



The impact of political cycle: Evidence from coalmine accidents in China



Huihua Nie^a, Minjie Jiang^b, Xianghong Wang^{a,*}

^a Renmin University of China, No. 59, ZhongGuanCun Ave., Beijing 100872, China

^b China National Association of Financial Market Institutional Investors, No. A9, Jinrong Ave., Beijing 100033, China

ARTICLE INFO

Article history:

Received 31 December 2012

Revised 1 April 2013

Available online 28 April 2013

JEL classification:

H700

E320

D820

L510

Keywords:

Political cycle

Political business cycle

China

Coalmine accident

ABSTRACT

Nie, Huihua, Jiang, Minjie, and Wang, Xianghong—The impact of political cycle: Evidence from coalmine accidents in China

This paper examines the impact of political cycle on coalmine accidents in China. The political cycle is formed by the major local meetings of legislative bodies held every year in all provinces of China. This is because the government has a strong incentive to maintain social stability during the meetings and to focus on economic growth in other times. We test how such cycles affect coalmine fatality using monthly data at the provincial level between 2000 and 2010. We find that the number of accidents and casualties were significantly lowered during the local events of “two sessions” after controlling for other time fixed effects. The temporary reduction of accidents seemed to have been achieved by controlling production rather than by improving safety measures. The magnitude of the cycle for accidents is enlarged in provinces where media exposure is stronger and where the vice governor in charge of safety is faced with a possible extension to another term in the current post. *Journal of Comparative Economics* 41 (4) (2013) 995–1011. Renmin University of China, No. 59, ZhongGuanCun Ave., Beijing 100872, China; China National Association of Financial Market Institutional Investors, No. A9, Jinrong Ave., Beijing 100033, China.

© 2013 Association for Comparative Economic Studies Published by Elsevier Inc. All rights reserved.

1. Introduction

Political cycles are thought to affect economic policies in ways that result in economic fluctuations. For example, public expenditures may display cyclical patterns following the cycles of political events such as elections or government turnovers. This paper examines the impact of political meeting events in China on its coalmine safety records. It studies political cycles from a new perspective in a country that does not hold regular free elections. The existing studies have found evidence of political business cycle (PBC) both in developed countries (Alesina et al., 1997) and in developing countries (Shi and Svensson, 2006), mostly in democratic settings. We find evidence that political cycles can be driven by the authoritarian government when no free elections are held in a non-democratic setting.

Since the seminal paper of Nordhaus (1975), the literature on political business cycle (PBC) has grown in abundance both theoretically and empirically (see reviews in Persson and Tabellini, 1990; Price, 1997; Drazen, 2001). Under a democratic institution with free elections, the incumbent politicians often use macroeconomic policies as the instruments of signaling to the voters (see Rogoff and Sibert, 1988; Rogoff, 1990). For example, they may use expansionary fiscal policies such as tax

* Corresponding author. Fax: +86 10 62511091.

E-mail address: shwang06@ruc.edu.cn (X. Wang).

cuts to stimulate economic performance before elections in order to increase their popularity among voters. Studying the impact of political cycles on economic activities helps understand the causes of economic fluctuations. The short-term behavior of politicians driven by political events may cause their policies to be socially non-optimal and result in the loss of social welfare. For example, as shown by [Baleiras and Santos \(2000\)](#), the amplitude of the public expenditure cycle is negatively related to social welfare. They further show that, with the existence of PBC, election regulations, such as imposing term limits and prohibiting revolving-door appointments, can have negative effects on social welfare.

It is therefore important to investigate the impact of PBC in different political institutions. Recent studies have found that countries at the average democratic level are more likely to be affected by PBC ([Gonzalez, 2000](#); [Brender and Drazen, 2005](#); [Shi and Svensson, 2006](#)). This is consistent with the findings in Russia ([Akhmedov and Zhuravskaya, 2004](#)). Some studies in the PBC literature have compared the differences between developed and developing countries. For example, using a large panel of 85 countries (not including China) over 21 years (1975–1995), [Shi and Svensson \(2006\)](#) find that political budget cycles are large in developing countries but small or nonexistent in developed countries; government fiscal deficit increases during election years by one percent of GDP on average.

Are there political cycles in countries that do not have major free elections? What are the political mechanisms that may affect economic cycles in these countries? The current literature on PBC is still lacking in this regard. China provides an ideal case for the study of PBC in a different institution. Our main argument is that even under an authoritarian institution without free election, PBC can still exist; PBC can be driven by top-down forces of the government when the bottom-up forces of public voters are weak or nonexistent. In this study, we examine how coalmine accidents in China are affected by the political cycle formed by major local meetings of legislative bodies, the provincial People's Congress and the provincial Chinese People's Political Consultative Conference (CPPCC) (also known as the local “two sessions”). There are a few studies that discuss PBC issues in China from political science or economics perspectives. [Tao \(2006\)](#) finds that, in Post-Mao China, economic cycles have become increasingly responsive to the political rhythms. For example, investment booms of the local governments followed the convening of the Party Congress in late 2002 and the government power transition in early 2003. [Dittmer and Wu \(2006\)](#) shows how PBC is driven by the force of factionalism and by inherent interest of the incumbents to buy off local officials to ensure stability and build a positive image for themselves at the meetings of national congresses. [Li \(2011\)](#) shows with annual provincial data from 1983 to 2007 that investment and inflation in China are cyclically affected by the National Conference of the Chinese Communist Party (NCCCP) that is held every 5 years. Our study differs from the existent studies in China in some important aspects. First, it uses monthly panel data to quantitatively investigate the impact of PBC on firm productions, which provides convincing evidence for the causal mechanism of PBC in China. Second, the PBC event studied in this paper is the meeting of local congresses, which has not been researched on.

The influence of political cycles on coalmine safety is made possible by the current politico-institutional environment. With political centralization and economic decentralization, the central government in China provides incentives to local politicians through vertical supervision and horizontal competition. Leaders in different provinces are competitors in the pool of candidates for future appointments and they try to signal their own competence by executing the decisions of the central government.¹ One of the ways to signal their ability is to balance the tradeoff between social stability and economic growth. During important political events, social stability is more important to the government than economic growth. To prevent accidents during special political events, the central government enforces safety regulations through strict accountability system, which may lead to less accidents and low production during such periods. In other times, the main objective of the government is economic performance that validates the government's economic policies. We use a unique data set containing information about coalmine production and accidents to test this theory.

There are several advantages in using data from coalmine accidents to examine PBC impact in China. First, the government is very sensitive to the issue of coalmine accident because it attracts much public and media attention. China has an extremely bad record in workplace safety. Its coalmine fatalities accounted for 80% of the world's total,² while it produced 40.5% of the world's coal in 2004.³ Coalmine accidents during the meetings such as the “two sessions” are likely to attract more attention of the mass media. The impact of media on public policies, such as government accountability, redistributive spending, and voting, has been documented in previous literature ([Strömberg, 2004](#); [Besley and Burgess, 2002](#); [Eisensee and Strömberg, 2007](#)). Second, the local government can affect coalmine accidents during the local “two sessions” since it has direct control over safety and production matters of the coalmines. Third, the close monitoring by the State Administration of Work Safety (SAWS) or the State Administration of Coal Mine Safety (SACMS) and the watch of public media make it hard to cover up coalmine accidents, which make the data more reliable. Finally, the accidents report system set up by the SAWS makes it possible to obtain high-frequency monthly data on coalmine accidents. It is vital to use high-frequency data to test the impact of political cycles because in low-frequency data the opposite-sign shifts in economic variables around political events can cancel out ([Akhmedov and Zhuravskaya, 2004](#)).

Using monthly panel data compiled at the provincial level between 2000 and 2010, we find that the number of coalmine accidents is significantly lower during the local “two sessions” (January or February) after controlling for other time fixed effects ([Fig. 1](#)). Our analysis with coal production indicates that the temporary reduction of accidents is obtained by

¹ The main local officials are appointed by the upper authorities and once their term is full in the current post, they can only be appointed to other posts. [Li and Zhou \(2005\)](#) show that the average tenure of office in their sample of provincial leaders is only 3.03 years between 1979 and 1995 in China.

² “Coal Mine Fatalities in China Account for 80 percent of World Total”, BBC, Nov. 13, 2004.

³ BP Statistical Review of World Energy, <http://www.bp.com/statisticalreview>.

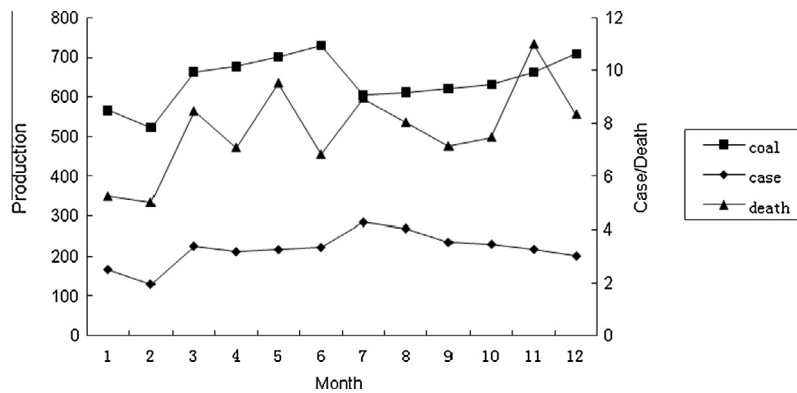


Fig. 1. Average monthly fatality and coal production (2000–2010). Note: The whole sample is included. Coal production is in 10 thousand tons.

controlling production rather than by improving safety measures. We also explore two possible channels through which the “two sessions” affect coalmine safety cycles: the exposure to media and the career motive of local officials. We find that the cycle of accidents is enlarged in provinces where the presence of media is stronger and when the vice governor in charge of safety is in the fourth year of his term with the possibility of being extended to a new term.

