B: Chinese Word Dictionary

This table presents the word list constructed to identify whether a word is aggressive or conservative in terms of tone and definite or ambiguous in terms of accuracy. The definite and ambiguous word lists are the same as You et al. (2018)'s dictionary. We select the positive or negative word in You et al. (2018)'s dictionary if they can be categorized into aggressive or conservative word at first. And then, we manually categorize the 1000 most frequent words of adjective, verb, and noun into aggressive or conservative word if they have aggressive or conservative meaning. At last we put them together and make our own word list of 389 aggressive words and 505 conservative words.

Panel A: Aggressive Word													
鳌头	创利	夺冠	很强	快速	前进	奋斗	再添	爆发式	叫得响	拔得头筹	焕然一新	迅捷有力
傲人	创造	夺魁	辉煌	战胜	前列	刺激	再续	不差钱	节节高	波澜壮阔	黄金时代	扬帆起航
傲视	蹿升	发明	火热	扩充	前茅	腾飞	造就	不平凡	聚宝盆	不败之地	激动人心	一飞冲天
霸主	打击	翻倍	跻身	扩展	前三	填补	增光	常青树	老字号	不负众望	技压群雄	一马当先
比肩	打开	翻红	极致	拉动	前十	挺进	增色	超预期	里程碑	不拘一格	捷足先登	一炮打响
变革	打破	翻身	加紧	拉高	前五	统领	摘帽	创记录	历史性	不畏艰辛	立竿见影	一炮而红
博得	打通	翻新	加速	老大	潜力	危机	摘星	创奇迹	领头羊	插上翅膀	能征善战	一骑绝尘
不怠	大获	反转	减少	老牌	强强	位列	斩获	大开发	前 50	常抓不懈	涅槃重生	一统江山
不够	大奖	飞速	降低	连翻	强势	先河	崭新	大制作	强心剂	承上启下	跑马圈地	一枝独秀
不好	大礼	飞跃	骄人	领航	抢先	先进	占据	底气足	强有力	叱咤风云	评先树优	屹立不倒
不可	大涨	斐然	较高	领跑	抢占	显赫	占领	顶梁柱	三连冠	大放异彩	破釜沉舟	异军突起
不利	登顶	丰厚	较强	领舞	全套	笑傲	长青	定心丸	四连冠	大力推行	破旧立新	影响深远
不强	底气	风头	杰出	领先	全新	新贵	招牌	翻两番	塑造者	底气十足	齐驱并进	勇往直前
超过	第一	改造	捷报	领衔	缺乏	新星	振奋	翻三番	五连冠	丢掉包袱	齐头并进	与时俱进
超群	第二	赶超	解放	领袖	入围	雄风	振兴	翻身仗	新飞跃	东山再起	前 100	浴火重生
超越	第三	高潮	进步	落后	入选	雄厚	制胜	翻一番	新纪元	独一无二	日新月异	摘入囊中
称霸	颠覆	高峰	进展	迈进	三甲	雄踞	重获	风向标	新跨越	多管齐下	日臻完善	崭露头角

称王	巅峰	高居	晋级	名列	上榜	炫目	重生	高成长	新里程	夺人眼球	生命张力	长盛不衰
称雄	点燃	高踞	晋升	名气	上攻	严重	重现	高技术	新历史	风雨无阻	势头迅猛	真抓实干
成功	顶级	高速	精彩	名震	神话	扬升	重振	高绩效	新水平	高歌猛进	势在必行	正当其时
成竹	顶尖	高新	精干	模范	胜出	耀眼	重整	高潜力	兴奋点	高举高打	事半功倍	指日可待
乘胜	独创	高涨	精进	难度	盛典	一举	抓住	高水平	有底气	高瞻远瞩	首屈一指	中流砥柱
乘势	独大	搞好	井喷	难以	盛景	赢得	壮观	高效能	有希望	更进一步	双轮驱动	中心地位
驰名	独当	革新	居前	逆袭	施展	赢家	卓绝	高增长	有效率	核心技术	硕果累累	自成一色
冲出	独到	攻克	居首	逆转	十强	优于	卓越	更快捷	有信心	赫赫有名	突飞猛进	自强不息
冲击	独领	过大	巨人	盘活	首创	有望	最高	更有效	正当时	鹤立鸡群	脱胎换骨	走出低谷
冲破	独树	过多	巨头	跑赢	首家	跃居	最好	国际化	制高点	后劲十足	脱颖而出	走出困境
出彩	独享	黑马	掘金	媲美	首位	跃上	最佳	后劲足	助推器	后来居上	无与伦比	做精做细
出众	独占	很大	崛起	起飞	刷新	跃升	最受	划时代	最前端	化危为机	显露锋芒	核心竞争力
传奇	夺得	很好	开辟	起跳	硕果	再获	坐享	佼佼者	最权威	欢欣鼓舞	雄心勃勃	

