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GDP Growth Incentives and Earnings Management: Evidence from China*

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Abstract

Using data from China, we examine whether and how the incentive to boost GDP growth at the government level affects earnings management at the firm level. We find that firms in provinces with GDP growth lower than the national level or the average of the adjacent provinces are more likely to engage in earnings management than firms in other provinces. Specifically, we find that these firms are more likely to inflate their revenues, overproduce, and delay their asset impairment losses, which are the three main channels through which corporate accounting numbers can affect the calculation of GDP. The aggregate earnings management induced by GDP growth incentives accounts for about 0.5% of GDP. The results are stronger for local state-owned enterprises, over which provincial government officials have more influence, and in provinces with a lower level of marketization, where government intervention is more prevalent. The results are also stronger for firms in provinces with younger governors and in the years immediately prior to the turnover of provincial officials, when GDP growth plays an important role in determining whether the officials get promoted. Overall, this paper is the first to provide systematic evidence on how firms engage in earnings management to boost the GDP growth in their provinces.

Key words: GDP growth, earnings management, China

JEL codes: M40

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1. Introduction

In this paper, we examine whether and how GDP growth incentives at the government level affect earnings management at the firm level. The gross domestic product (GDP) is an important measure of the economic development of a country (e.g., Henderson et al. 2012; BEA 2017). Many important government decisions, such as budget and monetary policies, and many corporate decisions, such as investments, are affected by the level and growth of GDP. However, despite the importance of GDP and the potential adverse consequences of reporting inaccurate GDP figures, GDP is difficult to measure and GDP figures are often inaccurate, especially in developing countries, partly due to their weak statistical infrastructure (e.g., Henderson et al. 2012; Johnson et al. 2013). Moreover, the reported GDP figures are often "manipulated," especially in weak or non-democracies (e.g., Magee and Doces 2015; Martinez 2018).[1]

GDP manipulation is arguably most prevalent in China. Whenever China announces its GDP figures, many people express skepticism, including high-ranking government officials (e.g., Owyang and Shell 2017).[2] Although the reliability of the national GDP figures has improved, GDP manipulation is still prevalent at the provincial level.[3] For example, the sum of the GDP of all of the provinces is invariably higher than the national GDP calculated by the National Bureau of Statistics of China (NBS), with the discrepancy being as high as RMB3.5 trillion in 2010, or

[1] GDP manipulation is not limited to developing countries and non-democracies. It also occurs in other countries, although on a much smaller scale. See Holtz (2014) for examples of political interference in statistics in the U.S. Also see https://dailyreckoning.com/manipulating-the-masses/, accessed on October 3, 2018.

[2] In 2010, WikiLeaks released a conversation that took place in 2007 between Li Keqiang, the then-governor of Liaoning province, and the U.S. Ambassador to China. Li was quoted as saying that the GDP figure reported by his province was "unreliable" and "man-made" (*World Finance*, February 16, 2018, https://www.worldfinance.com/markets/gdp-whats-in-a-number, accessed on October 3, 2018).

[3] The highest subnational division in China is the province. Mainland China has 22 provinces, 4 provincial-level municipalities (i.e., Beijing, Shanghai, Tianjin, and Chongqing), and 5 autonomous regions. In this paper, we refer to all of these divisions as provinces for ease of presentation.

8% of the national GDP.[4] (The discrepancy in the U.S. is usually around 1% of the national GDP.) Recently, a number of provinces in China (e.g., Liaoning and Tianjin) admitted that the GDP figures reported in the previous years were greatly inflated. For example, in January 2018, the Tianjin government admitted that the GDP for 2016 was RMB665.4 billion, not the originally reported RMB1,000.2 billion, reflecting a 50% inflation.[5]

Despite the prevalence of GDP manipulation, limited research has systematically examined the ways provincial officials manipulate the GDP figures. The popular press suggests that typical methods include (1) inflating local investment figures, (2) keeping "zombie" firms in operation, and (3) firms reporting inflated accounting numbers in response to local governments' pressure.[6] We focus on the last approach, which appears to be widespread. For example, in 2018 the NBS announced that due to the pressure from local governments, 97 firms reported greatly inflated numbers, including sales, to their local statistical bureaus.[7] Some provinces set explicit targets for local state-owned enterprises (SOEs). For example, Jiangxi Province set the 2018 sales and net income growth target at 10% for all local SOEs.

We investigate whether and how firms manage their accounting numbers to inflate the GDP figures in their respective provinces. We focus on China for a number of reasons. First, as mentioned above, the manipulation of provincial GDP figures is prevalent in China, and thus focusing on China can increase the power of the tests. Second, China is the second largest economy in the world and a primary destination for foreign investments. As such, China's

[4] The discrepancy can be due to the different scope of analyses used by the NBS and the provincial bureaus of statistics, double counting across provinces, and GDP manipulation at the provincial level.
[5] http://www.xinhuanet.com/mrdx/2018-01/20/c_136910201.htm. Accessed on October 3, 2018.
[6] For examples, see http://www.stats.gov.cn/tjfw/bgt2018/201811/t20181129_1636614.html (the first method) and http://finance.sina.com.cn/zl/bank/20151221/095724050544.shtml (the second method). Accessed on October 3, 2018.
[7] In 2017, the NBS established a platform to publicize cases of enterprises reporting inaccurate statistical numbers. See http://www.stats.gov.cn/tjfw/bgt2018/201809/t20180918_1623468.html. Accessed on October 3, 2018.

economic data is crucial for determining the state of the world economy (e.g., Koch-Weser 2013), and it is important that China and other countries can access accurate data. Third, provincial officials in China can influence listed firms' decisions, and provincial GDP growth incentives can thus affect firms' operating and reporting decisions. Lastly, China's capital markets are increasingly connected with the global capital markets. It has become easier for outside investors to trade in Chinese listed firms, as indicated by the inclusion of many Chinese listed firms in the MCSI index. Thus, it is important that global market participants understand how government incentives affect the quality of Chinese listed firms' financial statements.

There are various reasons why provincial governments manipulate their GDP figures. The most important one is that GDP growth is the primary metric that is used to evaluate local governments and their officials. Since the mid-1990s, the Chinese government has shifted its main focus to economic development and used GDP as the main measure of economic growth. Since then, GDP growth has become an important determinant of the promotion and career advancement of government officials (e.g., Xu 2011). Under the mounting pressure to deliver GDP growth, provincial government officials have used various means to boost GDP growth, including reforming economic structures, providing subsidies to promising sectors, and investing more in infrastructures. These measures have greatly contributed to the economic development of China. However, when these measures are not sufficient, provincial officials likely turn to GDP manipulation. As mentioned above, to manipulate GDP figures, government officials commonly pressure firms to report inflated accounting numbers.

How listed firms engage in earnings management to boost the GDP growth of their provinces depends on the link between firms' financial statements and the calculation of GDP. Note that we use the term of earnings management for convenience and to be consistent with the

earnings management literature. What is important for GDP growth is not earnings per se, but the specific accounting items that affect GDP calculation, as discussed below. In China, annual GDP is calculated as the weighted average of the GDP calculated under the production and income approaches with respective weights of 0.75 and 0.25. For both approaches, GDP is the total value-added of all the economic units. Under the production approach, value-added is total outputs minus intermediate inputs. For listed firms, total outputs are the sum of sales, change in inventory, and value-added taxes, whereas intermediate inputs are the expenditures paid for products and services used in the production process (e.g., raw materials). Under the income approach, value-added is the sum of operating income, compensation to employees, production taxes (e.g., sales taxes, value-added taxes), and fixed asset depreciation. Note that investment returns and fair value gains/losses are excluded from operating income for the purpose of GDP calculation, but asset impairment losses are not.

Based on these two approaches of GDP calculation, we conclude that firms can increase GDP by increasing their sales and inventory and delaying their asset impairment losses. By increasing sales (e.g., selling products to customers with poor credit) and inventory (e.g., overproduction), firms can directly increase the GDP calculated using the production approach. This can also increase operating income and thus the GDP under the income approach. Similarly, delaying asset impairment losses can increase operating income and the GDP under the income approach. As such, we develop three earnings management proxies that are relevant to the calculation of GDP: discretionary revenues (*DR*), overproduction (*Abnormal_PROD*), and abnormal impairment losses (*Abnormal_Impairment*). The estimation of theses proxies is based on models used in the prior literature (e.g., Francis et al. 1996; Riedl 2004; Roychowdhury 2006; McNichols and Stubben 2008; Stubben 2010). We also construct an overall earnings

management proxy, *Overall_EM*, based on the three individual measures.

Not all provincial officials have the same incentives to increase GDP growth. We argue that provincial officials have stronger incentives to increase the GDP figures when the GDP growth in their provinces lags behind the national level or the average GDP growth of the adjacent provinces. National GDP growth is an important statistic in China, and lagging behind it signals that a province is not doing well economically and can negatively affect the promotional prospects of the provincial officials (e.g., Maskin et al. 2000). Similarly, geographically close provinces face similar economic conditions, and the provincial officials compete with each other for promotion (e.g., Qian and Roland 1998). Thus, the officials from provinces whose GDP growth lags behind the adjacent provinces have stronger incentives to boost their GDP figures.

Using 21,702 firm-year observations in the 2002-2016 period, we find that firms in provinces with GDP growth lower than the national level or the average GDP growth of the adjacent provinces, referred to as provinces with strong GDP growth incentives, are more likely to engage in earnings management *in the future* than firms in other provinces. More specifically, they are more likely to inflate revenues, overproduce, and delay asset impairment losses. This effect is economically significant: the increases in sales and inventory and the decrease in asset impairment losses are about 0.90%, 0.98%, and 0.21% of total assets, respectively. The estimated aggregate level of earnings management induced by GDP growth incentives is on average 0.5% of GDP at the province-year level. The results are robust when using the subsample with GDP growth incentives only (without firms' own earnings management incentives) and when using an alternative GDP growth incentive measure – the GDP growth target measure in Lyu et al. (2018). In addition, we perform a falsification test using earnings management measures based on accounting numbers that do not affect GDP calculation and do

not find significant results, strengthening our inferences.

We conduct a number of cross-sectional analyses to provide additional insights. Because a key premise of our arguments is that provincial officials can influence the operations and financial reporting practices of the firms in their provinces, the findings should be stronger when provincial officials have a greater influence over the firms. Using local state-owned enterprises (local SOEs, versus central SOEs or non-SOE firms) and the low marketization of the province to capture the provincial officials' ability to influence firms, we document results consistent with this prediction. Another key premise of our arguments is that provincial officials have incentives to boost GDP figures for promotion purposes. Because the official retirement age of government officials in China is 65, the likelihood of promotion and thus the incentive to increase GDP should be stronger for younger officials. In addition, provincial officials in China have regular turnover years, and the incentive to increase GDP should be stronger prior to regular turnover years. Consistent with these predictions, we find that the results are more pronounced for firms from provinces with young provincial governors (60 or younger) than for the other firms and are more pronounced in the two years prior to the regular turnover years than in the other years.

Earnings management is costly for firms. Selling products or services to customers with poor credit can lead to higher bad debt expenses, and overproduction can lead to inventory write-offs. Indeed, we find that the extent of earnings management induced by GDP growth incentives is positively associated with future bad debt expenses, inventory write-offs, and asset impairment losses, and is negatively associated with future ROA. These results also suggest that firms cannot continuously engage in earnings management in the long run. In addition, given the costs of engaging in earnings management, it would be interesting to know whether the provincial governments compensate the firms to offset such costs, at least partially. We find that those firms

that engage in earnings management to boost GDP growth receive higher government subsidies and obtain more long-term loans than the other firms. We also find consistent evidence that earrings management to boost GDP growth is effective – such earning management helps provinces meet GDP growth benchmarks and increases the chance of the provincial governor's promotion.