This paper contributes to the study of political cycles in the following ways. First, as far as we know, our study is the first to quantitatively verify the existence of PBC in a non-democratic country using monthly regional data. We focus on the government’s trade-off between political stability and economic growth, which is different from the previously studied PBC mechanism such as fiscal or monetary policies. The main driving force of political cycles in this analysis is the upper authorities rather than public voters. This mechanism potentially helps explain PBC phenomena in other authoritarian countries (such as Singapore and Vietnam). China’s political event of local “two sessions” is characterized by a pre-event reduction in economic activities and a post-event growth, which is just opposite to the effect of elections on fiscal and monetary policies based on the pre-election models of PBC.

Second, we find that PBC can be driven by political events other than free elections. It is plausible that this can happen even in countries with democratic institutions. Therefore, our study makes an important contribution by broadening the scope of PBC research and better explaining the economic impacts of political events.

Third, this study sheds some lights on the implicit cost of the “China Model” in economic development, which is the coexistence of high-growth and high-accident (Nie and Li, *in press*). It also has some important policy implications. Since short-lived cycles may have negative consequences in the safety of workers when stability is not the main concern of the politicians, policy measures are needed to maintain safety and keep production from growing out of control. This validates the policy of controlling production at a balanced scale. It implies that, when local economic growth and competition incur serious cost in work safety, the central government can regulate the degree of competition to prevent negative externalities caused by local competitors who have limited terms in their posts. This deviates from the advocacy for local competitions found in earlier literature such as Oi (1992) and Maskin et al. (2000).

The rest of the paper is organized as follows. Section 2 reviews the institutional background related to coalmine safety and the political cycle formed by the major local meetings of legislative bodies in China. Section 3 describes the data and the empirical methods. Section 4 reports the empirical results. Section 5 concludes the paper.

2. Institutional background

2.1. The political cycle of local annual “two sessions”

The main events that we investigate are the major political meetings in China that can form political cycles, including the local legislature meetings, the national legislature meetings, and the local Party meetings.

The National People’s Congress (NPC) and the Chinese People’s Political Consultative Conference (CPPCC) represent respectively the top legislature and the top advisory body in China. At the provincial level, these two bodies convene about the same time once a year when the representatives meet for about 10 days. These meetings are usually referred to as the local annual “two sessions” (at the provincial, city, or county level). The role of People’s Congress in the political system of China is reviewed in O’Brien (1994) and Cho (2002). As explained in Cho (2002), the local people’s congresses (LPC’s) at the provincial level have grown in importance as local law-makers or as “information brokers” between the central and local levels. There are claims that the LPC’s supervision of government is more efficient than the NPC. The main agenda of the LPC’s meeting is to review and approve the government’s plans and budgets for economic and social development; to appoint provincial leaders (including the governor, the vice governor, the president of the court, and the procurator); or to remove current government’s inappropriate decisions or orders. During the recess of the provincial congress, the provincial Standing

Committee of People's Congress performs some of its functions. The provincial Standing Committee convenes at least every other month. In the meantime, the central government can nominate at any time candidates for leaders at the vice governor level (including the Acting Governor), to be approved by the Standing Committee. Therefore, China does not have a clear cycle for changes of government officials that are found in democratic countries that hold formal political elections in different levels. Meanwhile, the main agenda of the local CPPCC is making suggestions to the ruling Communist Party and has no legal constraint for the government. Therefore, when we refer to the “two sessions”, we focus on the impact of People's Congress.

The national People's Congress and the national CPPCC convene at the same time in Beijing every year between March 5th and 18th. These are referred to as the national “two sessions”. The provincial meeting for the Chinese Communist Party Congress is held once every 5 years, usually between April and May, or between October and December. The main agenda of this meeting is to discuss the important issues of the local Party, including the elections of the Party's committee members, the standing committee's members, and its Secretary and Deputy Secretary. This meeting is in much smaller scale than the provincial “two sessions”.

There are at least two reasons that make the local “two sessions” the most important political meetings at the local level. First, the Chinese Communist Party depends on the “two sessions” to make their policies into laws, and expresses its political intentions to the public and the elite representatives. Even though the People's Congress is often considered as a “rubber stamp”,⁴ it is an important political instrument of the state Party. Second, the sensitivity of the local “two sessions” lies in its relation to the performance evaluation of the local government officials. The local Party and administrative officials in China are mostly appointed and evaluated by their higher authorities, while their appointments are subject to the approval of the LPC. Because the “two sessions” get wide media exposure, the main goal of the central government during the “two sessions” is to maintain social stability and prevent work accidents and mass collective actions (such as petitions in government localities). The local officials can face severe penalties if such stability is not ensured. More importantly, because of fierce competitions at the horizontal level (Qian and Xu, 1993; Maskin et al., 2000), negative incidents such as coalmine accidents can be used by competitors to sabotage the political career of local officials (especially those in charge of production safety). When the meeting of “two sessions” is over, the main objective of the government switches back to “economic growth” and the local officials then devote themselves to the contest for GDP growth (Bo, 1996; Li and Zhou, 2005). Therefore, the local “two sessions” affect the behavior of the officials through two possible channels, media exposure and career motive, hence affect coal production and the occurrence of coalmine accidents. This eventually leads to a special kind of political economic cycle.

In addition to the meeting events, Spring Festival, as the most important traditional Chinese holiday, is also a major event in China that cannot be ignored. Spring Festival starts from the Chinese New Year's day that follows the lunar calendar. During this holiday, the urban areas usually take a break for a whole week and the rural areas usually take a break for 2 weeks. We control for the impact of Spring Festival in our analysis because the significance of this holiday may affect economic activities. We give a summary of these major events in Appendix A.

2.2. The accountability mechanism and its impact of coalmine safety

Coal is the most important source of energy in China, accounting for 70% of the total energy supply (Wang, 2006). In the meantime, occupational hazard at the coalmines is a serious problem in China. According to the statistics of SAWS, between 2002 and 2010, the annual coalmine fatality averaged to 4800 people in China, while it averaged only to 30 in the US in the same period. The frequent coalmine accidents in China have attracted much attention of the public including scholars. Wright (2004) and Tu (2007) blame the hiring of low quality workers in mines owned by local townships. Wang (2006) emphasizes the importance of independent regulatory system in preventing accidents. Jia and Nie (2012) argue that the collusion between the local government and coalmine firms is the fundamental reason. The approach we adopt in this paper differs from the previous studies. We try to examine how the accountability system for coalmine safety makes local politicians respond to the political environment and causes a cyclical pattern of coalmine accidents.

In order to reduce coalmine accidents, the central government has implemented a series of accountability measures concerning coalmine safety. First, responsible provincial officials are subject to penalties when accidents occur. According to a provision issued in 2001, “when an extremely fatal accident occurs, the local government officials have to be penalized based on the severity of the accident, either through demotion or dismissal, or through criminal procedures if dereliction of duty is involved.”⁵ Second, delayed reporting or underreporting of accidents are also subject to administrative penalties and criminal charges.⁶ The penalties to the responsible officials depend on the severity of the accidents. Since 2007, the State Council defined the levels of work place accidents as follows: accident with a fatality of 3 or less than is “general”, 3–9 is “relatively serious”, 10–29 is “very serious”, and above 30 is “extremely serious”.⁷ When the accidents cause “very bad social impact”, the officials in charge would be punished even though there is no fatal casualty. Naturally, because of the high media exposure and public attention of the local “two sessions”, accidents around that time are likely to be considered as accidents with “very bad social impact”.

⁴ Although the People's Congress is often considered as a “rubber stamp”, it does sometimes show its strong dissatisfaction toward the work of the government. For example, on February 14, 2001, the People's Congress in Shenyang twice rejected the report of the City Court.

⁵ See provision 14 of “The Provisions of the State Council on the Administrative Responsibility for Serious Safety Accidents”.

⁶ See Article 92 in “The Production Safety Law” issued in 2002.

⁷ Before that time, the government did not give a quantitative definition of “extremely serious accident”.

Table 1

Annual summary of coalmine accidents 2000–2010.

Year	N of observation	Number of accidents	Number of deaths	Total casualty
2000	108	37	383	424
2001	216	481	1477	1628
2002	216	1312	2705	2960
2003	216	1814	3357	4103
2004	216	1402	2625	3214
2005	216	1362	2761	3533
2006	216	295	1253	1681
2007	216	156	881	1316
2008	216	99	536	796
2009	216	85	592	986
2010	108	40	200	283

Note: Total casualty includes the number of persons killed, injured, or missing.

