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Abstract

China's hybrid economy blends state planning with market mechanisms, using annual economic targets to guide development and macroeconomic management to ensure their achievement. Local governments set ambitious growth targets to align with central mandates and incentivize subordinates, leading to asymmetric adjustments: targets rise rapidly during booms but decline sluggishly during slowdowns. This dynamic has heightened pressure on local governments to intervene in the economy, particularly after 2010. Our analysis shows that when a region falls short of its growth target, it increases infrastructure investment, land sales, and local government debt to close the gap. Notably, during the relatively stable period of 2011–2019, overly optimistic targets contributed an additional 14.0% of GDP to local government debt. While these interventions helped smooth cyclical fluctuations and moderated the trend of GDP deceleration, they also eroded GDP growth's reliability as an economic indicator, weakening its correlation with corporate revenue, household demand, and TFP gains.

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On September 26, 2024, China's Politburo—the 24-member committee at the apex of the country's political hierarchy—held its monthly meeting. Typically, the economy is not the centerpiece of its September discussions. This year, however, the faltering economy commanded the spotlight. The Politburo emphasized the imperative of achieving its annual growth target of 5%, signaling an intensified reliance on macroeconomic management policies to steer the economy toward this goal.[1]

The urgency of the situation was underscored by a coordinated stimulus program unveiled around the time of the meeting. China's key economic institutions—the Ministry of Finance, the People's Bank of China, and the National Development and Reform Commission—announced a series of measures, including an interest rate cut and a reduction in the reserve requirement ratio to inject liquidity into the economy. Additional steps included fiscal backing for a local government debt swap and initiatives to stabilize the housing market. This stimulus package aimed to ease local government debt burdens and strengthen fiscal spending, reflecting Beijing's determination to deploy substantial resources to prevent an economic slowdown.

By the Politburo meeting on December 9, 2024, optimism had returned. The committee anticipated that China's economic target for 2024 would be achieved, thanks in part to these interventions. Looking ahead, the Politburo signaled that the growth target for 2025 would remain at around 5%.

These glimpses into the Politburo's deliberations highlight the intricate dynamics of China's hybrid economic model. After more than four decades of market-oriented reforms, China has cultivated a vast economy that blends intensive state planning with market mechanisms, maintaining a delicate and sometimes uneasy equilibrium. While the rigidities of central planning have long been abandoned, the state remains deeply embedded in the economy through the continued use of five-year and annual plans, which set targets and development priorities to shape the nation's trajectory.

The execution of these plans depends on China's vast and hierarchical government apparatus. At the same time, market forces play a crucial role, with firms and households responding to the signals and incentives shaped by state policies. This interplay between state guidance and market dynamics defines China's economic model—not fully market-driven nor entirely state-controlled, but a distinctive hybrid of both. This unique synthesis distinguishes China's economic dynamics and policymaking from those of conventional market economies,

[1] The official translation of Chinese State Council Work Reports uses the term "Macro Regulation" (宏观调控) to refer to its macroeconomic management policies.

often complicating the application of standard frameworks to assess the health and efficiency of the world's second-largest economy.[2]

The framework of setting annual growth targets and ensuring their achievement through macroeconomic management has long been a cornerstone of China's economic planning, serving as both a policy anchor and an execution mechanism. Figure 1 charts China's economic growth alongside its official growth targets from 2002 to 2024, revealing two distinct phases in its economic trajectory.[3]

The first phase, prior to 2010, was marked by rapid economic expansion following China's accession to the WTO. Growth surged from 8.0% in 2002 to 11.4% in 2007 before moderating in response to the global financial crisis. The government's 4-trillion-yuan stimulus (2008–2010) sustained growth above 8% despite global headwinds. During this period, China initially set modest growth targets of 7% (2002–2004), later raising them to 8% (2005–2011). These targets were easily exceeded, reflecting the economy's strong momentum during its high-growth years.

The second phase, post-2010, marked a shift to slower but more stable growth, with expansion moderating from 10.3% in 2010 to 6.1% in 2019. Despite this deceleration, growth remained remarkably smooth, avoiding the cyclical fluctuations typical of both emerging and advanced economies. Notably, realized growth closely tracked official targets, which gradually declined from 8% in 2010 to 6% in 2019. The narrowing gap—consistently within 0.5%, with actual growth occasionally falling short by just 0.1%—suggests that growth targets became increasingly binding as a policy instrument.

While the COVID-19 pandemic disrupted China's growth trajectory, post-pandemic recovery has seen a return to more moderate expansion. GDP grew 5.2% in 2023 and 5.0% in 2024, aligning closely with the official 5% target. This renewed adherence to target-driven growth underscores the enduring influence of growth targets in shaping China's economic trajectory.