Panel B: Conservative Word												
阿斗	不正	低潮	滑落	落败	迫使	衰退	陨落	门外汉	出师不利	刻舟求剑	人浮于事	一蹶不振
挨打	残局	低靡	幻想	落寞	迫于	双输	再陷	难立足	猝不及防	力不从心	人心惶惶	一落千丈
暗礁	残酷	低速	积压	埋单	破灭	肆虐	重挫	难实现	措手不及	历经波折	任重道远	一损俱损
黯淡	残忍	低效	激进	茫然	凄惨	松散	纵容	难突破	大兵压境	流年不利	生不逢时	一塌糊涂
摆设	蚕食	垫底	尖锐	冒进	其害	损耗	被取消	难完成	大倒槽水	乱字了得	失之交臂	一潭死水
败北	惨淡	冬眠	艰难	没落	牵绊	缩减	被淘汰	难维持	大伤元气	屡屡碰壁	时运不济	一厢情愿
败局	惨烈	动荡	艰涩	蒙上	牵强	缩水	冰冻期	能力弱	大势已去	没有底气	事倍功半	饮鸩止渴
败象	惨痛	动摇	煎熬	蒙羞	前科	缩窄	不给力	酿苦果	胆战心惊	美梦破灭	受尽苦头	有苦难言
薄弱	惨重	毒瘤	减退	梦断	欠佳	太差	不过关	酿苦酒	荡然无存	面临考验	水深火热	有心无力
饱和	仓促	多变	僵局	梦碎	墙角	瘫痪	不过硬	跑不动	得而复失	面临困难	四面楚歌	于事无补

保守	草草	噩梦	降幅	渺茫	趋薄	淘汰	不健全	泼冷水	低开工率	面临难关	随波逐流	余波未平
报忧	差于	乏力	胶着	磨难	趋紧	推迟	不看好	惹众怒	低于目标	面临难题	损耗上升	舆论压力
悲催	缠身	繁多	焦虑	魔咒	缺漏	推后	不靠谱	死胡同	低于预期	面临淘汰	损耗增加	怨声载道
悲剧	唱空	放任	紧缩	暮气	日暮	颓靡	不乐观	算不得	多事之秋	明日黄花	所剩无几	增大难度
悲壮	唱衰	非议	警钟	难熬	冗杂	瓦解	不理性	损耗高	乏善可陈	命途多舛	胎死腹中	增加难度
背离	沉寂	封杀	窘境	难当	丧失	危局	不明朗	血淋淋	风光不复	命悬一线	昙花一现	战战兢兢
被否	沉疴	封锁	纠结	难过	深冬	危途	不明显	遇寒风	风光不再	墨守成规	躺着中枪	众矢之的
被迫	沉沦	负荷	堪忧	难解	深陷	危险	不上心	走下坡	风口浪尖	难出家门	烫手山芋	重蹈覆辙
被曝	沉闷	负重	考验	难堪	甚微	维艰	不统一	哀鸿遍野	风声鹤唳	难度上升	无功而返	重新洗牌
被指	吃紧	告吹	苛刻	难扛	剩宴	萎缩	不显著	保留意见	风雨飘摇	难度增大	无果而终	壮士断腕
笨象	迟钝	告负	空空	难逃	失策	未明	不现实	杯水车薪	腹背受敌	难度增加	无疾而终	追悔莫及
逼宫	迟滞	告终	空悬	难续	失宠	无常	不消化	背道而驰	固守陈规	难兄难弟	无计可施	自身难保
逼入	丑行	搁浅	枯竭	难掩	失利	无力	不一致	避之不及	寒气逼人	内外交困	无济于事	自食苦果
闭关	丑态	搁置	窟窿	泥潭	失灵	消减	不争气	变本加厉	后劲不足	内忧外患	无可奈何	自作自受
变差	丑闻	跟风	苦于	逆境	失落	休眠	不正常	不被看好	画饼充饥	能力不足	无米下炊	恣意妄为
变坏	出格	诟病	苦战	徘徊	失色	漩涡	超负荷	不见起色	灰头土脸	能力降低	无能为力	昨日风光
濒临	出局	谷底	困顿	蹒跚	失声	雪崩	打补丁	不了了之	鸡飞蛋打	泥沙俱下	心有余悸	冰火两重天
波折	出逃	过冷	困住	旁落	失守	压低	大洗牌	不能适应	积弱难返	捏一把汗	形同虚设	枪打出头鸟
剥夺	触礁	过量	勒紧	抛弃	失意	压缩	倒春寒	不切实际	积重难返	蚍蜉撼树	雪上加霜	墙倒众人推
剥削	粗糙	过慢	羸弱	泡汤	式微	延迟	飞不动	不占优势	岌岌可危	泼了冷水	血本无归	躺着也中枪
不策	存疑	过猛	冷清	泡影	势衰	延误	非理性	不着边际	极其不利	迫不得已	言之过早	一去不复返
不当	挫伤	过时	离谱	碰壁	受挫	殃及	负能量	步履维艰	急转直下	扑朔迷离	偃旗息鼓	八字还没一撇
不敌	打压	寒意	劣迹	疲弱	受害	夭折	高损耗	参差不齐	焦头烂额	其实难副	摇摇欲坠	烂泥扶不上墙
不济	大降	很惨	裂痕	疲态	受累	一劫	高消耗	草木皆兵	今非昔比	杞人忧天	夜不能寐	烂泥扶上了墙
不妙	大失	很差	漏洞	偏差	受限	遗症	更别谈	差强人意	进退维谷	千疮百孔	一鼻子灰	劣币驱逐良币

不全	殆尽	很坏	乱象	偏紧	受压	臆测	空欢喜	产能降低	举步维艰	前景不明	一波三折	赔了夫人又折兵
不善	单薄	红线	沦落	偏失	衰竭	隐忧	垮下来	产能限制	靠山吃山	强弩之末	一错再错	泥菩萨过河自身难保
不甚	淡出	忽悠	沦陷	平平	衰落	遇冷	烂摊子	偿债压力	靠水吃水	青黄不接	一地鸡毛	
不旺	倒霉	糊弄	裸泳	瓶颈	衰弱	遇阻	马后炮	踟蹰不前	磕磕碰碰	惹火烧身	一哄而上	