The paper contributes to the literature in several ways. First, it extends the earnings management literature by investigating the effect of government officials' GDP growth incentives on firms' financial reporting practices. Prior earnings management research has mostly focused on the incentives of managers and firms.[8] Although some studies have investigated earnings management associated with political considerations, the focus is on how firms engage in downward earnings management to reduce political costs (Watts and Zimmerman 1986). In contrast, we focus on the upward earnings management driven by government officials' incentives to boost GDP. To the best of our knowledge, this is the first paper that examines how firms engage in earnings management in response to government officials' incentives to boost economic growth metrics.

Second, this paper is the first to provide systematic evidence on how firms inflate revenues, overproduce, and delay asset impairment to increase GDP when the provinces in which they reside have strong GDP growth incentives. Although prior studies have examined whether GDP figures are manipulated (e.g., Lyu et al. 2018), there is scarce evidence on the means by which GDP figures are manipulated.

Lastly, this paper extends the literature on the link between firm-level earnings and macroeconomic activities. This literature has examined whether and why firm-level earnings can

[8] See Dechow and Skinner (2000) and Dechow, Ge, and Schrand (2010) for reviews of the literature.

be used to better predict macroeconomic indicators, such as inflation, monetary policies, and GDP growth, and vice versa.[9] Unlike those studies, which take firm-level earnings and macroeconomic indicators as given, we investigate how the link between firm-level accounting numbers and GDP growth induces firm-level earnings management when government officials have strong incentives to boost GDP growth.

The remainder of this paper is organized as follows. Section 2 discusses the background and develops the hypotheses. Section 3 presents the sample, data, and research design. Section 4 reports the main analyses and Section 5 the additional analyses. Section 6 concludes.

2. Background and hypothesis development

2.1 The calculation of GDP and its relation to financial statements

2.1.1 GDP – definition and calculation

GDP refers to the total dollar value of the goods and services produced by a country or a region over a specific period. The Organization for Economic Cooperation and Development defines GDP as "the sum of the gross values added of all resident and institutional units engaged in production."[10] The International Monetary Fund defines GDP as "the monetary value of final goods and services – that is, those that are bought by the final user – produced in a country in a given period of time."[11]

GDP can be measured using three approaches: the production approach, the income approach, and the expenditure approach. Under the production approach, GDP is calculated as the sum of the value-added at each stage of production and services, where value-added is the

[9] For examples, see Bonsall, Bozanic, and Fisher (2013), Konchitchki and Patatoukas (2014), Li et al. (2014), Ball and Sadka (2015), and Shivakumar and Urcan (2017).
[10] https://stats.oecd.org/glossary/detail.asp?ID=1163. Accessed on October 3, 2018.
[11] http://www.imf.org/external/pubs/ft/fandd/basics/gdp.htm. Accessed on October 3, 2018.

difference between sales and the value of the inputs in the production process (e.g., raw materials). Under the income approach, GDP is calculated as the income generated from production and mainly comprises the compensation received by employees and the operating income of companies. Under the expenditure approach, GDP is calculated as the total value of purchases made by all final users.

2.1.2 The use and calculation of GDP in China

In this section, we first discuss how GDP is calculated in China and how certain accounting items can affect the calculation of GDP. We then develop the earnings management proxies. Note that our earnings management proxies are based on the accounting numbers that become part of GDP and are not general earnings management proxies.

China adopted the concept of GDP in the early 1980s when China began the economic reform. In 1985, China issued the *Gross Domestic Product Calculation Framework (Pilot Program)* and started to use GDP as a supplementary measure of its economy. In October 1993, the government issued the *Gross National Product – Explanation and Calculation Framework* and started to use GDP as the main measure of its economy. In May 1997, China issued the *China Annual Gross Domestic Product Calculation Approaches* based on the 1993 version of the *United Nations System of National Accounts*. This document provides detailed discussions of the principles and approaches for calculating GDP. The formulas, forms, and steps that are used to calculate GDP were formalized with the publications of the *China Gross Domestic Product Calculation Handbook* in 2001 and the *China's System of National Accounts* in 2002. Since then, the scope and calculation of GDP have been refined to reflect the changes in China's economic structure, such as the growing service and financial sectors.

The approaches that are used to calculate GDP in China largely follow the international practices. The annual GDP is calculated as the weighted average of the GDP based on the

production and income approaches, with corresponding weights of 0.75 and 0.25. Under both the production and income approaches, the GDP is calculated as the sum of the value-added of all of the units in the economy. However, the calculation of value-added is different under the two approaches.[12] Under the production approach, value-added is the difference between total outputs and intermediate inputs. Total outputs are calculated as:

$$\textit{Total outputs} = \textit{Sales} + \textit{End-of-period inventory} - \textit{Beginning-of-period inventory} + \textit{Value-added taxes}$$

Intermediate inputs are essentially the costs of the raw materials and services related to production, management, sales, and financing, but excluding expenditures related to fixed assets (e.g., depreciation) and compensation paid to employees.

Under the income approach, value-added is calculated as:

$$\textit{Value-added} = \textit{Compensation to employees} + \textit{Production taxes} + \textit{Fixed asset depreciation} + \textit{Operating income}$$

In China, operating income is calculated as sales minus operating expenses (e.g., cost of goods sold), production taxes, SG&A, financing expenses, and asset impairment losses, and plus investment returns and fair value gains/losses. However, investment returns and fair value gains/losses are excluded from operating income when calculating GDP.

Based on the above discussions, we conclude that three items can be manipulated to increase the GDP figures: (1) sales, (2) inventory, and (3) asset impairment losses.[13]

[12] The calculation of GDP has many nuances. Our discussions here focus on the main principles and basic formulas.
[13] In an untabulated analysis, we examine the contemporaneous relation between these three accounts and GDP growth. Specifically, we regress a province's GDP growth rate on the contemporaneous growth rate of aggregate sales, aggregate inventory, and aggregate asset impairment losses of all the listed firms in the province, as well as the province's lagged GDP growth rate. We find that GDP growth rate is positively correlated with the growth rate of aggregate sales and aggregate inventory and is negatively correlated with the growth rate of aggregate asset impairment losses (t = 10.14, 6.19, -2.88, respectively), confirming the importance of these measures in the calculation of GDP.

Sales. Firms can increase their sales in various ways, including selling products/services to customers with low credit ratings without recording the corresponding bad debt expenses. Increasing sales can increase the GDP calculated under the production approach because sales are used directly in the calculation. It can also increase the GDP under the income approach because operating income increases with sales.

Inventory. Increasing the end-of-period inventory can increase the GDP calculated under the production approach. While the materials and services purchased from third parties reduce the value-added because intermediate inputs are deducted, the compensation paid to employees is not deducted.[14] Thus, firms can increase their value-added through overproduction. Under the income approach, overproduction can also increase the GDP – when firms overproduce, compensation paid to employees increases, and operating income also increases because the unit cost and the cost of goods sold decrease.

Asset impairment losses. Under the income approach, asset impairment losses reduce the operating income and thus the GDP. Accordingly, firms can delay their asset impairment losses to increase the GDP.

Given that we can only observe these items of listed firms, ex ante, whether managing the above three items can make a meaningful impact on GDP calculation is an empirical question. To showcase the importance of listed firms, Figure 1 plots the aggregate accounting numbers of listed firms (the accounting numbers that affect GDP calculation) as a percentage of GDP over time. As shown in the figure, total sales of all listed firms gradually increase from 14% of GDP in 2002 to 33% in 2016. Similarly, inventory and operating income increase from 3.3% and 3.5%

[14] At the same time, one firm's intermediate inputs are another firm's value-added, which also increases GDP.

of GDP in 2002 to 10% and 11% in 2016, respectively.[15] The increasing trend and the high percentages indicate that managing these accounts can have a meaningful impact on GDP growth figures. At the same time, we acknowledge that it is just one of the possible approaches provincial officials can use to influence GDP figures.[16]

Unlike the above three specific items, the typical accruals-based earnings management proxies used in the literature do not work in our setting, because some of the accruals items do not affect the calculation of GDP. For example, reducing depreciation expenses can increase operating income, but depreciation expenses are added back in the calculation of GDP under the income approach. The typical real earnings management proxies do not work either. For example, cutting R&D expenditures does not necessarily increase GDP – while cutting R&D increases operating income, it also decreases the compensation paid to the employees involved in R&D activities. Similarly for cutting SG&A. Meanwhile, we would like to note that we are not trying to identify all the possible earnings management strategies for boosting GDP growth.

2.2 Hypothesis development – The main prediction

Since the 1980s, China's central and provincial governments have paid increasing attention to economic growth and development (e.g., Montinola et al. 1995; Li and Zhou 2005; Xu 2011). Prior research suggests that two features of China's political institutions are critical to its economic development. First, the central government has adopted a number of measures, including economic decentralization, to provide provincial governments with the independence and incentives to pursue economic growth (e.g., Blanchard and Shleifer 2000). Second, the

[15] Under the income approach of GDP calculation, compensation to employees, production taxes, and fixed asset depreciation are added back to operating income. We make the same adjustment in Figure 1. Separately, we would like to note that asset impairment losses are a small component of GDP, increasing from 0% of GDP in 2002 to 0.4% in 2016. Readers should therefore interpret the results on asset impairment losses with caution.

[16] During the sample period, listed firms become an increasingly greater part of the economy in China. In terms of sales, we find that listed firms account for 15.5% of total sales of all firms (listed and private firms) in China in 2002 and this percentage increases to 26.9% by 2016.

central government continues to exercise control over the personnel matters of the subnational governments, including the appointment, promotion, and demotion of provincial officials. These two features lead to a tournament among provincial governments and a strong focus on provincial economic growth (e.g., Qian and Xu 1993; Qian and Roland 1998; Blanchard and Shleifer 2000; Jin et al. 2005). Given that GDP growth is one of the most important measures of economic development, it has been widely used to evaluate the performance of top provincial officials (e.g., Xu 2011).

In China, the two most senior provincial officials are the party secretary and governor, with the governor having a lower political rank than the party secretary. In terms of the opportunities for promotion, the provincial party secretary can be promoted to the State Council, vice premier, premier, or the Politburo (Xu 2011). However, given the small number of available positions, the likelihood of promotion is relatively low for provincial party secretaries (Xu, Wang, and Yuan 2007). In contrast, the provincial governor has more opportunities for promotion, to the governor of a larger province, the party secretary of a province, or an equal-ranking position in a central government ministry. Although the party secretary and governor of a province work together to develop the province, the governor is usually in charge of the province's economic development, while the party secretary is mainly in charge of party and social matters. Accordingly, GDP growth is one of the most important determinants of a provincial governor's promotion.

Prior research has confirmed empirically that officials from better performing provinces are more likely to be promoted. For example, Chen, Li, and Zhou (2005) and Li and Zhou (2005) find that provincial officials are more likely to be promoted when the province's GDP growth is higher than the national level. Sheng (2009) further finds that provincial GDP growth is an important determinant of promotion for provincial governors, but not for party secretaries.

Given the focus on economic growth, if value-added activities fail to boost GDP growth to the desired level, provincial officials will likely pressure the firms in their provinces to alter their operations and reporting practices to boost the GDP figures.[17] Shleifer and Vishny (1998) argue that self-interested politicians exploit their political power to exercise control over SOEs for their own interests. Provincial officials can wield significant influence over listed firms directly through government ownership and control, or indirectly through means such as bureaucracy, regulations, and political connections (e.g., Piotroski et al. 2015). As discussed above, a firm's sales and inventory increase GDP, while asset impairment losses reduce GDP. Thus, to boost GDP growth, provincial officials can induce the firms in their provinces to increase sales and inventory and delay asset impairment losses.