How do growth targets shape the Chinese economy? This paper explores the intricate relationship between national growth targets and their implementation across China's vast

[2] For example, strong government interventions induce distinct risk and market dynamics in the financial system (Song and Xiong, 2018). The dominance of state firms supports a quantity-based monetary policy, contrasting with the price-based frameworks of market economies (Chen, Ren & Zha, 2018). Additionally, local governments' reliance on land sales for fiscal revenue makes China's real estate cycles uniquely distinct (Xiong, 2023).

[3] The growth rates in Figure 1 are based on preliminary figures from the State Council's Work Report, released at the beginning of the following year. These figures may later be revised by the National Bureau of Statistics (NBS) due to audits or methodological adjustments, sometimes leading to significant changes. For example, the 2007 preliminary growth rate was initially reported as 11.4% but later revised to 14.2% due to methodological updates. For our analysis, the preliminary figures are most relevant, as they directly influence policymaking and official performance evaluations at the time. Therefore, we consistently use these initial GDP growth figures before any subsequent revisions.

subnational governance structure. From provinces, directly beneath the central government, down to cities, counties, and townships, each level of local government plays a crucial role in translating national targets into concrete economic outcomes.

At the start of each year, local governments set their own growth targets in coordination with higher authorities, drawing on assessments of local economic conditions. A notable feature of this process is the phenomenon of "*top-down amplification*"—whereby national growth targets are consistently exceeded by provincial targets, which in turn are surpassed by city-level targets.

This pattern reflects the incentive structure of China's governance system, where local officials are assessed based on their ability to implement directives from higher authorities and drive economic growth within their jurisdictions. Consequently, regional leaders often set ambitious growth targets that exceed the expectations of their superiors. This strategy serves a dual purpose: providing a buffer to ensure compliance with higher-level expectations while also motivating subordinates to outperform expectations. In this context, growth targets function not merely as planning tools but as instruments that foster competition among local governments.

Our findings reveal a *ratchet effect* in how local governments adjust their growth targets asymmetrically—raising them aggressively during economic booms but lowering them more cautiously during slowdowns. This pattern of asymmetric adjustment contributed to persistently ambitious targets in the post-2010 period of economic deceleration.

These growth targets are not merely a statistical exercise; they drive substantial policy responses at the provincial and city levels. Our analysis shows that when regions fall short of their growth targets, local governments respond with significant investments, particularly in infrastructure. The GDP gap—the difference between a region's realized GDP growth rate and its target—is strongly correlated with increased infrastructure spending, even after controlling for the realized growth rate. Specifically, when a province falls one percentage point short of its growth target, infrastructure investment increases by approximately 0.4% of GDP.

Local governments' regular budgets lack the flexibility and resources to fund these interventions, particularly mid-fiscal cycle. Instead, they rely on two primary alternative funding sources: land sales and debt financing. Since the 1994 tax-sharing reform, which reduced the share of tax revenues allocated to local governments, land sales—enabled by the state's constitutional ownership of land—have become a critical revenue source. Additionally, during the 2008 global financial crisis, the central government eased restrictions on local borrowing, leading to the creation of local government financing vehicles (LGFVs). These entities allowed local governments to raise funds for stimulus measures, effectively opening the floodgates for debt financing. Despite subsequent efforts to curb borrowing, many local governments continued

to rely on shadow banking channels to circumvent central oversight, sustaining high levels of off-balance-sheet debt to finance infrastructure and economic interventions.

Our cross-city analysis shows that for every 1% shortfall in a city's GDP gap, land sales increase by approximately 0.07% of GDP. More strikingly, after 2010, a 1% GDP gap corresponds to a 0.76% of GDP increase in local government debt—including both official local bonds and LGFV debt. This substantial figure exceeds the estimated increase in infrastructure investment, indicating that local governments have employed a broader range of interventions beyond infrastructure projects to meet their targets.

Using our estimated elasticity of local government debt to GDP gaps, we calculate that the cumulative GDP gaps faced by cities from 2011 to 2019—a period of steady growth without major disruptions—would have contributed to a 14.0% increase in local government debt relative to GDP. This estimate is conservative, as it does not account for debt incurred by cities that successfully met their targets. Nevertheless, this striking figure highlights the rapid accumulation of local government debt and the significant costs of China's countercyclical macroeconomic management.