There have been many cases of administrative penalties resulted from coalmine accidents. For example, on December 5th, 2007, a month before the local “two sessions”, a coalmine in Hong Dong County of Shanxi Province had a serious gas explosion, causing 105 people dead. This led to the penalties of 78 people, including a criminal charge to then vice mayor with a sentence of 14 years in prison, and the demotion of the mayor.⁸

Coalmine accidents may seriously affect social stability in the following ways. First, coalmine accidents cause financial losses as well as human casualties. In our data sample, 98% of accidents resulted in deaths with an average death rate of 2.3 and the biggest casualty is 171 people. This could harm the image of the government. Second, coalmine accidents often trigger mass incidents, which is one of the main disturbances to social stability. Conflicts between mining firms and the affected workers or families may result from coalmine accidents, either because the firms attempt to cover the truth about accidents or the affected families are not satisfied with their compensations. The mass incidents take the form of demonstration around the coalmines, visits to upper government offices, or even fights between firm managers and local workers (Li, 2010).⁹ Third, during politically sensitive periods, social stability becomes even more important. Since mass media attracts more public attention during such times, news can spread more easily. Therefore, the government does hope for more positive news and less negative news during the times of major meetings.¹⁰ Every year, the government issues document before these important meetings to emphasize social stability and production safety.¹¹

3. Data and method

3.1. The measurement of coalmine accidents

The main source of data is the State Administration of Work Safety in China. We collected monthly data for coalmine accidents at the provincial level from July 2000 to June 2010, including 7083 observed accidents. The monthly casualties of coalmine accidents in each province are measured by four variables: the number of accident cases, the number of deaths, total casualty (the number of deaths plus the number of persons injured and missing), or death rate (the number of deaths for each million tons of coal production). The sample does not contain Tianjin, Shanghai, Hainan, and Tibet since these places do not produce coal. We also removed Guangxi, Jiangsu, Zhejiang, Hubei, Ningxia, Qinghai, Shandong, Inner Mongolia, and Xinjiang, either because they have very low coal production or because they use open pits for coal production (Inner Mongolia and Xinjiang). We are then left with a monthly panel of 18 provinces and 11 years, containing 2160 observations.

⁸ See the media report: <http://politics.people.com.cn/GB/1026/9368922.html>.

⁹ For example, on December 9th, 2004, a coalmine accident in Meng County of Shanxi caused 33 deaths, including 12 workers from Sangzhi county of Hunan province. Every family of the dead workers was supposed to be compensated by 200 thousand *yuan*, but the Sanzhi county officials only gave the families 160 thousand. This led to mass visit of the workers' families, including one visitor to Beijing. This incident was eventually solved through the intervention of the media and some central government agencies. See: <http://news.sina.com.cn/c/2005-09-16/01326955088s.shtml>.

¹⁰ Indeed, Chinese media are quite controlled by the government. However, there are at least three ways in which the media can play a monitoring role in coalmine accidents. First, the local governments may have a control on the local media but not on the media of other provinces and the central media. In fact, most coalmine accidents are reported by outside media. For example, when a coalmine accident caused 81 dead in Nandan, Guangxi in July 2001, the local government tried to cover it up and the local media was not able to investigate. It was eventually reported by the central media “The People's Daily” and the Guangzhou media “Yangcheng Daily”. See <http://www.people.com.cn/GB/shehui/47/20010731/524926.html>. Second, with the prevalence of modern media channels such as internet, blogs, and especially micro-blogs, it is very easy for negative news to spread out. The local government can hardly control this. Third, as pointed out by Egorov et al. (2009), even in authoritarian country, the central government needs the media to monitor the local government actions to reduce moral hazard.

¹¹ For example, Datong (Shanxi) Safety Administration once issued a related document from the provincial government, “Shanxi Province Safety Office Announcement on Safe Production during 2011 Spring Festival, and National and Provincial ‘Two Sessions’”. It specified coalmine safety as the main focus of the provincial government, and required strict management accountability and 24-h duty system for key posts in coalmines. See: <http://www.datongsafety.com/2011/0722/12940.htm>.

Table 1 summarizes the main statistics of these variables. It shows that coalmine fatality reached peak in 2003 and then declined sharply since 2006.

Between July, 2001 and January, 2006, the SAWS reported accidents of all types. However, before and after that period, they only reported accidents that had more than three casualties. Due to this difference in statistical coverage, we first focus our regression analysis on the core sample that included the years when all accidents were reported (990 observations), then we use the 11-year whole sample (2160 observations) for robustness checks. Figs. 2 and 3 display the distribution of accidents and deaths by months.

3.2. The model specifications

The dependent variables are the four variables described above that measure coalmine safety. We use the number of accident cases in each month (*Case*) as the main dependent variable, and use monthly total casualty (*Casualty*), total deaths (*Death*) and death rate (*Death rate*) as alternative dependent variables. Compared with the number of deaths, we think that the local authorities have more control over the number of accidents. According to the current accountability system, frequent cases of coalmine accidents will result in severe penalties for the responsible authorities. It is also conceivable that the number of accident cases is more difficult to be covered up than the number of casualties if the officials intend to under-report accidents, so the number of accidents is likely to be more accurate than the number of deaths.

The regression analysis for the dependent variable is based on the following model:

$$y_{it} = \sum_{j \in \{-2,6\}} \alpha_j D_{it} + \beta y_{it-1} + \delta' X_{it} + \mu_i + \tau_t + \varepsilon_{it}$$

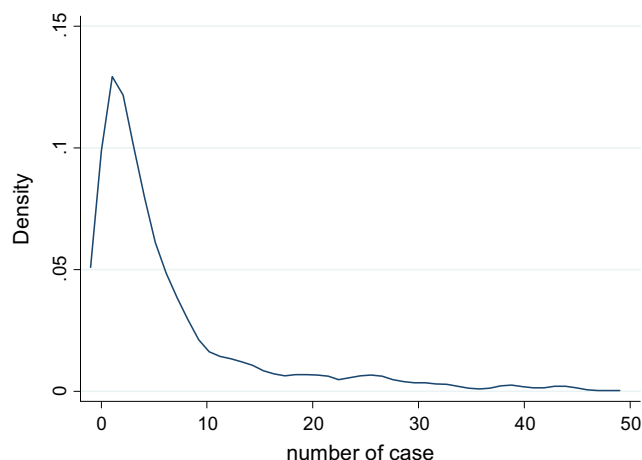


Fig. 2. The density distribution of monthly accidents.

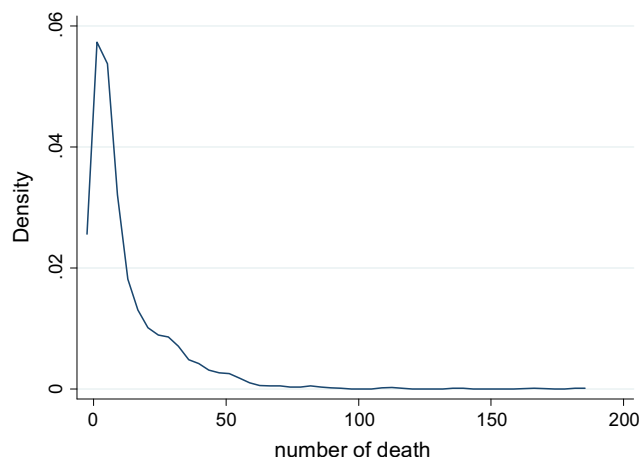


Fig. 3. The density distribution of monthly deaths.

where D_{it} are the dummy variables that describe the political cycle, including the local meetings of the “two sessions” (noted as *Local sessions*), Spring Festival (*Spring*), the national meeting of the “two sessions” (*National sessions*), the local Party meeting (*Party meeting*), and 1 and 2 months before (*Pre1* and *Pre2*) and 1–6 months after (*Post1* to *Post6*) the local “two sessions”, which we will explain in more detail later on. Our main purpose is to examine whether the number of coalmine accidents display a cyclical pattern in response to the local meeting event and the months before and after the meeting event. We do not include the national Party conference as a cycle variable, but the yearly and monthly time effects would have controlled its possible impact.¹²

We include y_{it-1} , the first lag of the dependent variable, to reduce possible serial autocorrelation of the error term. In China, a series of coalmine accidents in one region will usually lead to internal rectifications in the local coal industry, which may affect the quantity of coal production. While we already control for coal production in the model, other variables that affect safety might have been omitted (e.g., capital investment in safety equipment). Furthermore, frequent coalmine accidents might reflect some historical issues such as outdated technology and equipment, backward management, and business loss of the firm. Since these factors are difficult to control, we control for the lagged dependent variable in the regression while it is not the main variable of interest.¹³ We tested for appropriate lag structure using the Akaike criterion and found one lag to be optimal. According to Nickell (1981) and Wooldridge (2002), including the lagged dependent variable in fixed effects regressions will result in a potential estimation bias that is of order $1/T$ where T is the length of the panel data. The bias converges to zero when T goes to infinity. Considering that the monthly data set used in this study has a rather long time span, with 55 months in the core sample and 120 months in the whole sample, asymptotic properties should apply. Akhmedov and Zhuravskaya (2004) and Brender and Drazen (2005) use similar model specification and methods.¹⁴

X_{it} stands for the controlled variables, including coal production quantity (*Coal*), fixed capital investment (*Investment*), which respectively reflect the scale of a coalmine and the region's investment in infrastructure and technological equipment.¹⁵ μ_i is the fixed regional effects, and τ_t is the fixed time effects.