Of course, not all provincial officials have the same incentives to boost GDP growth. We argue that provincial officials have stronger incentives when the GDP growth in their provinces lags behind the national level or the average GDP growth of the adjacent provinces. National GDP growth is a prominent statistic in China (Holz 2014), and lagging behind it sends a strong signal that the province is not doing well, thus reducing the likelihood of its officials getting promotion. In addition, not all provinces have similar economic conditions or development opportunities. Provinces that are geographically close to each other have similar economic conditions, and thus the officials from these provinces compete for promotion opportunities, leading to a tournament among adjacent provinces. For example, using U.S. data, Besley and Case (1996) find that the performance of a state relative to its neighboring states (in terms of taxation policies) has a positive effect on the re-election of the state's governor. Thus, the

[17] In a similar vein, Piotroski and Zhang (2014) find that when provincial officials are evaluated based on market development, they pressure firms to go public prematurely. The idea is also similar to how executive compensation induces earnings management (e.g., Bartov and Mohanram 2004; Cheng and Warfield 2005).

officials from the provinces that lag behind their adjacent provinces likely have stronger incentives to boost GDP growth.

In sum, we argue that the provinces with GDP growth below the national level or the average level of the adjacent provinces have stronger incentives to inflate GDP figures via earnings management. As such, we state our first hypothesis as follows:

H1: Ceteris paribus, firms in provinces with stronger GDP growth incentives are more likely to engage in earnings management than firms in other provinces.

We might not find results consistent with H1 for several reasons. First, if it is well understood that firms engage in earnings management to boost GDP growth in the provinces with strong GDP growth incentives and the central government adjusts its evaluation and promotion decisions accordingly, the provincial officials will have weaker incentives to manipulate GDP growth. Second, the decentralization of state-owned firms and the interests of the provincial governments in developing the capital markets can insulate firms from the governments' short-term incentives (e.g., Piotroski and Zhang 2014). Lastly, given the maturation of the capital markets in China, firms' reputation concerns and external parties' (such as auditors') monitoring can reduce firms' incentives to yield to the pressure from government officials to engage in earnings management. Thus, whether we can find results consistent with H1 is an empirical question.

2.3 Hypothesis development – Cross-sectional variation

To affect firms' operations and financial reporting decisions, provincial officials need to have (1) the ability to influence firms' decisions and (2) the incentives to boost GDP growth. Below, we develop predictions based on variations in the provincial officials' ability to influence firms and their incentives to boost GDP growth.

First, the effect of GDP growth incentives on earnings management should be stronger for

the firms over which provincial officials have greater influence. There are three types of listed firms in China based on ownership structure: local state-owned enterprises (SOE), central SOEs, and private or non-SOE firms. One key attribute of SOEs is government ownership and control. As Djankov et al. (2003) point out, government ownership is the strongest form of government intervention as it enables governments to directly intervene in corporate decisions. A key difference between central and local SOEs is the authority they report to. Local SOEs report to the State-owned Assets Supervision and Administration Commission (SASAC) of the province, which then reports to the provincial governor and party secretary. The compensation and promotion of the senior executives of local SOEs are largely decided by the provincial officials (Brandt and Li 2003). In contrast, the provincial officials have limited influence over central SOEs, which report to the SASAC of the State Council (Chen et al. 2011), and non-SOE firms due to the lack of government ownership. As such, we expect that the effect of GDP growth incentives will be stronger for local SOEs than for other firms. Our second hypothesis is stated as follows:

H2: Ceteris paribus, the effect of GDP growth incentives on earnings management, as stated in H1, is stronger for local SOE firms than for central SOE or non-SOE firms.

Second, the government's influence over firms also varies with the level of marketization in the province. Although China has made great progress in marketization, the extent of the progress varies across provinces (Jin et al. 2005). In some provinces, such as Jiangsu, Guangdong, and Zhejiang, the markets are well developed and government intervention is limited (Chen et al. 2015). However, in the provinces where the markets are not well developed, the governments still exercise considerable control over firms (Fan, Wang, and Yu 2016).[18] For

[18] Prior research has shown that firms' opportunistic behavior is more prevalent in regions with weak legal institutions and poor market development in China (e.g., Jian and Wong 2010).

example, Wang et al. (2008) find that the effect of government intervention on the choice of external auditors is more pronounced in regions with less developed markets. Accordingly, the effect of GDP growth incentives should be stronger in the provinces with lower levels of marketization. Our third hypothesis is stated as follows:

H3: Ceteris paribus, the effect of GDP growth incentives on earnings management, as stated in H1, is stronger for firms in the provinces with lower levels of marketization than for firms in other provinces.

Third, our argument for provincial officials' incentives to boost GDP growth is based on the premise that the officials in the provinces with higher GDP growth are more likely to be promoted. Because provincial officials have an official retirement age of 65 in China (Li and Zhou 2005) and those close to the retirement age are unlikely to be promoted before retirement, older provincial officials will have weaker incentives to compete on GDP growth (Chen et al. 2017). In contrast, younger provincial officials have stronger incentives to increase GDP growth of their provinces so as to increase their chances of being promoted. We thus expect the effect of GDP growth incentives to be stronger for firms in the provinces with younger officials. Our fourth hypothesis is stated as follows:

H4: Ceteris paribus, the effect of GDP growth incentives on earnings management, as stated in H1, is stronger for firms in the provinces with younger provincial officials than for firms in other provinces.

Lastly, provincial governments in China undergo a leadership transition every five years, usually in the year before the official turnover of the central government. Given that GDP growth is one of the main metrics the central government uses to evaluate provincial officials, the provincial officials have stronger incentives to boost GDP growth in the years before the regular turnover year.[19] Accordingly, the effect of GDP growth incentives should be stronger in the years

[19] Consistent with this notion, prior research finds that government spending, investments, and IPO listings intensify before the turnover of officials at both the central and provincial levels in China (e.g., Piotroski and Zhang 2014).

immediately before the regular turnover year. Our last hypothesis is stated as follows:

> *H5: Ceteris paribus, the effect of GDP growth incentives on earnings management, as stated in H1, is stronger in the years immediately before the regular turnover year for provincial officials than in other years.*

3. Sample and research design

3.1 Sample and data

The initial sample comprises all the firms listed on the Shanghai and Shenzhen Stock Exchanges over the 2002-2016 period. The sample period starts from 2002 when the approaches that are used to calculate GDP were formalized and when listed firms became more representative of the Chinese economy after the increasing number of IPOs.

We obtain the financial statement data from the China Securities Markets and Accounting Research Database (CSMAR) and from firms' annual reports when necessary. We restrict our sample to non-financial firms because earnings management proxies are different for financial firms. We exclude firms for which we cannot identify the ultimate controlling shareholder and the nature of firm ownership (e.g., SOE or not). We further exclude firm-year observations without data to calculate earnings management proxies and control variables. The final sample consists of 21,702 firm-year observations. Table 1 summarizes the sample selection procedures.

3.2 Measurement of GDP growth incentives

To measure GDP growth incentives, we hand-collect the GDP data of each province from the websites of the Statistics Communique on National Economy and Social Development and National Statistics Yearbook. In China, total GDP in dollar amount is calculated using current year prices (i.e., nominal GDP), but GDP growth is calculated using constant prices (i.e., real GDP growth). The first GDP growth incentive measure, *GDP_Incentive1*, is based on the comparison between the provincial-level and national-level GDP growth. *GDP_Incentive1* is an

indicator variable for the provinces with GDP growth lower than the national level. The second measure, *GDP_Incentive2*, is based on the comparison between the provincial-level GDP growth and the average GDP growth of the adjacent provinces, i.e., those provinces that share a border with the province. *GDP_Incentive2* is an indicator variable for the provinces with GDP growth lower than the average GDP growth of the adjacent provinces. Please see Figure 2 for a map of China, which shows the adjacent provinces of each province. Lastly, we construct a composite measure, *GDP_Incentive*, based on the two individual measures. It equals 1 if *GDP_Incentive1* or *GDP_Incentive2* is 1, and 0 otherwise. For simplicity, we use the composite measure in the analyses; the inferences using the individual measures are the same.

Appendix A uses Qinghai and Fujian provinces as examples to illustrate the calculation of the GDP growth incentive measures.

As reported in Table 2, about 12.6 percent of the sample firms are from provinces with GDP growth lower than the national level,[20] and about 54.9 percent of the sample firms are from provinces with GDP growth lower than the average GDP growth of the adjacent provinces. Overall, about 55.6% of the sample firms are from provinces with GDP growth incentives as measured by *GDP_Incentive*.

3.3 Measurement of earnings management proxies

As discussed earlier, inflated revenues, overproduction, and delay of asset impairment losses can increase GDP. Below we discuss how we measure the abnormal levels of revenues, production (inventory), and asset impairment losses.

Revenue inflation. Because firms can increase revenues by selling products or services on credit, we use abnormal accounts receivable to detect revenue inflation. Specifically, we estimate

[20] This implies that the majority of the provinces report GDP growth higher than the national level, which is based on the figures from the NBS. This is another sign of GDP manipulation at the provincial level.

discretionary revenues using the models developed in McNichols and Stubben (2008) and Stubben (2010). The following regression is estimated for each industry-year with at least 15 observations:

$$\Delta AR_{it} = \alpha_0 + \beta_1 \Delta Sales_{it} + \varepsilon_{it} ,$$

where *ΔAR* is the annual change in accounts receivable scaled by lagged total assets and *ΔSales* is the annual change in sales scaled by lagged total assets. Discretionary revenues (*DR*) is the residual estimated from the regressions.

Overproduction. Firms can increase inventories through overproduction. Following Roychowdhury (2006), we use the following model to estimate overproduction:

$$\frac{PROD_{it}}{Assets_{it-1}} = \alpha_1 \frac{1}{Assets_{it-1}} + \alpha_2 \frac{Sales_{it}}{Assets_{it-1}} + \alpha_3 \frac{\Delta Sales_{it}}{Assets_{it-1}} + \alpha_4 \frac{\Delta Sales_{it-1}}{Assets_{it-1}} + \varepsilon_{it} ,$$

where *PROD* is the sum of the cost of goods sold and the change in inventory. The above regression is estimated for each industry-year with at least 15 observations. The overproduction proxy, *Abnormal_PROD*, is the residual estimated from the regressions.

Delay of asset impairment losses. We estimate the level of asset impairment losses using the factors identified in the literature (e.g., Francis et al. 1996; Riedl 2004). Specifically, we estimate the magnitude of asset impairment losses (scaled by lagged total assets) as a function of the contemporaneous change in provincial GDP growth, the contemporaneous change in the firm's pre-write-off earnings, firm size, audit quality, and the lagged asset impairment losses. The regression is estimated for each industry-year with at least 15 observations. Abnormal asset impairment losses (*Abnormal_Impairment*) is negative one times the residual estimated from the regressions. We multiply the residual by negative one, so that a higher value indicates upward earnings management, in order to be consistent with the other measures.

Overall EM proxy. Lastly, we construct an overall earnings management proxy,

Overall_EM, which is the sum of the above three measures. The higher this aggregate measure, the more likely the firm engages in earnings management to boost GDP growth.[21]

As reported in Table 2, the means of the earnings management proxies are around zero by design, but the standard deviations of the proxies are generally large, ranging from 0.012 (1.2% of total assets) for *Abnormal_Impairment* to 0.118 (11.8% of total assets) for *Overall_EM*.[22]

A potential concern with using financial statement data to calculate the earnings management proxies is that the data submitted to the provincial Bureaus of Statistics may differ from the financial statements. To shed light on this issue, we visited the Municipal Bureau of Statistics and the National Economic Accounting Office of one provincial-level municipality, who are in charge of collecting data for calculating the provincial GDP. The director of the bureau and the head of the accounting office both confirmed that the data submitted by the listed firms to the Bureau of Statistics is identical to what's reported in the financial statements. In addition, a national level inspection team regularly inspects the submitted data to ensure accuracy. Nevertheless, it is possible that some firms have submitted data that is different from their financial statements, which biases against finding results.