While these interventions stabilized GDP growth through cyclical fluctuations and moderated economic deceleration, they came at a steep price. The extensive infrastructure investment, along with land sales and debt financing leveraged by local governments, indicates that China's reported GDP growth is not merely a product of statistical over-reporting—a concern recently examined by Nakamura, Steinsson, and Liu (2016), Lv and others (2018), Chen and others (2019), and Gong, Shen, and Chen (2025). However, whether achieving these growth targets has translated into broad economic prosperity remains an open question.

Our analysis shows that from 2002 to 2008, provincial GDP growth was strongly correlated with revenue growth among publicly listed firms, a proxy for corporate health, and retail sales growth, a measure of household demand. Similarly, city GDP growth was closely linked to productivity gains. However, these correlations weakened significantly from 2011 to 2019, a period of steady but intervention-driven growth. This erosion of correlation underscores a fundamental issue for China's economic model: achieving GDP growth targets alone does not necessarily translate into broader economic prosperity for households and firms.

This disconnect between GDP growth and broader economic indicators may stem from key mechanisms identified in studies of the Chinese economy. As infrastructure investment faced diminishing returns, large-scale projects likely failed to generate meaningful spillover effects (e.g., Qian, Ru, and Xiong, 2024). Meanwhile, the surge in local government debt crowded out capital that could have otherwise supported more productive private enterprises, hindering

organic economic growth. This pattern aligns with findings from Cong and others (2019) and Huang, Pagano, and Panizza (2020) on the effects of China's post-crisis stimulus.

Our analysis sharpens the understanding of China's distinct economic management framework by highlighting how the central government sets national growth targets to anchor local targets and how local governments use macroeconomic management to meet their targets. This complements prior studies on the role of career incentives for local officials (e.g., Maskin, Qian & Xu 2000; Li & Zhou 2005; Xu 2011; Zhou and others 2015; Qian 2017; Zhou 2018). Our work is particularly related to Song and Xiong (2024), which develops a dynamic macroeconomic model to quantify the economic consequences of short-termism driven by local officials' career incentives. We highlight the intricate interplay between central and local growth targets, with local targets ultimately shaped by agency frictions within the bureaucratic system.

By doing so, our findings shed light on China's evolving economic challenges. Many commentators (e.g., Posen 2023) have noted that China's economy appears to have entered a new regime since the end of the COVID-19 pandemic. Our analysis traces the rise of local government debt and the heavy reliance on real estate for fiscal financing back to the pressures local governments have faced in meeting growth targets since the early 2010s—pressures deeply embedded in China's economic management framework. These pressures contributed to the overconstruction of housing across China, particularly in third-tier cities, where reliance on land sales for fiscal financing was especially pronounced, as highlighted by Rogoff and Yang (2024a). This, in turn, led to an outsized role for real estate and construction in China's economic structure (e.g., Rogoff and Yang 2024b; Huang et al. 2024).

Moreover, the increasingly rigid growth targets set by local governments may have reduced their flexibility and appetite for policy experimentation, a stark departure from their historical role as key drivers of China's market reforms (Wang and Yang 2024; Fang, Li and Lu 2025). Our analysis also underscores the need for policymakers to take a more cautious approach when setting national targets, particularly during periods of economic slowdown. Given their role in anchoring local targets and reinforcing the ratchet effect, national targets should be designed with greater flexibility to mitigate unintended distortions in local economic management.

I. The Informativeness of China's GDP Growth

When China announced its 2024 GDP growth at 5.0%, precisely meeting its official target, skepticism quickly followed. Critics questioned the credibility of the reported GDP statistics, as the strong growth appeared misaligned with weaker indicators such as subdued consumption demand. In this section, we assess the informativeness of GDP growth in China, focusing on

regional GDP growth to leverage variations across provinces and cities. Instead of concentrating on the most recent GDP statistics, we analyze systematic patterns over the past two decades.

Specifically, we examine the correlation between GDP growth and three broad economic variables that serve as indicators of economic health: (1) the revenue of publicly listed firms, which reflects corporate performance; (2) aggregate retail sales, which capture household demand; and (3) total factor productivity (TFP) growth, which measures productivity improvements.

We compare the correlation between GDP growth and changes in these economic indicators across two distinct periods: 2002–2008 and 2011–2019. As discussed earlier, China's GDP trajectory shifted significantly between these two periods. The first phase, 2002–2008, was characterized by rapid economic expansion, with national GDP growth consistently exceeding official targets. The second phase, 2011–2019, represents a more stable period in which national GDP growth closely aligned with official targets. This latter period followed the post-crisis stimulus that ended in 2010 but preceded the disruptions caused by the onset of the COVID-19 pandemic in 2020.