The time effects include those for political cycles and those for possible seasonality effects. We include year dummy variables infixed time effects because coal production is related to macroeconomic factors that are likely to change year by year instead of month by month.¹⁶ We also control for calendar months in fixed time effects. As we explain in next subsection, the calendar months chosen to be included would depend on their correlations with the political cycle variables.

One reason to include some months before and after the meeting event is to control for the lagged effect of the dependent variable. The other reason is to control for some economic effects that have a cycle impact. Alesina and Roubini (1992) used the 4th, 6th, an 8th quarters after the government reelection event as their controlled cycle variables to reflect the 1–2 year duration of wage contracts in the US. Berger and Woitek (1997) included the 1st to the 3rd months both before and after the elections to control for the elections' impact on economic variables such as price, unemployment and M1. The 4th lagged dependent variable was also controlled. Brender and Drazen (2005) controlled for the 1st to 4th years after the elections and the first lagged dependent variable. They did not include year dummies in their panel analysis considering that they were not significant.

As shown in Figs. 2 and 3, the dependent variables, cases of accidents and the number of deaths, are concentrated discrete variables, so we also estimate the regressions with fixed effects Poisson models as follows

$$E(y_{it}|D_{it}, y_{it-1}, X_{it}) = \exp \left(\sum_{j \in \{-2, 6\}} \alpha_j D_{it} + \beta y_{it-1} + \delta' X_{it} + \mu_i + \tau_t \right).$$

3.3. The explanatory variables

Our main interests are in the cycle variables, the time dummies that indicate the months when certain important events make the social stability a sensitive issue. These include the local “two sessions” (*Local sessions*), Spring Festival (*Spring*), the national “two sessions” (*National sessions*), and the local Party meeting. Information about these events was collected from Xinhua Website and People's Website. The local “two sessions” are mostly in January, Spring Festival falls mostly in February, while the national “two sessions” are fixed in March. Between 2000 and 2010, the 18 provinces in our sample held 180 local “two sessions”, only 35 (about 19%) of which occurred in early February, while all the others were held in middle or later January. If the meeting spans across both January and February (for instance, between January 28th and February 3rd), we note it as January.¹⁷

¹² Within the whole sample period, there were two party conferences in 2002 and 2007, but 2007 was not within the core sample.

¹³ When we omit the lagged dependent variable, it does not change the main results and conclusion of this paper.

¹⁴ We use GMM method for robustness check later on and obtain similar results. However, because the sample size is relatively small, the GMM estimator is not guaranteed to have anything close to its nice asymptotic properties (Hayashi, 2000, p. 215).

¹⁵ Tu (2007) emphasize that investment in infrastructure and safety equipment is very important for reducing coalmine accidents. Unfortunately, we could not find data on fixed investment in this specific category.

¹⁶ We also performed robustness analysis by controlling for monthly fixed effects and the conclusions of our analysis are not affected. In fact, most coefficients for the month dummies are not significant.

¹⁷ There are two reasons for this setting: First, the time before the meeting is politically more sensitive than the time after the meeting; second, statistics for the major events are usually collected at the end of the month, so accidents that occur at the end of the month allow the incumbents less time to react. When we record the cross-month meeting in both months, the results still hold.

Table 2
Summary statistics of the main variables.

Variables	Mean	S.D.	Min	Max	<i>m</i>
<i>Panel A: Monthly coalmine accidents</i>					
Case	6.38	8.50	0	48	990
Death	12.48	17.46	0	183	990
Total casualty	14.98	20.97	0	207	990
Deathrate	6.28	17.49	0	461.54	981
<i>Panel B: Provincial political cycle and economic variables</i>					
Local sessions	0.09	0.28	0	1	990
Spring	0.09	0.29	0	1	990
National sessions	0.07	0.26	0	1	990
Party meeting	0.02	0.14	0	1	990
Coal (ten thousand tons)	486.86	644.34	0.65	4429.69	981
Investment (hundred million Yuan)	129.43	112.81	0.89	1043.96	990
<i>Panel C: Provincial other variables</i>					
Media	19.63	15.24	4.65	79.97	108
Inoffice	3.67	2.45	1	10	90
Age	52.87	5.63	36	61	90

Note: Our core sample is from July of 2001 to January of 2006 and the data for governors end in 2005.

Although Spring Festival is not a political event, it is the most important holiday break when production is likely to be low. Among the ten Spring Festivals in our sample, six of them fell in February and the rest fell in January. The timing of the meetings and Spring Festival will affect how we control the month dummy variables in our econometric models.

We report the correlations between the time variables in Appendix B. It shows that the first month after local meeting event (*Post1*) is highly correlated with the month for Spring Festival; the second month after the local meeting (*Post 2*) is highly correlated with the national meeting event. Therefore, we omitted the first and second month after the local meeting event in the regressions.¹⁸

Since the 2 months before the local “two sessions” are highly correlated with November and December, and the 6 months after the meeting correlated with the months from February to July, we only included August, September, and October as controlled calendar months.¹⁹ This way, every month’s fixed effects (January to December) were included in the regression models.

The monthly economic variables in our regression analyses, including coal production, fixed assets investment, and high-way freight volume, were obtained from WIND database.

We also examine some provincial characteristics that determine the magnitude of political cycle, including media exposure and career concern of the provincial leaders. To measure the degree of media exposure, we use per capita print of newspaper in each province (*Media*) between 2000 and 2009 collected from “Chinese Press and Publishing Statistical Data Compilation”. To consider the career motive of the local officials, we collect the tenure of the vice governors in charge of safety in current position (*Inoffice*) and their ages (*Age*).

Table 2 summarizes the descriptive statistics for our main explanatory variables between 2001 and 2006 (the core sample).

4. Empirical analyses

4.1. Political cycle and coalmine accidents

We first analyze how political cycles affect coalmine safety and then examine the determinants of cycle magnitude. All regression estimates use robust standard errors clustered at the provincial level, which account for possible heteroskedasticity and within-province serial correlation of the idiosyncratic error terms.

4.1.1. Cases of accidents

We first use the number of accidents as the dependent variable. Table 3 reports the results for three regression models. Column (1) is the OLS model in which only the local “two sessions” (*Local sessions*) is included and is significantly negative. Column (2) and (3) report the fixed-effects estimates with the former one including all meeting variables and the latter one including all of our control variables. Column (4) reports the fixed-effects Poisson estimates with all the control variables. These results indicate that local “two sessions” is significantly negative in all of these regressions. Column (5) gives the marginal effects of the Poisson analysis from column (4).

¹⁸ When we use alternative specifications, such as including six pre-meeting and six post-meeting months, the main results still hold.

¹⁹ The conclusions are not affected when we control for the other months, from August to December.

Table 3

Political cycle and the number of accident cases.

Dependent variable	Case				
Model	OLS (1)	FE (2)	FE (3)	FE Poisson (4)	FE Poisson (5) Marginal effect
Case ₋₁			0.461*** (0.075)	0.026*** (0.007)	0.103*** (0.027)
Pre1			-0.245 (0.554)	-0.057 (0.095)	-0.224 (0.367)
Pre2			-1.222* (0.606)	-0.189** (0.057)	-0.708*** (0.200)
Local sessions	-1.633*** (0.311)	-2.018*** (0.373)	-1.615*** (0.475)	-0.316*** (0.099)	-1.123*** (0.312)
Spring		-3.881*** (0.897)	-3.563*** (1.048)	-0.743*** (0.117)	-2.260*** (0.260)
National sessions		0.058 (0.591)	1.305* (0.630)	0.121 (0.079)	0.512 (0.354)
Post3			-0.407 (0.311)	-0.098* (0.051)	-0.379** (0.189)
Post4			-0.566 (0.456)	-0.109** (0.051)	-0.419** (0.187)
Post5			0.226 (0.408)	0.028 (0.053)	0.115 (0.219)
Post6			0.837 (0.632)	0.125 (0.109)	0.529 (0.484)
Party meeting		-0.467 (0.760)	-0.208 (0.809)	-0.139 (0.164)	-0.527 (0.584)
Economic var.		Y	Y	Y	Y
Time FE		Y	Y	Y	Y
Province FE		Y	Y	Y	Y
Adj-R ²	0.003	0.724	0.789		
Observations	990	981	963	963	963

Note: Economic variables include monthly coal quantity and fixed investment in every province. Time fixed effects include years and calendar months from August to October. Robust standard errors are clustered at the provincial level and reported in parentheses.

* Denote significance at the 10% level.

** Denote significance at the 5% level.

*** Denote significance at the 1% level.

The results in column (4) indicate that the local “two sessions” significantly reduce the cases of accidents in the meeting month by 18% on average.²⁰ The number of accidents is also reduced 2 months before the local “two sessions”, but the results for this effect are not robust.