3.4 Empirical Model

To test H1, we regress the earnings management proxies on the lagged GDP growth incentive measure and control variables:

[21] While China differs from the U.S. in the underlying economic infrastructures (e.g., Allen et al. 2009; Carpenter and Whitelaw 2017), we believe that the estimation models for the earnings management proxies developed using the U.S. data apply to Chinese firms. We are not aware of any systematic issues with applying the earnings management proxies developed in the U.S. to Chinese firms. Prior studies of Chinese firms have also adopted the commonly used earnings management proxies developed in the U.S. (e.g., Zhang et al. 2010; Chen et al. 2011; Liu et al. 2016). The possibility that these models capture earnings management in Chinese firms with noises would bias against finding results consistent with our hypotheses.

[22] We calculate the earnings management proxies based on the consolidated figures of the listed firms. According to our conversations with several statistics bureau officials, firms report the consolidated figures to the statistics bureaus without adjusting for the amounts from their out-of-province subsidiaries. Our inferences remain the same when we adjust the financial numbers by removing the amounts from the out-of-province subsidiaries.

$$EM_{it} = \alpha_0 + \alpha_1 GDP\_Incentive_{it-1} + \boldsymbol{\beta}\, \boldsymbol{Controls_{it}} + Industry, Year, and\ Province\ Fixed\ Effects + \varepsilon_{it}\,, \quad (1)$$

where *EM* is one of the four earnings management proxies: discretionary revenues (*DR*), overproduction (*Abnormal_PROD*), abnormal asset impairment losses (*Abnormal_Impairment*), and the overall earnings management proxy (*Overall_EM*). We use the *lagged* GDP growth incentive to capture provincial officials' incentives to boost GDP when their GDP growth is lower than the national level or the average of the adjacent provinces in year *t-1*. In addition, using the lagged GDP growth incentive can avoid the potential mechanical relationship between earnings management proxies and contemporaneous GDP incentive measure. H1 predicts that GDP growth incentive has a positive effect on upward earnings management; thus α_1 is expected to be positive.

Following the earnings management literature (e.g., Cheng and Warfield 2005; Haw et al. 2005; Bowen et al. 2008), we control for the firm characteristics that might affect earnings management: lagged firm profitability (*ROE_NEG_L*, *ROE_SEO_L*),[23] firm size (*SIZE*), leverage (*LEV*), book-to-market ratio (*BM*), growth opportunities (*GROWTH*), and an indicator for seasoned equity offerings (SEO) in the next year (*SEO_F*). We also control for a number of corporate governance variables that prior research suggests can affect the extent of earnings management. Following Klein (2002) and Liu and Lu (2007), we control for the total compensation of the top three executives (*EXEC_COMP*), an indicator for CEO-Chairman duality (*DUAL*), board independence (*BOARD_IND*), the ultimate controlling shareholder's ownership (*CONTROL_OWN*), an indicator for the controlling shareholder's share pledging

[23] Listed firms in China have to satisfy certain profitability requirements before they can issue additional shares. Prior research finds that listed firms engage in earnings management to meet these profitability requirements (e.g., Chen and Yuan 2004; Haw et al. 2005). As such, we include an indicator variable for whether firms meet the SEO profitability requirement (*ROE_SEO_L*). We do not use contemporaneous profitability measures to avoid their spurious effects on earnings management proxies.

(*PLEDGE*), and an indicator for Big 4 auditors (*BIG4*). We also control for industry, year, and province fixed effects. Appendix B provides variable measurements. To reduce the effect of extreme values, we winsorize the continuous control variables at the 1st and 99th percentiles.

The descriptive statistics on the control variables are similar to those reported in prior research of Chinese listed firms. As reported in Table 2, about 10.9% and 52.4% of the sample firms have negative ROE and ROE lower than the SEO profitability requirement in the previous year, respectively. About 11.7% of the sample firms issue additional shares in the next year. On average, the sample firms have RMB7,750 million worth of total assets, leverage of 0.489, book-to-market ratio of 0.548, and annual sales growth of 20.3%. In terms of the governance variables, on average, the total compensation of the top three executives is RMB2,731 thousand, board independence is 35.8%, 17.6% of the firms have CEO-Chairman duality, the controlling shareholder owns 36.3% of the shares, the controlling shareholder of 31% of the firms pledge their shares, and 5.7% of the firms have a Big 4 auditor.

4. Main analyses

In this section, we first report the tests of the main prediction and then the tests of the cross-sectional predictions.

4.1 Tests of H1

4.1.1 Main results

Table 3 reports the regression results from the tests of H1 using the four earnings management proxies. As reported, *GDP_Incentive* is positively associated with *DR*, *Abnormal_PROD*, *Abnormal_Impairment*, and *Overall_EM* (t = 11.65, 5.52, 10.33, and 10.58, respectively). All the t-statistics are based on standard errors adjusted for clustering at the firm and year levels. In terms of economic significance, compared to the firms in other provinces,

those in the provinces with GDP growth incentives have higher *DR* (0.0090), higher *Abnormal_PROD* (0.0098), higher *Abnormal_Impairment* (0.0021), and higher *Overall_EM* (0.0209). (Note that higher *Abnormal_Impairment* implies lower asset impairment losses.) These values represent 0.90%, 0.98%, 0.21%, and 2.09% of the lagged total assets, indicating that the effects are economically significant.

To evaluate the overall economic significance of the phenomenon, we estimate the amount of earnings management induced by GDP growth incentives (*Induced_EM*). We first estimate Regression (1) using *Overall_EM* as the dependent variable and including both *GDP_Incentive1* and *GDP_Incentive2* in the regression. *Induced_EM* for individual firms is estimated as the predicted earnings management by the two GDP growth incentive measures. We then transform *Induced_EM* into a dollar amount by multiplying it by lagged total assets. Lastly, we aggregate *Induced_EM* across all the listed firms in a province-year and scale the sum by the lagged GDP for the province-year. We find that the total amount of induced earnings management for a province-year is on average 0.5% of lagged GDP. This magnitude is significant given that the average provincial GDP growth is 11.4% during the sample period.

The results for the control variables vary somewhat across the earnings management proxies. For the overall earnings management proxy, we find that the extent of earnings management is positively associated with the indicator for ROE being lower than the SEO profitability requirement, leverage, book-to-market ratio, sales growth, the indicator for SEO in the next year, and the controlling shareholder's ownership and share pledging, and negatively associated with the indicator for negative ROE, executive compensation, and audit quality.

In sum, we find that, consistent with H1, firms in provinces with stronger GDP growth incentives are more likely to engage in earnings management than firms in other provinces.

4.1.2 Sensitivity tests

We conduct a number of sensitivity tests to ensure the robustness of our results. First, the above results might be driven by firms' own earnings management incentives, instead of GDP growth incentives. To address this concern, we identify the firm-years where GDP growth incentives exist, but firms' earnings management incentives do not exist. Using *ROE_SEO_L* to capture firms' earnings management incentives, there are 5,821 such firm-years (*GDP_Incentive* = 1 and *ROE_SEO_L* = 0). We re-estimate Regression (1) including these firm-years and the firm-years without GDP growth incentives or firms' earnings management incentives as the benchmark group. As reported in Panel A of Table 4, the coefficient on *GDP_Incentive* continues to be significantly positive, suggesting that the documented results are unlikely to be driven by firms' own earnings management incentives.

Second, each province sets a GDP growth target at the beginning of the year. After the first half of the year, a province usually has a better idea of whether it can achieve the target. Not achieving the target is usually regarded as a failure of the provincial government. As such, the provinces that do not expect to meet their targets have strong incentives to increase their GDP in the second half of the year. Consistent with this notion, Lyu et al. (2018) document a disproportionally high frequency of meeting or just beating GDP growth targets. To investigate whether firms engage in earnings management to meet the GDP growth target, we construct a GDP growth incentive measure based on whether the actual GDP meets or just beats the GDP growth target, *GDP_MJB*. *GDP_MJB* equals 1 if the difference between the actual and target GDP growth is in the range of [0, 0.2], and 0 otherwise.[24] Panel B of Table 4 reports the regression results. As reported, the coefficient on *GDP_MJB* is significantly positive for the four

[24] Using a slightly different range, such as [0, 0.1] or [0, 0.3], leads to the same inferences. Note that while *GDP_Incentive* is measured in year *t-1*, *GDP_MJB* is measured contemporaneously with the earnings management proxies in year *t*.

earnings management proxies (t = 1.93, 2.65, 2.09, and 3.33, respectively). In addition, the results on *GDP_Incentive* continue to hold – the magnitude and significance of the coefficients are almost identical to those in Table 3. These results suggest that the GDP growth incentives examined in the main analysis and the incentive to meet or just beat the GDP growth target co-exist. [25, 26]

Lastly, we notice that *GDP_Incentive* is sticky; the correlation coefficient between *GDP_Incentive* and its one-year lag is 0.601, significant at the 0.01 level. Controlling for the lagged measure (measured in year *t-2*) leads to the same inferences (untabulated). In addition, we find that the coefficient on the lagged measure is significantly negative in the analyses of *DR*, *Abnormal_PROD*, and *Overall_EM*, reflecting the reversal nature of earnings management.[27]

4.1.3 Falsification tests

To further strengthen the main inferences, we conduct a falsification test using earnings management proxies not related to GDP calculation. We argue above that listed firms can increase sales and inventory and delay asset impairment losses to increase GDP growth because these measures affect GDP calculation. It thus follows that we should not find results for earnings management proxies based on the accounting numbers that do not affect GDP calculation. To test this conjecture, we construct two earnings management proxies: (1) modified discretionary accruals based on total accruals excluding the change in accounts receivable, the

[25] Untabulated F-tests indicate that the coefficient on *GDP_Incentive* is significantly larger than that on *GDP_MJB*, except for *Abnormal_PROD*. As such, we use *GDP_Incentive* as our main GDP growth incentive measure throughout the paper.

[26] We also replicate the cross-sectional tests using *GDP_MJB* to capture GDP growth incentives (untabulated). We find that the positive effect of *GDP_MJB* on the extent of earnings management is stronger for local SOE firms than for the other firms and stronger in the years before the regular turnover of provincial officials than in the other years.

[27] In an untabulated test, we find that the inferences hold for both the first half and the second half of the sample period. However, we find that the results are weaker for the analysis of *DR* in the most recent years, 2013-2016. Chinese President Xi Jinping started his first term in 2013 and launched a number of initiatives, including environmental protection and campaign against official corruption. These initiatives likely reduce the focus on GDP growth in the evaluation of provincial officials.

change in inventory, and asset impairment losses, and (2) the real earnings management proxy based on discretionary expenditures per Roychowdhury (2006).

Table 5 reports the regression results. As reported, the coefficient on GDP growth incentive is insignificant at the conventional levels for both proxies. The insignificant results from these falsification tests help strengthen the main inferences.

4.2 Cross-sectional analyses – Tests of H2 ~ H5

4.2.1 Firm ownership type – Tests of H2

H2 states that the effect of GDP growth incentives on earnings management is stronger for local SOE firms than for the other firms. To test H2, we construct an indicator variable, *Local_SOE*, which equals 1 if the firm is a state-owned enterprise reporting to the provincial SASAC. We add this variable and its interaction with *GDP_Incentive* to Regression (1) and report the results in Panel A of Table 6. The coefficient on *GDP_Incentive* captures the effect of GDP growth incentives on earnings management for central SOE and non-SOE firms, and the coefficient on *GDP_Incentive* × *Local_SOE* captures the incremental effect for local SOE firms. As reported, we find that GDP growth incentives have an insignificant effect on earnings management for central SOE and non-SOE firms. In contrast, the incremental effect for local SOE firms is significantly positive for all the earnings management measures at the 1% level. The untabulated F-test indicates that the net effect of GDP growth incentives for local SOE firms is significant at the 1% level for all the earnings management proxies.

Interestingly, the coefficient on *Local_SOE* is significantly negative for the analyses of *DR*, *Abnormal_PROD*, and *Overall_EM*. This result implies that when there are no GDP growth incentives, local SOE firms engage in downward earnings management, consistent with the reversal nature of earnings management.