In Table 1, we regress the annual revenue growth of publicly listed firms on the GDP growth of their headquarters' province, controlling for lagged revenue growth and provincial factors, with firm and year fixed effects. During 2002–2008, firm revenue growth was positively and significantly correlated with provincial GDP growth (coefficient: 1.771), indicating that GDP growth at the provincial level was closely linked to corporate performance. However, in 2011–2019, this correlation turned negative, albeit statistically insignificant, implying GDP growth no longer served as a meaningful proxy for corporate health.

In Table 2, we regress province-level retail sales growth, measured by total retail sales of consumer goods, on provincial GDP growth, lagged consumption growth, and provincial control variables, together with province and year fixed effects. From 2002 to 2008, GDP growth was positively and significantly correlated with retail sales growth (coefficient: 0.895), indicating that provincial GDP growth served as a reliable proxy for household demand. However, from 2011 to 2019, this correlation weakened to 0.06 and lost statistical significance, suggesting that GDP growth no longer meaningfully reflected household demand.

In Table 3, we regress city-level total factor productivity (TFP), estimated using Stochastic Frontier Analysis (SFA) with capital stock and total employment as inputs, on city GDP growth, and city-level control variables, together with city and year fixed effects. Both TFP and GDP growth are standardized by their respective standard deviations. From 2002 to 2008, GDP growth was positively and significantly correlated with TFP (coefficient: 0.160), indicating that GDP

growth reflected productivity improvements. However, in 2011–2019, this correlation dropped to nearly zero, suggesting GDP growth no longer meaningfully captured productivity gains.

Taken together, these regressions suggest that during the 2011–2019 period, GDP growth became increasingly disconnected from firm revenue growth, retail sales growth, and TFP, reducing its reliability as a measure of economic health. While these findings are based on cross-regional variations, they echo the ongoing concerns that China's GDP growth may not accurately reflect overall economic prosperity.

One might attribute the disconnect between GDP growth and economic prosperity to the misreporting of GDP statistics. There is indeed strong evidence of China's GDP statistics being managed, as provided by Nakamura, Steinsson, and Liu (2016), Lv and others (2018), Chen and others (2019), and Gong, Shen, and Chen (2025). Further confirmation comes from the widely publicized acknowledgment of GDP inflation by several provincial-level subnational governments, including Liaoning, Inner Mongolia, and Tianjin in 2017–2018.

GDP growth in China is not just a measure of economic development—it is also a key performance indicator for regional officials, playing a vital role in the country's governance system. This role gives regional leaders strong incentives to inflate GDP growth figures. At the same time, such manipulation is constrained by internal governance mechanisms, which are essential for the proper functioning of China's vast bureaucracy. The ongoing tension between local officials' incentives to inflate GDP figures and the central government's monitoring mechanisms is a fundamental aspect of China's bureaucratic system. As a result, it is unlikely that GDP inflation alone could sustain China's remarkably smooth growth trajectory for a prolonged period, as observed from 2011 to 2019.

Instead, this paper explores an alternative explanation for the disconnect between GDP growth and economic prosperity, tracing it to China's unique economic development framework. This framework involves setting annual growth targets not only at the national level but also across all subnational levels, with macroeconomic management guiding state-led investment to ensure these targets are met. This economic management approach smooths cyclical shocks and consistently delivers annual growth rates, making it resemble statistical manipulation. However, it differs in a fundamental way: rather than relying on mere reporting adjustments, China's countercyclical macroeconomic management drives extensive state-led investments. These investments are financed not only through the regular fiscal budget but also through expansive off-budget spending by local governments, funded by land sales and local debt.

II. Growth Targets and Macroeconomic Management

Following four decades of pragmatic, gradualist market reforms, China has developed a hybrid economy that blends market dynamics with government control. Private firms now account for over 50% of tax revenue, 60% of GDP, 70% of technological innovation, 80% of urban employment, and 90% of all firms. Yet the state retains substantial control, particularly in strategic sectors such as banking, finance, energy, communications, and transportation. More broadly, the government exerts significant influence through monetary, fiscal, and industrial policies.

While rigid central planning is a relic of the past, the government continues to steer economic development through five-year plans and annual growth targets that define national priorities and objectives. The annual growth target, a cornerstone of this framework, is set by the State Council in coordination with ministries and provincial governments. Announced during the National People's Congress each March, it serves as a benchmark for coordinating state efforts to drive economic growth.