The national “two sessions” (*National sessions*) is not significant because it is held in Beijing and does not involve appointments of local officials.

Spring Festival (*Spring*) also significantly reduces coalmine accidents. This could be either because of the holiday break or because it is another time with political sensitivity.

The months after the local “two sessions” either increase or decrease the number of accidents. In particular, the third and the fourth month after have significantly negative effects. The fluctuation could have been caused by changes in coal production or other seasonal factors. Possible seasonal factors that can affect coalmine safety include weather conditions, working environment that affects workers’ behavior or emotions, and other institutional arrangements. For example, there is an annual safety inspection on the coalmine industry, usually before June.²¹ This may help explain the significant reduction in coalmine accidents 3 or 4 months after the local “two sessions”.

The local Party meeting does not have significant impact on the number of coalmine accidents. Compared with the local “two sessions”, the local Party meeting may be less important since it is smaller in scale, not as long, not as much followed by the media, and not directly related to the appointments of government officials (except for the Party secretary who is not directly in charge of production issues).

The lagged dependent variable is significantly positive. This indicates that there exist serial autocorrelations, or coalmine accidents are affected by historical factors.

The above analysis confirms that coalmine accidents are sharply reduced during the most sensitive annual political event of local “two sessions”, and are then brought up by the “performance impulse” of local officials after the meetings. This forms a Chinese-style political cycle that is different from what are found in the developed countries.

²⁰ The average effect is computed from the marginal effect 1.123 divided by the average value of the dependent variable 6.38. We can obtain the same results if we use the logarithm form of the dependent variable in FE model. However, we cannot use logarithm form of the dependent variable in FE Poisson model.

²¹ See <http://www.sxjmfxy.com.cn/news/ArticleShow.asp?ArticleID=5948>.

Table 4

Impact of political cycle on coalmine death and casualty.

Dependent variable	Death				Total casualty
	OLS	FE	FE Poisson	FE Poisson	FE Poisson
Model	(1)	(2)	(3)	(4)	(5)
				Marginal effect	
y_{-1}		0.0004 (0.022)	−0.001 (0.001)	−0.007 (0.011)	−0.0002 (0.001)
Pre1		−2.371 (2.439)	−0.210 (0.214)	−1.689 (1.573)	−0.322 (0.190)
Pre2		−1.421 (3.524)	−0.107 (0.263)	−0.894 (2.109)	−0.203 (0.254)
Local sessions	−3.715** (1.688)	−6.650** (2.468)	−0.550** (0.229)	−3.875*** (1.254)	−0.583*** (0.215)
Spring		−9.786*** (2.413)	−0.952*** (0.254)	−5.850*** (1.016)	−0.918*** (0.262)
National sessions		−3.099 (3.306)	−0.236 (0.228)	−1.865 (1.621)	−0.295 (0.226)
Post3		−4.105* (2.131)	−0.303** (0.155)	−2.337** (1.028)	−0.325** (0.138)
Post4		−2.269 (3.462)	−0.178 (0.235)	−1.440 (1.761)	−0.172 (0.246)
Post5		−3.609 (2.230)	−0.269* (0.161)	−2.104* (1.103)	−0.354** (0.165)
Post6		−1.655 (1.867)	−0.134 (0.135)	−1.109 (1.049)	−0.159 (0.118)
Party meeting		−2.101 (1.411)	−0.239 (0.167)	−1.865 (1.165)	−0.250 (0.165)
Economic var.		Y	Y	Y	Y
Time FE		Y	Y	Y	Y
Province FE		Y	Y	Y	Y
Adj- R^2	0.004	0.380			
Observations	990	963	963	963	963

Note: y_{-1} stands for lag dependent variable. Economic variables include monthly coal quantity and fixed investment in every province. Time fixed effects include years and calendar months from August to October. Robust standard errors are clustered at the provincial level and reported in parentheses.

* Denote significance at the 10% level.

** Denote significance at the 5% level.

*** Denote significance at the 1% level.

4.1.2. Number of deaths and total casualty

We next examine how severity of coalmine accidents relates to political cycles. Three models are estimated with the results for the *Deaths* variable in columns (1)–(3) of Table 4. Column (4) reports the marginal effects of the Poisson estimate for *Deaths*. Column (5) reports the fixed effect Poisson estimate when the dependent variable is *Total casualty*, which includes both the number of deaths and the number of injured and missing ones.

The results show that during the month for the local “two sessions”, coalmine deaths or total casualties were significantly reduced. The marginal effects from the Poisson regression indicate that the number of deaths is reduced by 30% in the month for the local “two sessions”. Spring Festival is still significantly negative. The national “two sessions” and the local Party meeting are not significant. The third month and the fifth month after the local two sessions are significantly negative.

The above results indicate that the number of accidents and the casualties of accidents show a similar cyclical pattern: lower before the local “two sessions”, and higher after the meetings. We next examine the impact of the “two sessions” on the death rate of coalmine accidents.

4.1.3. Death rate

There are different ways in which authorities can try to control coalmine safety, such as by enhancing the safety supervision system or by reducing coal production. To examine the channels through which political cycles affect coalmine safety, we use monthly death rate of coalmine accidents as the dependent variable for the above regression models, excluding coalmine production from the explanatory variables. We also use coal production as the dependent variable to see if controlling production is used as a way to reduce accidents.

The results in the first two columns of Table 5 indicate that death rate is not significantly affected by the local “two sessions” or Spring Festival. In the meantime, columns (3) and (4) show that coal production is significantly lower in the month for the local “two sessions” and during Spring Festival. Therefore, the number of deaths and coal production are affected in the same pattern by the political cycle of meeting events. This implies that the lowered number of accidents is realized most likely by reducing production rather than by improving safety measures such as enhanced supervision or enhanced technology. This reflects the Chinese-style tradeoff between “social stability” and production. Fig. 1 also demonstrates the co-movement between production cycle and safety cycle, especially in the early part of the year.

Table 5

Effects of political cycle on death rate and coal production.

Dependent variable	Death rate		Coal production		Highway freight	
	OLS	FE	OLS	FE	OLS	FE
Model	(1)	(2)	(3)	(4)	(5)	(6)
y_{-1}		0.096 [*] (0.516)		0.836 ^{***} (0.044)		0.519 ^{***} (0.038)
Pre1		–2.700 (1.182)		14.475 (17.772)		18.518 (96.796)
Pre2		–2.146 [*] (1.202)		4.574 (8.288)		–20.133 (73.450)
Local sessions	–1.867 (1.375)	0.029 (1.909)	–31.951 ^{**} (13.471)	–67.521 ^{**} (25.933)	59.967 (44.957)	–4.556 (95.912)
Spring		–1.494 (1.589)		–112.385 ^{***} (32.876)		–173.541 [*] (99.750)
National sessions		–0.436 (1.413)		55.534 (23.907)		118.443 (90.322)
Post3		0.626 (1.970)		–19.026 (13.797)		58.331 (77.045)
Post4		0.268 (1.526)		–15.707 ^{**} (6.138)		–225.905 [*] (111.084)
Post5		–0.264 (1.612)		–6.152 (9.778)		–208.134 ^{**} (97.150)
Post6		1.616 (2.158)		–38.229 ^{**} (16.705)		–57.622 (54.199)
Party meeting		1.799 (2.839)		–10.065 (12.125)		205.572 ^{**} (87.763)
Economic var.		Y		Y		Y
Time FE		Y		Y		Y
Province FE		Y		Y		Y
Adj- R^2	0.001	0.184	0.0002	0.978	0.0001	0.946
Observations	981	962	981	962	882	774

Note: y_{-1} stands for lagged dependent variable. Economic variables include monthly fixed investment in every province. Time fixed effects include years and calendar months from August to October. Robust standard errors are clustered at the provincial level and reported in parentheses.

^{*} Denote significance at the 10% level.

^{**} Denote significance at the 5% level.

^{***} Denote significance at the 1% level.

Some regulation measures implemented by the local governments support our conclusion. In order to control safety, many local Safety Administrations require that coal mining be stopped for safety inspection during Spring Festival and during the local “two sessions”. For example, in Yichun, Jiangxi province, where many work accidents occurred between 2000 and 2003, only those larger mines that could pass the inspection were allowed to resume production.²² In fact, since its founding in 2000, SAWS had issued similar orders that stopped coalmine production for safety inspection during Spring Festival.²³

Possible seasonality effects are controlled for by the inclusion of fixed investment and calendar months. The negative effects of the fourth month and the sixth month on coal production may reflect seasonal effects or the semi-annual safety inspection we mentioned earlier. As Fig. 1 shows, except for the local “two sessions” and Spring Festival, coal production is rather stable in most months. In fact, the monthly production of each mine has to be approved by the regulation agencies not to exceed a balanced amount. For example, as an important coal producing center, Jingcheng in Shanxi Province has issued the following policy for balanced mine production: “The planned annual total production is not to exceed its capacity, and the monthly production is not to exceed the planned amount by 10%”.²⁴ This regulation measures are meant to control extreme local competitions that may result in negative externalities.