Overall, the stronger results for local SOE firms than for the other firms are consistent with

H2. The findings suggest that provincial officials are able to boost GDP growth by influencing the production activities and financial reporting practices of local SOEs.

4.2.2 The extent of marketization – Tests of H3

H3 predicts that the effect of GDP growth incentives on earnings management is stronger for firms in the provinces with a lower level of marketization, where government intervention is more prevalent. To test H3, we construct an indicator variable, *Low_Market*, for the provinces with a lower level of marketization. Specifically, *Low_Market* equals 1 for the province-years with a below-the-sample-median marketization index; the marketization index data is from Fan, Wang, and Yu (2016). We add *Low_Market* and its interaction with *GDP_Incentive* to Regression (1).

Panel B of Table 6 reports the regression results. As reported, the coefficient on *GDP_Incentive* is significantly positive for all the earnings management proxies, suggesting that GDP growth incentives induce provincial officials to intervene in firms' operations and financial reporting to boost GDP growth. More importantly, the coefficient on *GDP_Incentive* × *Low_Market* is significantly positive for *DR*, *Abnormal_Impairment*, and *Overall_EM* (t = 3.56, 2.05, and 2.86, respectively). These results are consistent with H3.

4.2.3 Age of provincial officials – Tests of H4

H4 predicts that the effect of GDP growth incentives on earnings management is stronger for firms in the provinces with younger provincial officials, who have stronger incentives to boost GDP growth. To test H4, we construct an indicator variable, *Young_Governor*, which equals 1 if the provincial governor is 60 or younger. We add this variable and its interaction with *GDP_Incentive* to Regression (1). We use the governor's age to define this variable, because the provincial governor is in charge of the province's economy and GDP growth is more important for the governor's promotion than for the party secretary's.

Panel C of Table 6 reports the regression results. As reported, the coefficient on *GDP_Incentive* is significantly positive for all the earnings management proxies, suggesting that GDP growth incentives motivate the provincial leaders who are older than 60 to boost GDP growth. More importantly, the coefficient on *GDP_Incentive* × *Young_Governor* is significantly positive for all four earnings management proxies (t = 5.18, 2.16, 1.72, and 4.16, respectively). This result suggests that compared with their older counterparts, younger provincial governors have stronger incentives to boost GDP growth by inducing the firms in their provinces to engage in earnings management.

4.2.4 Years before government official turnover – Tests of H5

H5 predicts that the effect of GDP growth incentives on earnings management is stronger in the years immediately before the turnover year than in other years. To test H5, we construct an indicator variable, *Turnover*, for the two years before the regular turnover of the provincial officials. During our sample period, the central government leadership turnover occurred in 2007, 2012, and 2017 when the National Congress of the Communist Party of China was held. The provincial leadership turnover usually occurred one year earlier, in 2006, 2011, and 2016.[28] As such, *Turnover* is set as 1 for the years 2004-2005, 2009-2010, and 2014-2015, and 0 for the other years. We add *Turnover* and its interaction with *GDP_Incentive* to Regression (1).

Panel D of Table 6 reports the regression results. As reported, the coefficient on *GDP_Incentive* is significantly positive for all the earnings management proxies, suggesting that GDP growth incentives motivate the provincial officials to boost GDP growth. More importantly, the coefficient on *GDP_Incentive* × *Turnover* is significantly positive for *DR,*

[28] Turnover can also occur in other years for various reasons. For example, some governors are promoted in the middle of their term, some resign before the term ends because they have reached retirement age, and others are demoted or prosecuted for corruption.

Abnormal_Impairment, and *Overall_EM* (t = 3.03, 6.31, and 2.59, respectively). This result suggests that consistent with H5, provincial officials have stronger incentives to induce the firms in their provinces to engage in earnings management to increase GDP growth in the years immediately before the regular turnover years than in the other years.[29]

5. Additional tests

5.1 The cost of engaging in earnings management to boost GDP growth

The above analyses show that firms engage in various earnings management activities to increase GDP in their provinces when the provinces' GDP growth is below the national level or the average GDP growth of the adjacent provinces. However, earnings management is costly for firms. For example, increasing sales to customers with lower credit quality can lead to higher future bad debt expenses. Similarly, overproduction can lead to future inventory write-offs and delaying asset impairment losses can lead to future asset impairment losses. All of these can lead to lower firm performance in the future.

To investigate whether this is the case, we regress future bad debt expenses (*Bad_Debt*), inventory write-offs (*Inventory_Off*), asset impairment losses (*Impairment*), and return on assets (*ROA*) on an indicator variable for higher induced earnings management, *Induced_EM_H*, the lagged dependent variable (measured in year *t*), and control variables. *Induced_EM_H* equals 1 for firm-years with *Induced_EM* higher than the sample median, where *Induced_EM* is the level of earnings management predicted by GDP growth incentives, as explained in Section 4.1.1. We follow Lewellen and Resutek (2019) in the choice and measurement of control variables.

[29] Interestingly, the coefficient on *Turnover* is significantly negative for *Abnormal_PROD* and *Overall_EM*. This result suggests that when there are no GDP growth incentives, firms in the provinces with upcoming provincial official turnover engage in downward earnings management, consistent with the reversal nature of earnings management.

Table 7 reports the regression results, with Panel A for *Bad_Debt*, Panel B for *Inventory_Off*, Panel C for *Impairment*, and Panel D for *ROA*. In each panel, we present the one-year-ahead, two-years-ahead, and three-years-ahead analyses. As reported, the coefficient on *Induced_EM_H* is significantly positive for future bad debt expenses (except the three-years-ahead measure), inventory write-offs (except the three-years-ahead measure), and asset impairment losses (except the one-year-ahead measure), and is significantly negative for future ROA. The effects are also economically significant. For example, an increase in *Induced_EM_H* from zero to one is associated with a decrease in one-year-ahead ROA of 1.39%, two-years-ahead ROA of 1.63%, and three-years-ahead ROA of 1.43%. (The average ROA in those years is 4.42%).

Overall, these results indicate that engaging in earnings management to increase GDP growth is costly for firms because it eventually leads to higher bad debt expenses, higher inventory write-offs, higher asset impairment losses, and lower ROA in the future.[30] The results also suggest that firms cannot continuously inflate sales, overproduce, and delay asset impairment losses in the long run.

5.2 Local versus non-local auditors

Given the cost of engaging in earnings management, a natural question is whether auditors play a disciplining role in reducing earnings management. Throughout the analyses, we control for audit quality and indeed find that firms with Big 4 auditors engage in less earnings management, as indicated by the significantly negative coefficients on *BIG4* in Table 3. However, only 5.7% of Chinese listed firms in our sample have Big 4 auditors, with the remaining firms using Chinese accounting firms. Some of these accounting firms have

[30] We find similar evidence at the provincial level – the aggregate earnings management induced by GDP growth incentives is positively associated with one-year-ahead aggregate inventory write-offs and asset impairment losses.

headquarters in the same provinces as their listed client firms. While provincial officials can exert significant pressure on the accounting firms that are headquartered in their provinces, they have limited influence over the accounting firms with headquarters in other provinces. Thus, we expect the results to be weaker for firms with auditors that do not have headquarters in the same province (referred to as non-local auditors) than for firms with local auditors.

We use a similar research design as the cross-sectional analyses to test this prediction. *Non_Local_Auditor* is set as 1 if the auditor's headquarters is not in the same province as the firm's headquarters, and 0 otherwise.[31] We find that the coefficient on *GDP_Incentive* × *Non_Local_Auditor* is significantly negative for the analyses of *DR*, *Abnormal_PROD*, and *Overall_EM* (untabulated), indicating that hiring non-local auditors can constrain earnings management induced by provincial officials' GDP growth incentives.

5.3 Benefits of earnings management to boost GDP growth: Subsidies and loans

Given the cost of earnings management, firms may expect some benefits from the governments when they engage in earnings management to boost GDP growth. A typical benefit is government subsidy, of which the most common type is a reduction in taxes (Chen et al. 2008). Another benefit from the governments is the ability to obtain loans, since all major banks in China are state-owned (e.g., Cull and Xu 2005).

In this section, we investigate whether firms that engage in earnings management to boost GDP are "compensated" with higher government subsidies and more loans. For this purpose, we regress government subsidies and the amount of new loans (both scaled by total assets) on GDP-incentive-induced earnings management *Induced_EM_H*, as used in Table 7, and control

[31] We regard the Big 4 auditors as non-local auditors. Alternatively, classifying them as local or non-local based on their headquarters in China (Beijing for E&Y and KPMG, and Shanghai for PwC and Deloitte) leads to quantitatively similar results.

variables. [32, 33] Table 8 reports the regression results. The coefficient on *Induced_EM_H* is significantly positive in both regressions (t = 2.56 and 3.09, respectively), suggesting that firms that engage in earnings management to boost their province's GDP growth receive higher government subsidies and obtain more loans than the other firms.

5.4 The effectiveness of earnings management

We argue that provincial officials have incentives to boost GDP when their provinces lag behind the nation or the adjacent provinces in GDP growth, because their promotion depends on their provinces' GDP growth. We further argue that provincial officials then pressure firms in their provinces to engage in earnings management. In this section, we investigate whether earnings management induced by GDP growth incentives is effective. First, we investigate whether such earnings management helps the province meet the GDP growth benchmark (i.e., the national GDP growth or the average GDP growth of the adjacent provinces). For this purpose, we estimate a logit regression of the likelihood of a province meeting or beating the GDP growth benchmark (*GDPG_MB*) on the aggregate amount of induced earnings management across all the listed firms in the province (*Induced_EM_PH*) and several lagged GDP growth variables. As reported in Panel A of Table 9, the coefficient on *Induced_EM_PH* is significantly positive, indicating that the likelihood of a province meeting or beating the GDP growth benchmark increases with the aggregate amount of earnings management induced by GDP growth incentives.

Second, we investigate whether such earnings management increases provincial officials'

[32] Government subsidies (scaled by total assets) have a mean of 0.08% and a standard deviation of 0.58%. Note that government subsidies do not affect the GDP calculation.

[33] New loans (scaled by total assets) have a mean of 1.31% and a standard deviation of 6.59%. Separately, we do not find a significant impact of induced earnings management on interest rate, suggesting that the additional loans are not obtained at the expense of higher interest rate.

chance of being promoted. We estimate an ordered logit regression of a provincial governor's promotion (*Promotion*) on the aggregate amount of induced earnings management in the province (*Induced_EM_PH*) and a number of variables suggested by prior research that explain governor promotion (e.g., Li and Zhou 2005).[34] As reported in Panel B of Table 9, the coefficient on *Induced_EM_PH* is significantly positive, indicating that the likelihood of a provincial governor's promotion increases with the aggregate amount of earnings management induced by GDP growth incentives.

Overall, the above findings indicate that earnings management induced by GDP growth incentives is effective – it increases the likelihood that a province meets or beats the GDP growth benchmark and the likelihood that a provincial governor gets promoted.

5.5 Provinces' GDP growth incentives or firms' earnings management incentives?

An alternative explanation for our results is that the economic conditions in a province affect both the province's GDP growth and the earnings management incentives of firms in the province. As such, the results might capture firms' incentives to engage in earnings management in response to the underlying economic conditions, rather than provincial officials' GDP growth incentives. However, there are several reasons why this alternative explanation is unlikely to hold. First, throughout the analyses, we control for a comprehensive list of firm and CEO characteristics that prior research suggests can affect firms' incentives to engage in earnings management. Second, we use the lagged GDP growth incentives, which are based on the comparison between the province's GDP growth and the national or adjacent provinces' GDP growth, to explain future earnings management. It is unlikely that firms will engage in earnings

[34] The governor promotion variable is set as 2 for governors who are promoted to a higher position (e.g., a province's party secretary), 1 for those staying in the current position or moving to a similar position, and 0 for demotion.

management in response to the previous year's GDP growth difference in the absence of GDP growth incentives. While it is possible that poor economic conditions (e.g., a downturn) can lead to firms' poor performance, which in turn motivates firms to manage earnings, we control for this possibility by including two measures of firm performance throughout the analyses. In an untabulated analysis, we further control for the lagged GDP growth and obtain the same inferences. Third, the alternative explanation implies that all firms should be affected similarly. However, we find different results depending on firms' ownership type, the level of marketization in the province, and the age and the turnover year of the provincial officials. Fourth, as discussed earlier, we do not find significant results for GDP growth incentives when we use earnings management proxies that are not related to GDP calculation. Lastly, as reported earlier, we obtain quantitatively similar results for GDP growth incentives after we restrict the analyses to those firm-years where firms' earnings management incentives do not exist.