As shown in Figure 1, growth targets remained relatively stable in the early 2000s, initially set at 7% before rising to 8% in 2005. Beginning in 2011, the targets were gradually lowered: 7.5% in 2012, 7.0% in 2015, 6.5% from 2016 to 2018, followed by successive reductions to 6% in 2019 and 2021, 5.5% in 2022, and 5% in 2023 and 2024.

A clear pattern emerges when comparing growth targets with realized growth rates, specifically the figures announced at the beginning of the following year. Before 2008, China consistently exceeded its targets by more than two percentage points, reflecting conservative goal-setting during a period of rapid economic expansion. The 2008 global financial crisis prompted a massive stimulus program that sustained high growth from 2008 to 2010. After the stimulus ended, realized growth rates aligned more closely with targets, typically exceeding them by less than 0.5 percentage points. Notably, in both 2014 and 2015, actual growth fell short of targets by 0.1%.[4]

The tighter alignment between growth targets and outcomes after 2010 marks a new phase in China's economic development, as the rapid expansion of the pre-2008 era gave way to a more moderate trajectory. The COVID-19 pandemic in 2020 caused significant disruptions; for the first time, China did not set a national growth target, and growth plummeted to 2.3%. It rebounded to 8.1% in 2021 but fell again to 3% in 2022, reflecting substantial deviations from targets. After lifting its zero-COVID policy at the end of 2022, the economy stabilized at a lower

[4] Note that subsequent NBS audits and revisions have adjusted the official growth rates for 2014 and 2015 to exactly match the targets for those years. However, the initial growth rates announced shortly after each year had fallen short, highlighting the challenges China faced in meeting its targets.

growth trajectory, achieving 5.2% in 2023 and 5.0% in 2024—both aligning with the 5% targets set for those years.

What stands out in Figure 1 is the smooth alignment of growth targets and outcomes from 2010 to 2019, a period of relative stability. This consistency is remarkable, especially compared to other economies, including advanced ones, which typically experience much greater fluctuations. Rather than attributing this alignment solely to statistical management, it is essential to recognize that China operates a coordinated system designed to achieve national growth targets.

II.A. Top-Down Amplification

The national growth targets, together with many other central government economic policies, are implemented by China's subnational governments. China has an expansive government system that spans five layers. At the apex stands the central government in Beijing, comprising the State Council and its ministries, which set national policies governing the economy and matters of state importance.

The next tier consists of 23 provinces, five autonomous regions, and four centrally administered municipalities (Beijing, Shanghai, Tianjin, and Chongqing). Below the provincial level, the third tier—the prefectural level—encompasses 293 prefecture-level cities that oversee counties, districts, or county-level cities at the fourth level. At the base of this administrative pyramid is the fifth level, where townships operate under county oversight, managing the local affairs of towns and villages.

China operates an administrative contracting system that grants local governments broad authority over political, social, and economic affairs within their jurisdictions. Leaders at each level are appointed by higher authorities and are responsible for implementing policies set by their superiors. At the same time, local governments have significant autonomy in managing local economies, developing markets, and formulating development policies.[5]

To implement the central government's growth target, each layer of local government sets its own growth target. At the start of each year, local governments negotiate mandates with their upper-level authorities, establish their targets, and announce them during their respective People's Congress meetings. In this way, the national growth target is systematically broken down into specific targets for each province, which are further subdivided into targets for cities. This hierarchical structure ensures that development objectives align across all levels of

[5] This system is often characterized as a regionally decentralized authoritarian system, as summarized by Xu (2011), Qian (2017), and Zhou (2022).

government. Regional governments at each layer are tasked with meeting their designated targets, creating a coordinated system for achieving national goals.

Figure 2 compares GDP-weighted average growth targets at the provincial and city levels with national targets, all in real terms. The figure reveals a striking pattern: from 2004 to 2022, national targets were consistently exceeded by provincial targets, which in turn were surpassed by city-level targets. This progressive escalation reflects a well-documented phenomenon in Chinese bureaucracy known as "top-down amplification" (Zhou and others 2015).

Before 2010, average city-level growth targets exceeded provincial-level averages by approximately 2 percentage points, while provincial-level averages surpassed national targets by another 2 percentage points. After 2010, growth targets at all three levels declined, and the gaps between them narrowed but remained noticeable.

Regional targets at different levels are *voluntary* rather than mandates imposed by higher authorities. They serve as coordination and motivation tools, helping governments at all levels align their divisions and subordinates. For example, if the central government sets a national growth target of 6%, it signals an expectation that provincial growth rates will be around this level. While provinces can negotiate with the central government to account for local idiosyncratic factors, the central government's specific expectations for each province are not publicly disclosed. Based on these negotiations, each province sets its own target—often higher than the central government's implicit expectation—creating an incentive structure that cascades downward. If a province sets its target at 7%, it pressures cities within its jurisdiction to aim for at least 7%. In turn, cities may set an even higher target, such as 8%, pushing counties under their administration to strive for even greater growth.