A possible concern with the above result is that the reduction of coal production could be a result when the major meeting events distracted the local leaders’ efforts put on productions. Skouras and Christodoulakis (2010) find that, during political elections, the government is faced with a tradeoff of allocating effort or attention between governing vs. campaigning. This is unlikely to be case for coal production because the local “two sessions” are mainly attended by local government officials or representatives while coalmines and other production units are not involved in organizing these meeting. To verify our hypothesis, we test if general productions in the province are affected by the meeting variables. Since monthly local GDP statistics are not available, we use a proxy variable to measure local production outputs, which is the monthly highway freight volume collected between 2001 and 2010. Using models similar to the analysis for coal production in columns (5) and (6) of Table 5, we do not find significant impact of the local meetings on highway freight volume. This suggests that

²² The document of the Yichun Safety Administration: <http://www.ycsafety.gov.cn/pub/zffw/YSAJGZ/2012-01/201201301027054315.html>. Other provinces have issued similar documents.

²³ The link to the issued document: <http://www.chinasafety.gov.cn/file/2004-01/2000/aqbg53.htm>.

²⁴ Source of document: <http://www.jcmt.gov.cn/show.asp?id=1692>.

Table 6

Media exposure and career concern on the cycles' magnitude.

Dependent variable	Case		Death	
	FE Poisson	FE Poisson	FE Poisson	FE Poisson
Model	(1)	(2)	(3)	(4)
R stands for	Media	Inoffice4	Media	Inoffice4
R * Pre1	0.001 (0.003)	0.068 (0.469)	0.004 (0.010)	−0.738 (0.451)
R * Pre2	0.005 (0.005)	0.064 (0.341)	0.019 (0.011)	0.561 (0.587)
R * Local sessions	−0.013*** (0.004)	−0.783* (0.406)	−0.026* (0.015)	−2.058*** (0.786)
Local sessions	−0.117 (0.132)	−0.317*** (0.120)	−0.211 (0.285)	−0.525* (0.212)
R * Spring	0.0004 (0.016)	−0.907* (0.551)	−0.023 (0.026)	−2.100*** (0.615)
R * National sessions	−0.007 (0.004)	−0.021 (0.343)	0.011 (0.009)	0.974** (0.388)
R * Post3	0.004 (0.007)	0.226 (0.315)	0.005 (0.009)	−0.174 (0.397)
R * Post4	0.014*** (0.005)	0.303 (0.275)	−0.003 (0.014)	−0.039 (0.234)
R * Post5	0.010*** (0.004)	0.024 (0.312)	0.015 (0.010)	−0.534 (0.414)
R * Post6	0.001 (0.005)	−0.187 (0.295)	0.005 (0.009)	0.183 (0.390)
R * Party meeting	−0.024*** (0.008)	0.156 (0.348)	−0.008 (0.017)	−0.359 (0.606)
Control var.	Y	Y	Y	Y
Observations	963	946	963	946

Note: Control variables include lagged dependent variable, other political meeting dummy variables, media exposure or leaders' fourth year in tenure, monthly coal production, fixed investment, years, and calendar months from August to October. Robust standard errors are clustered at the provincial level and reported in parentheses.

* Denote significance at the 10% level.

** Denote significance at the 5% level.

*** Denote significance at the 1% level.

the reduction of coal production is likely to be caused by intended intervention on sensitive industries for the purpose of preventing accidents and securing social stability.

4.2. Determinants of political cycle magnitude

Because of the impact of political cycles, coalmine accidents display annual cycle movements together with the political event of local “two sessions”. We next examine the determinants of the cycles' magnitude. In particular, we consider two possible channels through which the “two session” affect coalmine accidents: media exposure and career motive of the local officials. The best way to test our hypotheses concerning the possible determinants of cycle magnitude is to include in our regression analysis with additional regressors: proxies for the media exposure and leaders' career motive in a province and their interactions with the political cycle dummies.

4.2.1. Media exposure

We first consider the impact of media exposure on the magnitude of coalmine accidents' cycles. We use per capita print of newspaper as the proxy for the degree of media exposure.²⁵ Our hypothesis is that higher circulation of newspaper indicates easiness of information flow, making it easier for the negative news of coalmine accidents to be released to the public.²⁶ Since media exposure can be related to social stability and media coverage is heavier during the event of local “two sessions”, local officials are more likely to be cautious in avoiding accidents in places with strong media exposure. We include this proxy and their interaction with all the cycle dummies in our earlier regression models in Tables 3 and 4. The results are presented in columns (1) and (3) in Table 6. The interaction term for the media exposure and the local “two sessions” is significantly negative, indicating that the density of media exposure intensifies the effect of political cycles.²⁷ Our analysis supports the view of Egoroy et al. (2009) that media can play an important role even in an authoritarian system because it helps the government to monitor the behavior of bureaucratic officials.

²⁵ We also use the types of newspaper per person as a measurement of media exposure and obtain similar results. This is consistent with the finding of Jia and Nie (2012).

²⁶ Besley and Burgess (2002) use per capita newspaper circulation in India as the proxy for mass media and find that an increase in newspaper circulation is associated with an increase in public food distribution and an increase in the share of public expenditures.

²⁷ When we only include the interaction of media exposure and the “two sessions”, the interaction term is still significant.

Table 7

Government election and the cycle of coalmine accidents.

Dependent variable Model	Case		Death	
	FE (1)	FE Poisson (2)	FE (3)	FE Poisson (4)
y_{-1}	0.461*** (0.074)	0.025 (0.007)	0.001 (0.022)	−0.001 (0.001)
Pre1	−0.226 (0.562)	−0.055 (0.097)	−2.333 (2.459)	−0.209 (0.215)
Pre2	−1.235* (0.606)	−0.189*** (0.057)	−1.450 (3.530)	−0.107 (0.264)
Local sessions_elec	−2.532** (1.012)	−0.384*** (0.142)	−8.552** (3.734)	−0.624** (0.308)
Local sessions_nonelec	−1.350** (0.586)	−0.288** (0.138)	−6.099** (2.483)	−0.519** (0.230)
Spring	−3.631*** (1.031)	−0.747*** (0.111)	−9.928*** (2.297)	−0.956*** (0.248)
National sessions	1.280* (0.634)	0.120 (0.078)	−3.148 (3.304)	−0.236 (0.228)
Post3	−0.430 (0.309)	−0.098** (0.050)	−4.154* (2.116)	−0.304* (0.155)
Post4	−0.586 (0.466)	−0.109** (0.051)	−2.313 (3.454)	−0.178 (0.235)
Post5	0.209 (0.410)	0.028 (0.053)	−3.646 (2.213)	−0.270* (0.161)
Post6	0.822 (0.622)	0.125 (0.109)	−1.686 (1.854)	−0.134 (0.135)
Party meeting	−0.199 (0.811)	−0.138 (0.166)	−2.082 (1.420)	−0.237 (0.167)
Economic var.	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Province FE	Y	Y	Y	Y
Adj-R ²	0.789		0.380	
Observations	963	963	963	963

Note: y_{-1} stands for lag dependent variable. Economic variables include monthly coal quantity and fixed investment in every province. Time fixed effects include years and calendar months from August to October. Robust standard errors are clustered at the provincial level and reported in parentheses.

* Denote significance at the 10% level.

** Denote significance at the 5% level.

*** Denote significance at the 1% level.

4.2.2. Career motive of local officials

Another channel that the local “two sessions” can affect coalmine safety is through the local officials’ concern for their political career. According to the request of the central government, when severe accidents occur, the “officials in charge” are going to bear the responsibility. Each province has a vice governor who is mainly in charge of safety issues and should be directly responsible for coalmine accidents. Coalmine accidents are very likely to affect the future career of this vice governor.²⁸ We focus on this governor as a possible factor that affects the cycles of coalmine safety. In China, one term of a government official is usually 5 years and each official cannot hold the same post for more than two terms. Therefore, the fourth year in a post is likely to be an important year for a local leader when he is faced with the possibility of being reappointed or promoted. Within our sample, the average age of the safety governors is 53, far from the retirement age of 60, so a vice governor can be possibly promoted to a governor.²⁹ Therefore, we use whether the safety governor is in the fourth year of his term as a proxy variable for the local officials’ career motive (*Inoffice4*). We include the interactions of this dummy variable with all political cycle dummy variables in our regressions to test the career motive hypothesis.

Table 6 reports the effect of career motive on safety cycles in columns (2) and (4). The interaction of *Inoffice4* and the “two sessions” is significantly negative both for the number of accidents and the number of deaths.³⁰ This implies that the vice governor in charge of safety is sensitive to coalmine accidents when he is in the fourth year of his post, which amplifies the political cycle for coalmine accidents. We also tested the effect of the safety governors’ age and found it not significant. There are reasons that age effect can be ambiguous. While a young official is concerned with reputation for future promotion, an older official near retirement may be concerned with the reputation he is going to live with for the rest of his life after retirement.

²⁸ For example, on February 14th of 2005, Sunjiawen of Liaoning Province had a very bad coalmine accident, leading to 214 deaths of coal miners. The vice governor of Liaoning province who was in charge of safety was ordered to be on probation by the State Council. See: <http://news.sina.com.cn/c/2005-02-24/01435183469s.shtml>.