Overall, the above discussions and the additional tests suggest that the alternative explanation is unlikely to explain our results. Nevertheless, we acknowledge that we cannot completely rule out the possibility that the documented effect of GDP growth incentives is confounded by unspecified firm incentives.

6. Conclusion

In this paper, we examine whether and how GDP growth incentives at the government level affect earnings management at the firm level. GDP growth is an important measure for evaluating a country's economy. However, the importance of GDP growth can induce government officials to manipulate the GDP figures. Although GDP manipulation is a widespread phenomenon, it is arguably most prevalent in China, especially at the provincial

level. Provincial officials have particularly strong incentives to increase GDP growth when their province's GDP growth lags behind the national level or the average level of the adjacent provinces, which can negatively affect the officials' likelihood of being promoted. Accordingly, officials from these provinces are more likely to pressure the firms in their provinces to engage in earnings management to boost GDP growth.

Using 21,702 firm-year observations in the 2002-2016 period from China, we find that firms in the provinces with GDP growth lower than the national level or the average level of the adjacent provinces are more likely to engage in earnings management than firms in the other provinces. More specifically, these firms are more likely to inflate revenues, overproduce, and delay asset impairment losses. In addition, we argue and find that the results vary with the provincial officials' ability and incentives to influence firms' operations and financial reporting practices. First, the results are more pronounced for local SOE firms, over which provincial officials have more control, than for central SOE and non-SOE firms, and for firms in provinces with a lower level of marketization, where government intervention is more prevalent. Second, the results are stronger for firms in provinces with younger governors and for the years immediately before the regular turnover of provincial officials.

This paper contributes to the literature by investigating the effect of government officials' incentives on firms' earnings management. To the best of our knowledge, this paper is the first to examine how firms engage in earnings management in response to government officials' incentives to boost GDP growth. The paper also extends the emerging literature on the information link between firm-level performance and the macro economy by examining how such link leads to earnings management. Lastly, the paper provides systematic evidence on *how* Chinese provincial governments manipulate GDP figures. Such manipulation is costly not only

for the firms that manage earnings to boost GDP growth, but also for the society when governments and corporations make decisions based on the manipulated GDP figures.

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Appendix A
Examples of the calculation of the GDP growth incentive measures

In this appendix, we use Qinghai and Fujian provinces as examples to illustrate how the three GDP growth incentive measures are calculated. Please refer to Appendix B for variable definitions. GDP growth is in percentage.

			National level comparison		Adjacent province comparison						
Province	Year	Provincial GDP growth (A)	National GDP growth (B)	*GDP_Incentive1* (based on comparison between A and B)	GDP growth of adjacent provinces				Average (C)	*GDP_Incentive2* (based on comparison between A and C)	*GDP Incentive*
					Xinjiang	Xizang	Gansu	Sichuan			
Qinghai	2005	12.2	11.4	0	10.9	12.1	11.8	12.6	11.9	0	0
	2006	12.2	12.7	1	11.0	13.4	11.4	13.3	12.3	1	1
	2007	13.5	14.2	1	12.2	14.0	12.3	14.5	13.3	0	1
					Guangdong	Zhejiang	Jiangxi				
Fujian	2005	11.6	11.4	0	13.8	12.8	12.8		13.1	1	1
	2006	13.4	12.7	0	14.1	13.6	12.3		13.3	0	0
	2007	15.2	14.2	0	14.9	14.7	13.2		14.3	0	0

Appendix B
Variable measurements

GDP growth incentive measures

GDP_Incentive1	=	An indicator variable based on the comparison of the GDP growth between the provincial and national levels; it equals 1 if the GDP growth of the province is lower than the national GDP growth, and 0 otherwise.
GDP_Incentive2	=	An indicator variable based on the comparison of the GDP growth between the province and the adjacent provinces; it equals 1 if the GDP growth of the province is lower than the average GDP growth of the adjacent provinces, and 0 otherwise.
GDP_Incentive	=	A composite GDP growth incentive measure; it equals 1 if *GDP_Incentive1* or *GDP_Incentive2* is 1, and 0 otherwise.

Earnings management proxies

DR	=	Discretionary revenues, calculated as the residuals from a regression of the annual change in accounts receivable on the annual change in sales, estimated for each industry-year with at least 15 observations.
Abnormal_PROD	=	Abnormal production, calculated as the residuals from a regression of the sum of the cost of goods sold and the change in inventory on sales, concurrent and lagged change in sales, estimated for each industry-year with at least 15 observations.
Abnormal_Impairment	=	Abnormal asset impairment losses, calculated as negative one times the residuals from a regression of the asset impairment losses on the change in provincial GDP growth rate, the change in the firm's pre-write-off earnings, firm size, audit quality, and the lagged asset impairment losses, estimated for each industry-year with at least 15 observations.
Overall_EM	=	Overall earnings management proxy, calculated as *DR* + *Abnormal_PROD* + *Abnormal_Impairment*.

Control variables

ROE_NEG_L	=	An indicator variable for negative return on equity (ROE) in the previous year (t-1).
ROE_SEO_L	=	An indicator variable for ROE being lower than the ROE requirement for seasoned equity offerings in the previous year (t-1), which is 10% for the 2002-2005 period and 6% for the 2006-2016 period.
SIZE	=	Natural logarithm of total assets in RMB.
LEV	=	Total debt (the sum of current liabilities and long-term debt) scaled by total assets.
BM	=	The ratio of the book value of assets to the market value of assets, which is calculated as the market value of equity plus the book value of total debt.
GROWTH	=	Annual percentage change in sales.
SEO_F	=	An indicator variable for firms that issue addition shares via right offerings in the next year (t+1).
EXEC_COMP	=	Natural logarithm of the total compensation of the top three executives in RMB.
DUAL	=	An indicator variable for CEO-Chairman duality.

BOARD_IND	=	The percentage of independent directors on the board.
CONTROL_OWN	=	The ownership of the ultimate controlling shareholder.
PLEDGE	=	An indicator variable for firms whose controlling shareholder engages in shares pledging.
BIG4	=	An indicator variable for Big 4 auditors.
Industry fixed effects	=	Indicator variables for the industries, defined based on the industry classifications published by the China Securities Regulatory Commission in 2012.
Year fixed effects	=	Indicator variables for the years.
Province fixed effects	=	Indicator variables for the provinces.

FIGURE 1
Aggregate accounting measures over GDP over time

This figure presents the time trend of aggregate sales over GDP (*Sum_Sales/GDP*), aggregate inventory over GDP (*Sum_Inventory/GDP*), and aggregate operating income over GDP (*Sum_OpIncome/GDP*). For *Sum_Sales/GDP* in a year, we first sum the sales of all the listed firms in a province, then divide the sum by the province's GDP, and lastly take the average of the ratio across all the provinces. Similarly for *Sum_Inventory/GDP* and *Sum_OpIncome/GDP*. Note that this figure is based on all the listed firms with available data, not just the sample firms. Note also that under the income approach of GDP calculation, compensation to employees, production taxes, and fixed asset depreciation are added back to operating income. We make the same adjustment when calculating *Sum_OpIncome/GDP*.

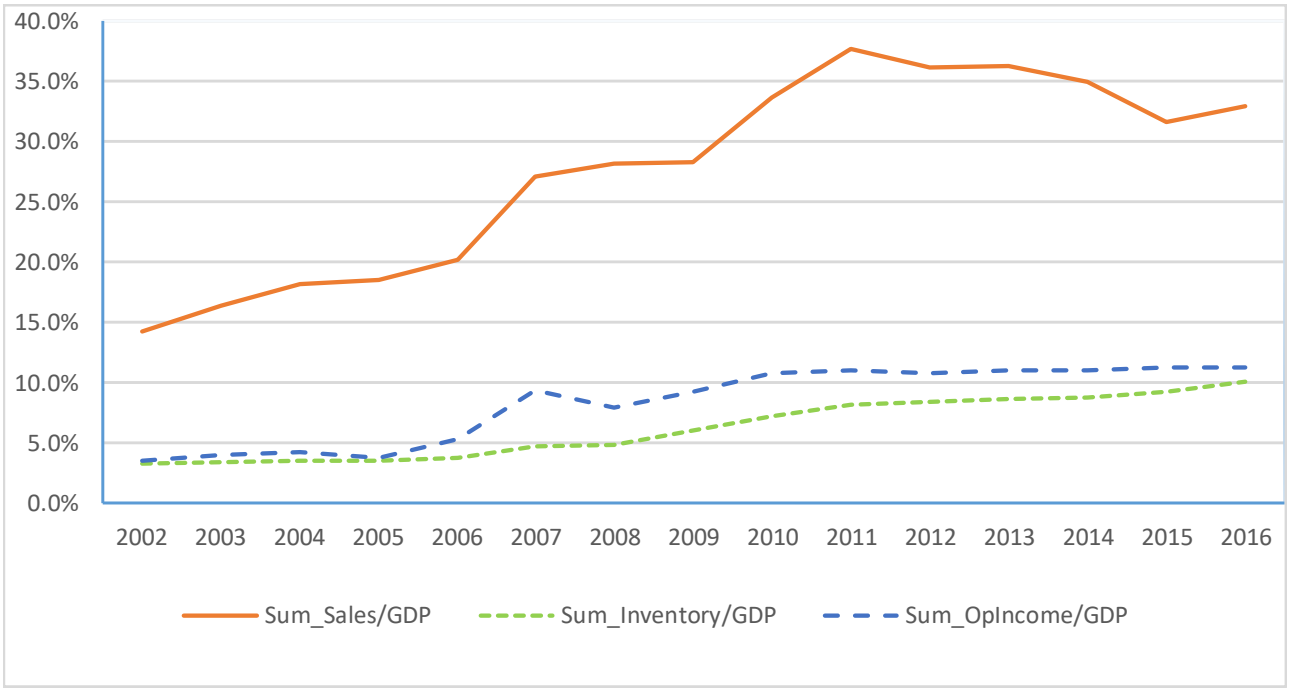

FIGURE 2
Map of China

Below is a map of China (https://www.chinadiscovery.com/china-maps/china-provincial-map.html).

TABLE 1
Sample selection

This table describes the sample selection process. The final sample includes 21,702 firm-years over the 2002-2016 period.

		Sample size
Firm-year observations available from CSMAR over 2002-2016		23,452
Less:		
Observations without data to calculate earnings management proxies	671	
Observations without information on firm ownership type	56	
Observations from firms in the financial industries	168	
Observations without data to calculate the control variables	855	
Final sample		21,702

TABLE 2
Descriptive statistics

This table reports the descriptive statistics on the GDP growth incentive measures, earnings management proxies, and firm characteristics. The sample includes 21,702 firm-years over the 2002-2016 period. See Appendix B for the variable measurements.