Setting a growth target higher than the implicit expectation of its upper government serves two key purposes for a regional government. First, it acts as a safeguard, reducing the risk of falling short of the upper government's expectations, even if actual growth falls below the self-imposed goal. Second, an ambitious target motivates subordinates to exceed expectations, thereby enhancing the regional government's standing in the GDP tournament.

As part of China's market-oriented reforms, economic performance—primarily measured by GDP growth—has become a central criterion for evaluating local officials, with promotions and demotions closely tied to growth outcomes. This GDP tournament has been recognized as a key driver of China's economic development since the onset of its market reforms (e.g., Maskin, Qian, and Xu 2000; Li and Zhou 2005; Song and Xiong 2024).[6] In particular, Li and others

[6] Zhou and others (2015) find that growth targets are closely linked to the career incentives of local leaders, following a U-shaped relationship with their age. Younger leaders, with greater potential for promotion, are more likely to set high growth targets to showcase their capabilities and ambition. Conversely, older leaders nearing

(2019) develop a Tullock contest model to analyze optimal target setting in a multi-layered, tournament-based system, capturing the phenomenon of top-down amplification in growth target setting within China's hierarchical government structure.

II.B. Macroeconomic Management

China has a longstanding macroeconomic management framework that relies on countercyclical interventions to ensure the annual growth target is met. In the government work report submitted by the State Council to the National People's Congress each March, it is customary to outline how countercyclical monetary, fiscal, and industrial policies were deployed to achieve the previous year's growth target.

The national growth targets are ultimately achieved through subnational governments. The macroeconomic management measures taken at the national level, whether monetary or fiscal, are channeled through regional governments to ensure their growth objectives are met. Thus, assessing the cost and efficiency of China's macroeconomic management requires examining how local governments achieve their growth targets—the central focus of our analysis.

Once a growth target is established at any level of government, it functions as a coordination mechanism for the entire administrative system. Leaders closely monitor progress throughout the year, conducting inspections to ensure targets remain on track. If progress lags midyear, intervention strategies are promptly implemented to compensate for the shortfall.

Regions may employ various measures to stimulate their economies. A common approach is to initiate additional infrastructure projects, such as upgrading local road networks and agricultural facilities, building subways, constructing airports, or developing new industrial and commercial districts. These projects directly boost local GDP and create employment opportunities.[7] Another strategy involves enacting industrial policies, such as offering grants and subsidies to stimulate investment and innovation in priority sectors, including new energy and electric vehicles.

When a region falls behind its growth target, this may occur independently or concurrently with other regions missing their targets. Consequently, its intervention may align with or diverge from a broader national intervention program. When aligned with a national program, the region

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mandatory retirement often adopt similarly ambitious targets as a final effort to secure promotion, which may extend their tenure.

[7] As a frequently used intervention tool, local governments in China maintain a reserve of infrastructure projects, enabling them to expedite evaluation, approval, and funding for midyear project launches aimed at meeting growth targets. Moreover, China's GDP calculation rules allow regions to record a portion of a project's GDP during its construction, based on its duration and projected completion date. These measures significantly shorten the lag between local government interventions and their impact on reported GDP growth.

can benefit from central government fiscal allocations or easier and more affordable credit access through monetary policies. However, even in the absence of a national program, local governments have certain discretion and flexibility to implement their own fiscal policies.[8]

In China, subnational governments carry out more than 80% of fiscal spending. They typically rely on three key sources to fund infrastructure projects and other intervention measures: regular fiscal budget, off-budget government funds, and debt financing. [9]

The regular fiscal budget of a local government is determined in coordination with the central government under China's Budget Law. In 1994, China implemented a systematic tax-sharing reform that established clear rules for revenue sharing between central and local governments. This reform significantly increased the central government's share of national tax revenue, enhancing its capacity to reallocate fiscal resources across regions, prioritize central government initiatives, and subsidize less developed areas.

The regular fiscal budget, funded by fiscal revenue and a modest fiscal deficit (typically kept below 3% and financed through official government bonds), is allocated across all regions through a redistribution process.[10] However, since the regular fiscal budget is set in coordination with the central government at the start of each fiscal year, it lacks the flexibility to fund mid-year economic interventions, particularly those responding to unexpected economic conditions.