²⁹ We analyzed the current provincial governors’ resume and found that among the 31 governors, 25 (about 81%) of them have been vice governors, with the average tenure of 5.24 years.

³⁰ When we only include the interaction of career concern and the “two sessions”, the interaction term is still significant.

Table 8

Robustness checks: Controlling full monthly effects or using the whole sample.

Sample Dependent variable Model	Core sample		Full sample	
	Case FE Poisson (1)	Case FE Poisson (2)	Death FE Poisson (3)	Coal FE (4)
y_{-1}	0.027*** (0.007)	0.032*** (0.004)	0.001 (0.002)	0.920*** (0.009)
Pre1		0.029 (0.084)	−0.088 (0.124)	11.634 (13.821)
Pre2		−0.138 (0.090)	0.069 (0.128)	12.541 (9.790)
Local sessions	−0.147* (0.087)	−0.265** (0.115)	−0.442** (0.194)	−88.192** (34.849)
Spring	−0.409*** (0.137)	−0.656*** (0.119)	−0.907*** (0.197)	−141.332*** (43.854)
National sessions	0.052 (0.159)	0.113 (0.081)	−0.099 (0.139)	108.771*** (32.706)
Post3	0.046 (0.075)	−0.077 (0.079)	−0.162 (0.141)	−10.072 (11.842)
Post4	−0.063 (0.099)	−0.094* (0.056)	−0.065 (0.170)	3.007 (9.653)
Post5	−0.002 (0.136)	0.049 (0.087)	−0.202 (0.158)	−1.507 (11.001)
Post6	0.054 (0.128)	0.183 (0.131)	−0.047 (0.102)	−58.458** (26.724)
Party meeting	0.007 (0.152)	0.017 (0.117)	−0.085 (0.163)	−3.037 (8.405)
Economic var.	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Province FE	Y	Y	Y	Y
Observations	963	2080	2080	2079

Note: y_{-1} stands for lag dependent variable. Economic variables include monthly coal quantity and fixed investment in Eqs. (1)–(3), but only fixed investment in Eq. (4). Time fixed effects include all months in Eq. (1), but years and calendar months from August to October in Eqs. (2)–(4). Robust standard errors are clustered at the provincial level and reported in parentheses.

* Denote significance at the 10% level.

** Denote significance at the 5% level.

*** Denote significance at the 1% level.

4.2.3. Government election time

We also consider another event that may be related to career motive: the change of government term. Every 5 years, the local governments at all levels are supposed to be changed to a new term with officials elected during the local congress meetings.³¹ Within the periods of our data, there are 2 years as government election years, one is 2003, and the other is 2008. It is reasonable to conjecture that when officials are faced with the pressure of reelection during the meeting events, they are more concerned with their images during the two sessions and will exert greater efforts to prevent coal accidents.

To investigate the effect of election years on coalmine accidents, we create two dummy variables as explanatory variables: meeting month in the election years (*Local sessions_elec*), and meeting month in the non-election years (*Local sessions_nonelec*). We include these variables in the regressions for cases and casualties of coalmine accidents presented in Table 7. The results indicate that the meeting event is significant both in the election years and in the non-election years. While the election years seem to have a larger absolute value in the coefficient, the difference is not significant ($p = 0.36$ for model (1); $p = 0.65$ for model (2); $p = 0.46$ for model (3); $p = 0.68$ for model (4)). This implies that there is not a significant cycle effect from election years. The result is not surprising. As we stated earlier, the central government can appoint new provincial leaders any time of the year, i.e., the appointments of local officials are continuous but not concentrated around the election years. Therefore there is not a clear cycle of local leadership changes. The results have special implications for understanding the characteristics of political cycles in an authoritarian country where the term of individual leaders is more important than the term of government.

4.3. Robustness analysis

4.3.1. Monthly fixed effects

Since our panel data set consists of monthly observations, it seems natural to try controlling for the monthly fixed effects even though we think that macroeconomic factors are most likely to affect coal production by year. Since the months before

³¹ Note that government election time refers to the year (every 5 years) when the local government officials are changed or elected or appointed at the congresses. Many officials are still reappointed to the same posts. For example, at the 2008 congress of Hunan province when the government was changed, only one of the eight vice governors was newly appointed, while the other seven had already been in the current positions from previous appointments.

Table 9

Robustness checks: Separating Spring Festival and Tobit Method.

Dependent variable Model	Sample		Subsample		Core sample	
	Case	Death	Case	Death	Case	Death
	FE Poisson (1)	FE Poisson (2)	RE Tobit (3)	RE Tobit (4)	GMM (5)	GMM (6)
Pre1	0.192 (0.151)	−0.246 (0.492)	−0.048 (0.730)	−2.201 (2.599)	10.776 (13.250)	24.065* (12.197)
Pre2	−0.004 (0.076)	−0.334 (0.474)	−1.199* (0.728)	−1.287 (2.574)	0.060 (0.674)	8.524 (8.248)
Local sessions	−0.328** (0.148)	−0.726** (0.314)	−1.951** (0.770)	−8.305*** (2.739)	−4.791*** (1.820)	−20.775** (10.59)
Spring	−0.676*** (0.141)	−1.037** (0.421)	−4.875*** (0.739)	−13.749*** (2.612)	−4.589** (1.836)	−25.318** (11.553)
National sessions	0.212** (0.095)	−0.343 (0.420)	1.255* (0.758)	−3.779 (2.690)	−0.009 (2.081)	−301.884 (190.226)
Obs.	614	614	963	963	963	963

Note: Other variables include lag dependent variable, Post3–6, Party meeting, monthly coal quantity and fixed investment. Robust standard errors are clustered at the provincial level and reported in parentheses.

* Denote significance at the 10% level.

** Denote significance at the 5% level.

*** Denote significance at the 1% level.

the local “two sessions” are not significant from previous analyses, we include only the post-event months in this regression.³² In fact, the evaluation of government officials usually follows the calendar year (from January to December). The regression results are presented in columns (1) of Table 8. The month for the local “two sessions” is still significant, and so is Spring Festival.

4.3.2. The whole sample regressions

Another robustness check is for the whole sample. In the earlier regressions, we have excluded the years when accidents with three or less casualties were not reported. With the whole sample, we report the results with the earlier specifications in columns (2) to (4) of Table 8. The results indicate similar cyclical pattern as found earlier with significant negative effects of the local “two sessions” and Spring Festival.

4.3.3. Separating the effect of Spring Festival

In some years, Spring Festival and local “two sessions” fell in the same month. In order to separate the holiday effect from the political impact on coalmine safety, we remove all of the observations when the local “two sessions” fell after or in the same month with Spring Festival. The reason is that when Spring Festival is before the local “two sessions”, one may suspect that the reduced production during the local “two sessions” is resulted from the lagged effect of Spring Festival break. The results after separation are reported in columns (1) and (2) of Table 9. The earlier conclusions about the impact of political cycle on coalmine accidents still hold.

4.3.4. Alternative specifications

Considering that the dependent variables are positive integers, we explore using the method for truncated observations. The results for random effects Tobit are reported in columns (3)–(4) of Table 9, which show similar conclusions as earlier regressions.³³ This shows that our results regarding the impact of political cycles are robust.

Finally, considering the lagged dependent variable included as an explanatory variable, we explore using the GMM method to correct possible estimation bias of fixed effects (Arellano and Bond, 1991). As shown in columns (5)–(6) of Table 9, the local “two sessions” and Spring Festival are still significantly negative for the number of accident cases and the number of deaths.

5. Conclusion

This paper has examined the impact of political cycle on coalmine accidents in China. Political cycles are formed by the major meeting events of provincial “two sessions” held every year by the legislative bodies. We find that the number of coalmine accidents is significantly lowered during the provincial “two sessions” after controlling for other time fixed effects. Our analysis with coal production indicates that the temporary reduction of accidents is obtained by controlling production rather than by improving safety measures. Based on the incentives of local officials, we have identified two possible channels for the impact of PBC on coalmine accidents. The cycle for accidents is enlarged in provinces where media exposure is high or when the vice governor in charge of safety is faced with a possible extension to another term. Our results are robust when alternative specifications are used.

³² When we control for more months before the meeting event, the main conclusions of our study still hold.

³³ As stated in Greene (2004), the maximum likelihood estimator for panel Tobit model with fixed effects will be biased and inconsistent, and will suffer from “incidental parameters problem”. Therefore we use random effects estimate for the Tobit model.

The results of this paper have important policy implications. The impact of political meetings on the cycle of coalmine safety reflects the result of the top-down vertical accountability system in an authoritarian institution compared to a democratic one. The combination of the short tenure of local politicians, the absence of bottom-up forces from public voters, and the horizontal competition between provinces weakens the politicians' long-term incentive for improving work safety. Therefore, policy measures should be designed to adjust the incentive mechanism and regulate the behavior of responsible officials in line with a long-term goal for work safety. For example, the government can consider using death rate as an important measurement of safety rather than focusing only on the number of deaths or casualties. This can hopefully give the local officials more incentive to reduce the rate of work accidents.