	N	mean	Std.	P25	median	P75
GDP growth incentive measures						
GDP_Incentive1	21,702	0.126	0.332	0	0	0
GDP_Incentive2	21,702	0.549	0.498	0	1	1
GDP_Incentive	21,702	0.556	0.497	0	1	1
Earnings management proxies						
DR	21,702	0.004	0.046	-0.018	-0.001	0.019
Abnormal_PROD	21,702	0.006	0.106	-0.051	0.009	0.063
Abnormal_Impairment	21,702	0.001	0.012	-0.001	0.001	0.006
Overall_EM	21,702	0.010	0.118	-0.054	0.011	0.072
Control variables						
ROE_NEG_L	21,702	0.109	0.311	0	0	0
ROE_SEO_L	21,702	0.524	0.499	0	1	1
SIZE (raw value, in million RMB)	21,702	7,750	17,259	1,252	2,617	6,077
SIZE	21,702	21.81	1.252	20.95	21.68	22.53
LEV	21,702	0.489	0.231	0.324	0.487	0.635
BM	21,702	0.548	0.257	0.345	0.530	0.738
GROWTH	21,702	0.203	0.590	-0.032	0.113	0.290
SEO_F	21,702	0.117	0.321	0	0	0
EXEC_COMP (raw value, in thousand RMB)	21,702	2,731	115,552	530	1,001	1,734
EXEC_COMP	21,702	13.74	0.960	13.18	13.82	14.37
DUAL	21,702	0.176	0.381	0	0	0
BOARD_IND	21,702	0.358	0.070	0.333	0.333	0.400
CONTROL_OWN	21,702	0.363	0.157	0.239	0.339	0.480
PLEDGE	21,702	0.310	0.463	0	0	1
BIG4	21,702	0.057	0.232	0	0	0

TABLE 3
GDP growth incentives and earnings management

This table reports the results from the following OLS regression:
$EM_{it} = \alpha_0 + \alpha_1 GDP\_Incentive_{it-1} + \boldsymbol{\beta}\ \boldsymbol{Controls_{it}} + Industry, Year, and\ Province\ Fixed\ Effects + \varepsilon_{it}$,
where *EM* is one of the four earnings management proxies: discretionary revenues (*DR*), overproduction (*Abnormal_PROD*), abnormal asset impairment losses (*Abnormal_Impairment*), and the overall earnings management proxy (*Overall_EM*). See Appendix B for the variable measurements. The sample includes 21,702 firm-years over the 2002-2016 period. Intercepts are included but are not reported. The t-statistics are based on standard errors adjusted for firm and year level clustering. ***, **, and * indicate two-sided significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	DR	*Abnormal_PROD*	*Abnormal_Impairment*	*Overall_EM*
GDP_Incentive	0.0090***	0.0098***	0.0021***	0.0209***
	(11.65)	(5.52)	(10.33)	(10.58)
ROE_NEG_L	-0.0052***	-0.0073***	-0.0004	-0.0130***
	(-4.37)	(-3.14)	(-1.06)	(-4.75)
ROE_SEO_L	-0.0051***	0.0350***	-0.0016***	0.0283***
	(-7.08)	(22.46)	(-8.65)	(16.01)
SIZE	0.0001	-0.0006	-0.0004***	-0.0009
	(0.04)	(-0.57)	(-3.06)	(-0.81)
LEV	0.0019	0.0835***	-0.0073***	0.0781***
	(1.20)	(24.71)	(-11.87)	(19.86)
BM	-0.0007	0.1001***	0.0050***	0.1043***
	(-0.37)	(21.66)	(10.09)	(20.42)
GROWTH	0.0075***	0.0029	-0.0002	0.0103***
	(7.38)	(1.48)	(-0.82)	(4.45)
SEO_F	0.0041***	0.0059***	0.0011***	0.0110***
	(3.67)	(2.62)	(4.32)	(4.39)
EXEC_COMP	-0.0003	-0.0181***	0.0002	-0.0182***
	(-0.64)	(-15.69)	(1.52)	(-14.09)
DUAL	0.0028***	0.0006	-0.0000	0.0034
	(3.07)	(0.32)	(-0.21)	(1.59)
BOARD_IND	-0.0073	-0.0081	0.0003	-0.0151
	(-1.44)	(-0.76)	(0.25)	(-1.28)
CONTROL_OWN	-0.0031	0.0162***	0.0023***	0.0155***
	(-1.43)	(3.31)	(4.23)	(2.82)
PLEDGE	0.0018**	0.0065***	-0.0001	0.0082***
	(2.38)	(4.00)	(-0.61)	(4.48)
BIG4	-0.0038***	-0.0111***	-0.0007**	-0.0156***
	(-3.18)	(-3.46)	(-2.36)	(-4.38)
Industry, year, province fixed effects	Yes	Yes	Yes	Yes
N	21,702	21,702	21,702	21,702
Adj. R^2	0.0295	0.1428	0.0388	0.1139

TABLE 4
GDP growth incentives and earnings management – Sensitivity tests

This table reports two sets of sensitivity tests for the effect of GDP growth incentives on earnings management. Panel A is based on a subsample with GDP growth incentives only, and Panel B includes an additional measure of GDP growth incentives. In both panels, the dependent variable *EM* is one of the four earnings management proxies: discretionary revenues (*DR*), overproduction (*Abnormal_PROD*), abnormal asset impairment losses (*Abnormal_Impairment*), and the overall earnings management proxy (*Overall_EM*). See Appendix B for the variable measurements. Intercepts are included but are not reported. The t-statistics are based on standard errors adjusted for firm and year level clustering. ***, **, and * indicate two-sided significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Panel A: GDP growth incentives only sample

This panel reports the results from the OLS regression of *EM* on *GDP_Incentive* and the control variables. The regression uses a subsample of 5,821 firm-years where GDP growth incentives exist, but firms' earnings management incentives do not exist (*GDP_Incentive* = 1 and *ROE_SEO_L* = 0) and a subsample of 4,499 firm-years without GDP growth incentives or firms' earnings management incentives (*GDP_Incentive* = 0 and *ROE_SEO_L* = 0) as the benchmark group.

	DR	*Abnormal_PROD*	*Abnormal_Impairment*	*Overall_EM*
GDP_Incentive	0.0087***	0.0147***	0.0017***	0.0251***
	(6.82)	(4.80)	(6.19)	(7.43)
Control variables	Yes	Yes	Yes	Yes
Industry, year, province fixed effects	Yes	Yes	Yes	Yes
N	10,320	10,320	10,320	10,320
Adj. R^2	0.0213	0.1476	0.0458	0.1241

Panel B: Meeting/beating GDP growth targets and earnings management

This panel reports the results from the OLS regression of *EM* on *GDP_Incentive*, an additional GDP growth incentive variable – meeting or just beating the GDP growth targets (*GDP_MJB*), and the control variables. *GDP_MJB* equals 1 if the difference between the actual and target GDP growth is in the range of [0, 0.2], and 0 otherwise. The sample includes 21,539 firm-years over the 2002-2016 period.

	DR	*Abnormal_PROD*	*Abnormal_Impairment*	*Overall_EM*
GDP_Incentive	0.0090***	0.0099***	0.0021***	0.0210***
	(11.66)	(5.53)	(10.26)	(10.58)
GDP_MJB	0.0025*	0.0081***	0.0007**	0.0113***
	(1.93)	(2.65)	(2.09)	(3.33)
Control variables	Yes	Yes	Yes	Yes
Industry, year, province fixed effects	Yes	Yes	Yes	Yes
N	21,539	21,539	21,539	21,539
Adj. R^2	0.0295	0.1435	0.0386	0.1147

TABLE 5
GDP growth incentives and earnings management – Falsification tests

This table reports the results from the OLS regression of two earnings management proxies (*EM*) on *GDP_Incentive* and the control variables. *EM* is one of the following two proxies: (1) modified discretionary accruals (*DA_Adj*) from the Jones model based on total accruals excluding change in accounts receivable, change in inventory, and asset impairment losses, and (2) the discretionary selling, general, and administrative expenses (*RM_DISX*) per Roychowdhury (2006). Both measures are the residuals from the corresponding regressions estimated for each industry-year with at least 15 observations. See Appendix B for the measurements of the other variables. The sample includes all firm-years with available data over the 2002-2016 period. Intercepts are included but are not reported. The t-statistics are based on standard errors adjusted for firm and year level clustering. ***, **, and * indicate two-sided significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	DA_Adj	*RM_DISX*
GDP_Incentive	-0.0030	0.0006
	(-1.06)	(0.46)
Control variables	Yes	Yes
Industry, year, province fixed effects	Yes	Yes
N	14,959	19,895
Adj. R^2	0.0255	0.1209

TABLE 6
GDP growth incentives and earnings management – Cross-sectional analyses

This table reports the results from the OLS regression of the earnings management proxies (*EM*) on the GDP growth incentive (*GDP_Incentive*), the conditioning variable, their interaction, and the control variables. *EM* is one of the four proxies: discretionary revenues (*DR*), overproduction (*Abnormal_PROD*), abnormal asset impairment losses (*Abnormal_Impairment*), and the overall earnings management proxy (*Overall_EM*). The conditioning variable is the indicator for local SOE firms (*Local_SOE*) in Panel A, the indicator for low level of marketization in the province (*Low_Market*) in Panel B, the young provincial governor indicator (*Young_Governor*) in Panel C, and the indicator for the years right before provincial official turnover (*Turnover*) in Panel D. *Local_SOE* equals 1 if the firm is a state-owned enterprise reporting to the provincial SASAC, and 0 otherwise. *Low_Market* equals 1 if the marketization index of a province-year is lower than the median marketization index of all the provinces for that year, and 0 otherwise; the marketization index is from Fan, Wang, and Yu (2016). *Young_ Governor* equals 1 if the provincial governor is 60 or younger, and 0 otherwise. *Turnover* equals 1 for years 2004-2005, 2009-2010, and 2014-2015, the two years before the regular provincial official turnover, and 0 otherwise. See Appendix B for the measurements of the other variables. The sample includes 21,702 firm-years over the 2002-2016 period. Intercepts are included but are not reported. The t-statistics are based on standard errors adjusted for firm and year level clustering. ***, **, and * indicate two-sided significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Panel A: GDP growth incentives and earnings management – Firm ownership type

	DR	*Abnormal_PROD*	*Abnormal_Impairment*	*Overall_EM*
GDP_Incentive	0.0009	0.0003	-0.0003	0.0009
	(0.95)	(0.14)	(-1.24)	(0.37)
Local_SOE	-0.0023**	-0.0060**	-0.0003	-0.0087***
	(-2.48)	(-2.57)	(-1.19)	(-3.36)
GDP_Incentive × Local_SOE	0.0252***	0.0288***	0.0076***	0.0615***
	(21.90)	(10.10)	(25.88)	(19.58)
Control variables	Yes	Yes	Yes	Yes
Industry, year, province fixed effects	Yes	Yes	Yes	Yes
N	21,702	21,702	21,702	21,702
Adj. R^2	0.0542	0.1476	0.0750	0.1342

Panel B: GDP growth incentives and earnings management – The level of marketization

	DR	*Abnormal_PROD*	*Abnormal_Impairment*	*Overall_EM*
GDP_Incentive	0.0074***	0.0083***	0.0019***	0.0176***
	(8.45)	(4.05)	(8.34)	(7.73)
Low_Market	-0.0029	-0.0010	-0.0011*	-0.0050
	(-1.50)	(-0.21)	(-1.83)	(-0.95)
GDP_Incentive × Low_Market	0.0065***	0.0060	0.0011**	0.0136***
	(3.56)	(1.40)	(2.05)	(2.86)
Control variables	Yes	Yes	Yes	Yes
Industry, year, province fixed effects	Yes	Yes	Yes	Yes
N	21,702	21,702	21,702	21,702
Adj. R^2	0.0300	0.1429	0.0389	0.1142

TABLE 6 (cont'd)

Panel C: GDP growth incentives and earnings management – Provincial governor age

	DR	*Abnormal_PROD*	*Abnormal_Impairment*	*Overall_EM*
GDP_Incentive	0.0046***	0.0055**	0.0017***	0.0119***
	(4.14)	(2.15)	(5.94)	(4.19)
Young_Governor	0.0004	0.0032	-0.0003	0.0033
	(0.45)	(1.35)	(-1.27)	(1.27)
GDP_Incentive × Young_Governor	0.0067***	0.0065**	0.0006*	0.0139***
	(5.18)	(2.16)	(1.72)	(4.16)
Control variables	Yes	Yes	Yes	Yes
Industry, year, province fixed effects	Yes	Yes	Yes	Yes
N	21,702	21,702	21,702	21,702
Adj. R^2	0.0320	0.1437	0.0388	0.1161