Beyond the regular fiscal budget, local governments manage off-budget government funds, primarily financed by non-tax revenue, with land sales as the dominant source. The 1994 tax-sharing reform increased the central government's share of tax revenue but left local governments with unchanged fiscal responsibilities. To compensate, the central government allowed local governments to retain land sale proceeds, which have since accounted for over 90% of these funds. Additional sources include urban maintenance and construction fees. These funds are earmarked for infrastructure, urban development, and land-related projects, making them a key tool for financing economic interventions.

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[8] Notably, even when regional interventions align with national stimulus programs, local governments are often required to provide matching funds. For example, China's 4-trillion yuan stimulus in response to the 2008 global financial crisis mandated that regional governments contribute funds from local budgets and bank credit to qualify for national infrastructure grants. This matching requirement nearly tripled the central government's fiscal impact but also forced local governments to secure their own financing to participate.

[9] Local governments also oversee two additional accounts: one linked to state-owned enterprises (SOEs) under their ownership and another for public social security funds. At the aggregate level, SOEs contribute less than 1% to the fiscal budget, making them an unlikely source for funding economic interventions. Similarly, public social security funds, earmarked for pensions, medical insurance, and employment insurance, are strictly designated, further limiting their use for local economic interventions.

[10] China also issues special-purpose government bonds earmarked for specific projects outside the regular budget.

In addition to the regular fiscal budget and off-budget government funds, debt financing has become a key funding source for local governments, especially after 2008. Before 2008, the central government strictly prohibited unauthorized local borrowing to enforce fiscal discipline. However, in response to the 2008 global financial crisis, it allowed local governments to raise funds through Local Government Financing Vehicles (LGFVs)—entities created to borrow from banks and bond markets for local projects.

This policy shift relaxed financial discipline, granting local governments greater fiscal flexibility and fueling a surge in borrowing (Bai, Hsieh, and Song, 2016; Chen, He, and Liu, 2020). Even after the 2010 stimulus ended and the central government called for debt reduction, many local governments continued borrowing through LGFVs, often relying on shadow banking instruments like wealth management products, which initially operated outside regulatory oversight. By the time the central government tightened controls in 2016, local debt had far exceeded 2010 levels, prompting multiple national audits to uncover the extent of hidden debt.

To address fiscal distress from rising local debt, the central government launched debt swaps, enabling local governments to replace high-interest LGFV debt with lower-interest local government bonds, thereby reducing financial pressure and enhancing transparency. However, borrowing through LGFVs persisted, as local governments continued creating new LGFVs to fund infrastructure and economic projects beyond central oversight—partly driven by local officials' career incentives, as highlighted by Song and Xiong (2024). [11]

This highlights a key tension in China's hybrid economy. Unlike central planning, which offers little flexibility to local governments, firms, and individuals, China's current economic planning leverages the incentives of local officials, who possess greater knowledge and capacity to manage local economies. However, their interventions—whether driven by personal incentives or pressure to meet targets—often lead to increased debt, stimulating short-term growth while imposing long-term costs.

II.C. Empirical Strategy

Are growth targets merely a sideshow, or do they have a profound impact on the Chinese economy? Opinions differ. Given China's successful market reforms, some argue that its growth is primarily driven by market forces. In this view, government-set growth targets may serve only to smooth out cyclical shocks or, at most, lead regional governments to engage in statistical management to meet targets without significant impact on investment and actual growth. In

[11] In addition to LGFV borrowing, local governments in recent years have also utilized other alternative sources of off-budget financing, such as Public-Private Partnership (PPP) projects.

contrast, an alternative perspective holds that these targets play a crucial role in shaping the economy by prompting regional governments to commit substantial investment to achieve them.

To clarify these perspectives, we will focus primarily on analyzing the pressure that growth targets impose on local governments. Once we establish the significant effects of these targets, we will examine, in Section VI, how local governments at different levels coordinate with the central government in setting them.

With this focus, we aim to investigate how local governments employ countercyclical intervention tools—such as infrastructure investments financed through land sales and local debt—to achieve their growth targets. To quantify the pressure faced by a region, we define the GDP gap as the difference between its realized growth rate and its initial growth target for a given year.[12] A positive GDP gap reflects overperformance, while a negative GDP gap signifies underperformance. Using this measure of growth pressure, we structure our analysis around the following central hypothesis:

Central Hypothesis: When faced with the pressure of a more negative GDP gap, regional leaders intensify countercyclical intervention measures throughout the year.