Acknowledgements

The authors thank Ruixue Jia, Ting Jiang, Ziyang Fan, Tao Li, Pinghan Liang, the referee, and participants at China 1st Organizational Economics Conference at Renmin University of China for helpful comments and discussions. Nie is grateful for the support from Program for New Century Excellent Talents in University and China Ministry of Education Fund for Young Scholars in Humanities and Social Science.

Appendix A. Major political meeting events and Spring Festival

Event	Duration and Time	Function	Note
Local People's Congress (LPC)	One week. Between January 10 and February 27	Review and approve the government's plans and budgets for economic and social development; to appoint provincial leaders	Once a year. Almost at the same time for one province every year
Local Chinese People's Political Consultative Conference (CPPCC)	At the same time with local people's congress	Discuss reports of the local government; provide consultation and suggestions	Same as above
National People's Congress (NPC)	About 10 days. Between March 5th and 18th	Review and approve the government's plans and budgets for economic and social development; to appoint leaders of the country	Once a year in Beijing
National CPPCC	At the same time with NPC	Discuss government reports; provide consultation and suggestions	Same as above
Spring Festival	One week break. Falls in January or February	Break; family reunion	Once a year. Same for the whole country
Local Conference of Chinese Communist Party (CCP)	Four days. In April, May, October, or November	Discuss local party issues; elect party committee members and approve nominations from the upper authorities	Time may be different for each province, but it is always five years apart

Appendix B. Correlations between time dummy variables

	Lsessions	Spring	Nsessions	Post1	Post2	Post3	Post4	Post5	Post6	M1	M2	M3	M4	M5	M6
Lsessions	1.00														
Spring	0.19	1.00													
Nsessions	-0.09	-0.09	1.00												
Post1	-0.09	0.60	0.10	1.00											
Post2	-0.09	-0.09	0.80	-0.08	1.00										
Post3	-0.09	-0.09	-0.08	-0.08	-0.08	1.00									
Post4	-0.09	-0.09	-0.08	-0.09	-0.08	-0.08	1.00								
Post5	-0.09	-0.09	-0.09	-0.09	-0.09	-0.09	-0.09	1.00							
Post6	-0.09	-0.10	-0.09	-0.09	-0.09	-0.09	-0.09	-0.10	1.00						
M1	0.81	0.34	-0.09	-0.09	-0.09	-0.09	-0.09	-0.10	-0.10	1.00					
M2	0.08	0.64	-0.08	0.81	-0.08	-0.08	-0.08	-0.09	-0.09	-0.09	1.00				
M3	-0.09	-0.09	1.00	0.10	0.81	-0.08	-0.08	-0.09	-0.09	-0.09	-0.08	1.00			
M4	-0.08	-0.09	-0.09	-0.08	0.11	0.81	-0.08	-0.09	-0.09	-0.09	-0.08	-0.08	1.00		
M5	-0.09	-0.09	-0.09	-0.06	-0.08	0.10	0.81	-0.09	-0.09	-0.09	-0.08	-0.08	-0.08	1.00	
M6	-0.09	-0.09	-0.09	-0.08	-0.06	-0.08	0.10	0.74	-0.09	-0.09	-0.08	-0.08	-0.08	-0.08	1.00

Note: Lsessions = local sessions, Nsessions = national sessions.

References

- Akhmedov, Akhmed, Zhuravskaya, Ekaterina, 2004. Opportunistic political cycles: test in a Young democracy setting. *Quarterly Journal of Economics* 119 (4), 1301–1338.
- Alesina, Alberto, Roubini, Nouriel, Cohen, Gerald, 1997. *Political Cycles and the Macroeconomy*. MIT Press.
- Arellano, Manuel, Bond, Stephen, 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies* 58 (2), 277–297.
- Baleiras, Nuno, Santos, Vasco, 2000. Behavioral and institutional determinants of political business cycles. *Public Choice* 104 (1/2), 121–147.
- Besley, Timothy, Burgess, Robin, 2002. The political economy of government responsiveness: theory and evidence from India. *Quarterly Journal of Economics* 117 (4), 1415–1451.
- Bo, Zhiyue, 1996. Economic performance and political mobility: Chinese provincial leaders. *Journal of Contemporary China* 5 (12), 135–154.
- Brender, Adi, Drazen, Allan, 2005. Political budget cycles in new versus established democracies. *Journal of Monetary Economics* 52, 1271–1295.
- Cho, Young Nam, 2002. From 'Rubber Stamps' to 'Iron Stamps': the emergence of Chinese local people's congresses as supervisory powerhouses. *China Quarterly* 171, 724–740.
- Dittmer, Lowell, Wu, Yu-Shan, 2006. Leadership coalition and economic transformation in reform China: revisiting the political business cycle. In: Dittmer, Lowell, Liu, Guoli (Eds.), *China's Deep Reform: Domestic Politics in Transition*. Rowman & Littlefield Publishers, Lanham, MD, pp. 25–48.
- Drazen, Allen, 2001. The Political Business Cycle after 25 Years. In: *NBER Macroeconomics Annual 2000*, MIT Press.
- Egorov, Georgy, Guriev, Sergei, Sonin, Konstantin, 2009. Why resource-poor dictators allow freer media: a theory and evidence from panel data. *American Political Science Review* 103 (04), 645–668.
- Eisenstein, Thomas, Strömberg, David, 2007. News droughts, news floods, and U. S. disaster relief. *Quarterly Journal of Economics* 122 (2), 693–728.
- Gonzalez, Maria, 2000. On Elections, Democracy, and Macroeconomic Policy: Evidence from Mexico, Working Paper.
- Greene, William, 2004. Fixed effects and bias due to the incidental parameters problem in the Tobit Model. *Econometric Reviews* 23 (2), 125–147.
- Hayashi, Fumio, 2000. *Econometrics*. Princeton University Press.
- Jia, Ruixue, Huihua Nie, 2012. Decentralization, Collusion and Coalmine Deaths, Working Paper.
- Li, Hongbin, Zhou, Li-An, 2005. Political turnover and economic performance: the incentive role of personnel control in China. *Journal of Public Economics* 89, 1743–1762.
- Li, Yinan, 2011. China's Political Business Cycle. Stockholm University, Working Paper.
- Li, Yunfei, 2010. The Mass Incidents in Shanxi in Times of Frequent Coalmine Accidents (in Chinese). Master Thesis, Nanjing Poly-technology University.
- Maskin, Eric, Qian, Yingyi, Chenggang, Xu, 2000. Incentives, scale economies, and organization forms. *Review of Economic Studies* 67 (2), 359–378.
- Nickell, Stephen, 1981. Biases in dynamic models with fixed effects. *Econometrica* 49 (6), 1417–1426.
- Nie, Huihua, Jinbo Li, in press. Collusion and economic growth: a new perspective on China model. *Economic and Political Studies*.
- Nordhaus, William, 1975. The political business cycle. *Review of Economic Studies* 42 (2), 169–190.
- O'Brien, Kevin, 1994. Agents and remonstrators: role accumulation by Chinese people's congress deputies. *China Quarterly* 138, 359–380.
- Oi, Jean, 1992. Fiscal reform and the economic foundations of local state corporatism in China. *World Politics* 45 (1), 99–126.
- Persson, Torsten, Tabellini, Guido, 1990. *Macroeconomic Policy*. Harwood Academic Publishers, Credibility and Politics.
- Price, Simon, 1997. Political business cycles and macroeconomic credibility: a survey. *Public Choice* 92 (3/4), 407–427.
- Qian, Yingyi, Xu, Chenggang, 1993. Why China's economic reforms differ: the m-form hierarchy and entry/expansion of the non-state sector. *Economics of Transition* 1 (2), 135–170.
- Rogoff, Kenneth, 1990. Equilibrium political budget cycles. *American Economic Review* 80 (1), 21–36.
- Rogoff, Kenneth, Sibert, Anne, 1988. Elections and macroeconomic policy cycles. *Review of Economic Studies* 55 (1), 1–16.
- Shi, Min, Svensson, Jakob, 2006. Political budget cycles: do they differ across countries and why? *Journal of Public Economics* 90 (8–9), 1367–1389.
- Skouras, Spyros, Christodoulakis, Nikos, 2010. Electoral Misgovernance Cycles: Evidence from Wildfires and Tax Evasion in Greece and Elsewhere. <<http://ssrn.com/abstract=1709068>>.
- Strömberg, David, 2004. Radio's impact on public spending. *Quarterly Journal of Economics* 119 (1), 189–221.
- Tao, Yi-Feng, 2006. The evolution of 'political business cycle' in post-Mao China. *Issues & Studies* 42 (1), 163–194.
- Tu, Jianjun, 2007. Coal mining safety: China's Achilles' heel. *China Security* 3, 36–63.
- Wang, Shaoguang, 2006. Regulating death at coalmines: changing mode of governance in China. *Journal of Contemporary China* 15 (46), 1–30.
- Wooldridge, Jeffrey, 2002. *Econometric Analysis of Cross Section and Panel Data*. MIT Press.
- Wright, Tim, 2004. The political economy of coal mine disasters in China: your rice bowl or your life. *China Quarterly* 179 (1), 629–646.