Panel D: GDP growth incentives and earnings management – Years before provincial official turnover

	DR	*Abnormal_PROD*	*Abnormal_Impairment*	*Overall_EM*
GDP_Incentive	0.0074***	0.0089***	0.0012***	0.0176***
	(8.05)	(4.25)	(5.19)	(7.56)
Turnover	0.0039*	-0.0207***	-0.0000	-0.0168***
	(1.84)	(-4.37)	(-0.05)	(-3.16)
GDP_Incentive × Turnover	0.0040***	0.0023	0.0021***	0.0084***
	(3.03)	(0.80)	(6.31)	(2.59)
Control variables	Yes	Yes	Yes	Yes
Industry, year, province fixed effects	Yes	Yes	Yes	Yes
N	21,702	21,702	21,702	21,702
Adj. R^2	0.0299	0.1428	0.0405	0.1141

TABLE 7
Earnings management induced by GDP growth incentives and future performance measures

This table reports the results from the OLS regression of future performance measures on the extent of earnings management induced by the GDP growth incentives. *Induced_EM* is calculated as the amount of *Overall_EM* predicted by *GDP_Incentive1* and *GDP_Incentive2* in a regression of *Overall_EM* on these two GDP growth incentive measures and the control variables in Regression (1). *Induced_EM_H* is an indicator variable for firm-years with *Induced_EM* above the sample median. *Bad_Debt* is bad debt expenses scaled by average total assets. *Inventory_Off* is inventory write-offs scaled by average total assets. *Impairment* is asset impairment losses scaled by average total assets. *ROA* is net income scaled by average total assets. Δ*NWC* is the change in net working capital (*NWC*) scaled by average total assets, where *NWC* is current operating assets minus current operating liabilities. Δ*LTNOA* is the change in long-term net operating assets (*LTNOA*) scaled by average total assets, where *LTNOA* is total assets minus current assets and non-debt long-term liabilities. Δ*Sales* is the change in net revenue scaled by average total assets. For each panel, the dependent variable is estimated one-year-ahead, two-years-ahead, and three-years-ahead. Intercepts are included but are not reported. The t-statistics are based on standard errors adjusted for firm and year level clustering. ***, **, and * indicate two-sided significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Panel A: Future bad debt expenses

	Bad_Debt_{t+k}		
	t+1	*t+2*	*t+3*
$Induced\_EM\_H_t$	0.0002**	0.0003***	0.0001
	(2.39)	(3.50)	(0.76)
Bad_Debt_t	0.2699***	0.1697***	0.1123***
	(16.00)	(9.90)	(7.05)
ROA_t	0.0023**	0.0044***	-0.0001
	(2.09)	(3.97)	(-0.13)
ΔNWC_t	0.0002	0.0011**	0.0007
	(0.59)	(2.44)	(1.56)
$\Delta LTNOA_t$	-0.0013***	-0.0002	0.0002
	(-3.68)	(-0.52)	(0.42)
$\Delta Sales_{t+k}$	-0.0001	-0.0002	-0.0006*
	(-0.47)	(-0.61)	(-1.83)
Industry, year, province fixed effects	Yes	Yes	Yes
N	16,339	14,263	12,181
Adj. R^2	0.1242	0.0863	0.0665

TABLE 7 (Cont'd)

Panel B: Future inventory write-offs

	Inventory_Off$_{t+k}$		
	t+1	*t+2*	*t+3*
Induced_EM_H$_t$	0.0003**	0.0002*	0.0002
	(2.51)	(1.89)	(1.09)
Inventory_Off$_t$	-0.0542**	-0.0092	0.0409**
	(-2.39)	(-0.43)	(1.98)
ROA$_t$	0.0071***	0.0042**	0.0063***
	(4.27)	(2.41)	(3.97)
Δ*NWC*$_t$	0.0018***	0.0007	0.0005
	(2.72)	(0.96)	(0.72)
Δ*LTNOA*$_t$	-0.0013**	0.0006	0.0007
	(-2.28)	(1.02)	(0.97)
Δ*Sales*$_{t+k}$	-0.0005	-0.0001	-0.0002
	(-1.15)	(-0.16)	(-0.36)
Industry, year, province fixed effects	Yes	Yes	Yes
N	11,515	9,735	8,183
Adj. R^2	0.0356	0.0259	0.0290

Panel C: Future asset impairment losses

	Impairment$_{t+k}$		
	t+1	*t+2*	*t+3*
Induced_EM_H$_t$	0.0005	0.0008***	0.0008**
	(1.51)	(2.59)	(2.28)
Impairment$_t$	0.2079***	0.0753***	0.0313*
	(9.21)	(3.82)	(1.69)
ROA$_t$	-0.0445***	-0.0406***	-0.0379***
	(-8.83)	(-9.19)	(-8.03)
Δ*NWC*$_t$	0.0004	0.0024	0.0025
	(0.21)	(1.51)	(1.55)
Δ*LTNOA*$_t$	-0.0011	-0.0009	0.0012
	(-0.72)	(-0.59)	(0.79)
Δ*Sales*$_{t+k}$	-0.0057***	-0.0037***	-0.0027***
	(-5.77)	(-3.81)	(-2.87)
Industry, year, province fixed effects	Yes	Yes	Yes
N	16,608	14,532	12,438
Adj. R^2	0.1134	0.0617	0.0479

TABLE 7 (Cont'd)

Panel D: Future return on assets (ROA)

	ROA_{t+k}		
	t+1	*t+2*	*t+3*
$Induced\_EM\_H_t$	-0.0139***	-0.0163***	-0.0143***
	(-14.67)	(-15.12)	(-12.46)
ROA_t	0.5241***	0.3616***	0.3020***
	(33.23)	(22.96)	(19.24)
ΔNWC_t	-0.0073	-0.0162***	-0.0194***
	(-1.47)	(-3.19)	(-3.23)
$\Delta LTNOA_t$	-0.0050	-0.0026	-0.0074
	(-1.03)	(-0.51)	(-1.33)
$\Delta Sales_{t+k}$	0.0592***	0.0430***	0.0373***
	(18.13)	(12.03)	(10.67)
Industry, year, province fixed effects	Yes	Yes	Yes
N	17,777	15,676	13,536
Adj. R^2	0.3291	0.2014	0.1590

TABLE 8
Benefits of earnings management induced by GDP growth incentives – Government subsidies and new loans

This table reports the results from the OLS regression of contemporaneous government subsidies (*Subsidy*) and one-year-ahead new loans (*New Loans*) on the extent of earnings management induced by the GDP growth incentives. *Induced_EM* is calculated as the amount of *Overall_EM* predicted by *GDP_Incentive1* and *GDP_Incentive2* in a regression of *Overall_EM* on these two GDP growth incentive measures and the control variables in Regression (1). *Induced_EM_H* is an indicator variable for firm-years with *Induced_EM* above the sample median. *Subsidy* is the total subsidies received from the governments divided by total assets. *New Loans* is the change in long-term loans divided by total assets. See Appendix B for the measurements of the other variables. The sample includes all the firm-years with available data over the 2002-2016 period. Intercepts are included but are not reported. The t-statistics are based on standard errors adjusted for firm and year level clustering. ***, **, and * indicate two-sided significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Subsidy	*New Loans*
Induced_EM_H	0.0002**	0.0029***
	(2.56)	(3.09)
ROE_NEG_L	0.0001	-0.0055***
	(0.46)	(-3.50)
ROE_SEO_L	-0.0003**	-0.0001
	(-2.05)	(-0.14)
SIZE	-0.0001*	0.0017***
	(-1.80)	(2.67)
LEV	0.0015*	-0.0065***
	(1.88)	(-2.85)
BM	-0.0006*	-0.0123***
	(-1.79)	(-4.46)
GROWTH	-0.0001	0.0008
	(-1.05)	(0.87)
SEO_F	0.0000	0.0176***
	(0.16)	(9.46)
EXEC_COMP	0.0000	0.0027***
	(0.06)	(3.96)
DUAL	0.0001	0.0020*
	(1.23)	(1.78)
BOARD_IND	0.0002	0.0092
	(0.42)	(1.43)
CONTROL_OWN	0.0003	0.0024
	(1.03)	(0.76)
PLEDGE	-0.0000	0.0027***
	(-0.59)	(2.64)
BIG4	0.0002	-0.0021
	(1.50)	(-1.02)
Industry, year, province fixed effects	Yes	Yes
N	21,702	17,779
Adj. R^2	0.0428	0.0336

TABLE 9
Effectiveness of earnings management induced by GDP growth incentives – Meeting GDP growth benchmark and provincial governor's promotion

This table reports the results on the effect of the aggregate earnings management induced by GDP growth incentives in the province (*Induced_EM_PH*) on (1) the likelihood of meeting or beating GDP growth benchmark (Panel A) and (2) the likelihood of the provincial governor's promotion (Panel B). *Induced_EM_PH* is an indicator variable for province-years where the sum of *Induced_EM* across all the firms in the province (summed in dollar amount and deflated by the province's lagged GDP) is above the sample median. *Induced_EM* is calculated as the amount of *Overall_EM* predicted by *GDP_Incentive1* and *GDP_Incentive2* in a regression of *Overall_EM* on these two GDP growth incentive measures and the control variables in Regression (1). The sample includes 465 province-years over the 2002-2016 period. Intercepts are included but are not reported. Z-statistics are presented in parentheses. ***, **, and * indicate two-sided significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Panel A: Meeting or beating GDP growth benchmark

This panel reports the results from the logit regression of meeting or beating GDP growth at the national or the adjacent province level ($GDPG\_MB_t$) on *Induced_EM_PH*. $GDPG\_MB_t$ is an indicator variable for province-years whose GDP growth is the same as or higher than the national GDP growth or the average GDP growth of the adjacent provinces in year *t*. $GDPG_{t-1}$ is the GDP growth of the province in year *t-1*. $GDPG\_N_{t-1}$ is the national GDP growth in year t-1. $GDPG\_AP_{t-1}$ is the average GDP growth of the adjacent provinces in year *t-1*.

	$GDPG\_MB_t$
$Induced\_EM\_PH_t$	0.1223***
	(2.76)
$GDPG_{t-1}$	14.1712***
	(9.99)
$GDPG\_N_{t-1}$	1.3840
	(0.92)
$GDPG\_AP_{t-1}$	-14.9779***
	(-8.41)
Province fixed effects	Yes
N	465
Pseudo R^2	0.3543

TABLE 9 (Cont'd)

Panel B: Provincial governor's promotion

This panel reports the results from the ordered logit regression of the provincial governor's promotion (*Promotion*) on *Induced_EM_PH*. *Promotion* equals 2 if the governor is promoted (e.g., becoming a provincial party secretary), 1 if the governor stays on the post or moves to a similar position (e.g., becoming the governor of another province of similar size), and 0 if the governor resigns or is demoted. *GDPG* is the province's GDP growth during the governor's tenure, *Age* is the governor's age, *Age65* is an indicator variable for governors who are 65 or older, *Education* is an indicator variable for whether the governor has a bachelor degree, *Tenure* is the number of years the governor has been in the current position, and *Central* is an indicator variable for those governors who previously worked or are currently holding a joint position in the central government.

	Promotion
Induced_EM_PH	0.3304**
	(2.40)
GDPG	6.3988***
	(2.19)
Age	-0.0356
	(-1.70)
Age65	-1.9038***
	(-3.80)
Education	0.2079
	(0.54)
Tenure	0.0458
	(1.15)
Central	0.0294
	(0.17)
Province fixed effects	Yes
N	465
Pseudo R^2	0.1380