The observed GDP gap in a given year reflects the impact of government intervention. Absent factors that make government intervention non-monotonic with respect to the initial shortfall, a larger initial shortfall should trigger more intensive intervention. However, despite these efforts, we expect the relationship between the initial and year-end shortfalls to remain monotonic, meaning that larger observed shortfalls consistently correspond to more substantial government intervention.

Table A1 in the Appendix presents summary statistics for the variables used in our analysis. It reveals that the GDP gap, measured in percentage points, has a mean of 0.492 and a standard deviation of 2.396 at the provincial level, while at the city level, it has a mean of -0.322 and a standard deviation of 2.929. The positive provincial mean is primarily attributed to the high-growth period before 2008, whereas the lower mean at the city level compared to the provincial level reflects the layer-by-layer intensification of growth targets. Additionally, there is significant variation in the GDP gap at both levels, driven not only by differences in regional economic fundamentals but also by the varying career incentives of regional leaders who set the targets.

[12] Another relevant variable is the implicit growth expectation held by the local government's higher authorities. Unlike the publicly announced growth target, this expectation is typically kept internal. Importantly, while this expectation represents the baseline priority for local leaders, the official growth target serves as a focal point for mobilizing and coordinating the entire administrative system to achieve it. Failure to meet the stated target necessitates justification. Therefore, the gap between realized growth and the official target provides a more accurate measure of the pressure faced by local governments.

In our analysis, we use the GDP gap to measure the pressure on local governments to meet their growth targets. Since part of the variation in the GDP gap stems from fluctuations in a region's natural growth rate, we account for this by controlling for the region's actual growth rate, past growth rate, and other economic variables.[13]

Growth targets may also incentivize local governments to over-report GDP growth rates, as analyzed by Lv et al. (2018) and Gong, Shen, and Chen (2025). These studies highlight that such target-driven over-reporting tends to occur around the threshold for meeting growth targets. In contrast, our analysis focuses on whether local government intervention varies systematically with observed GDP gaps, rather than being confined to the break point.

In the following sections, we examine how infrastructure investment, land sales, and local government debt vary across regions with different GDP gaps.

III. Infrastructure Investment

In this section, we analyze how infrastructure investment in a region correlates with the region's GDP gap. Our central hypothesis posits that regions increase infrastructure investment in response to a larger negative GDP gap. Regions may also implement local industry policies and other measures to stimulate firm investment and the local economy, but systematically measuring these alternative interventions is challenging.

Before China's market reforms in 1978, infrastructure investment was minimal and heavily concentrated in heavy industry, neglecting essential sectors such as transportation, energy, and urban utilities. The 1978 reforms marked a turning point, elevating infrastructure development to a central role in China's economic strategy. Given that infrastructure investments are primarily state-funded, they have become a key countercyclical economic tool. This was evident in the 4-trillion-yuan stimulus of 2008, which aimed to stabilize growth amid collapsing global demand, with 1.5 trillion yuan allocated to railways, highways, airports, and power grids. Even beyond the post-2008 stimulus, China has continued to rely heavily on infrastructure investment as a cornerstone of its macroeconomic management.

[13] It is useful to note that the GDP gap, after controlling for the region's actual GDP growth, is not correlated with the region's underlying economic fundamentals. To illustrate this, we measure the region's economic fundamentals in year t using the normalized firm revenue change, defined as the change in the total revenue of all industrial firms with annual main revenue above 20 million RMB in the region from year t-1 to year t, divided by the region's GDP in year t-1. In Table A2 of the Appendix, we analyze the correlation between the GDP gap and the normalized firm revenue change. Columns (1) and (3) present this relationship at the provincial and city levels, respectively, without controlling for GDP growth. As anticipated, the normalized firm revenue change is significantly correlated with the GDP gap in both cases. However, in Columns (2) and (4), where GDP growth is included as a control variable, this correlation substantially diminishes and becomes statistically insignificant.

Figure 3 depicts the share of infrastructure investment in China's GDP since 2002, based on official data from the National Bureau of Statistics. This share rose steadily from 11% in 2002 to just over 20% in 2016–2017, before declining to around 18% in recent years. The figure also highlights China's exceptionally high overall investment rate, which has consistently exceeded 40% of GDP, reinforcing its investment-driven economic model. Notably, infrastructure investment has expanded as a share of fixed investment, rising from around 30% in the 2000s to over 40% in recent years.[14]

Figure 4 further highlights the role of infrastructure investment as a key tool for countercyclical interventions by illustrating the changes in firm revenue and infrastructure investment,[15] both normalized by national GDP, from 2004 to 2023. The figure reveals a clear pattern at the national level: when firm revenue declines, infrastructure investment typically increases, effectively counterbalancing negative economic shocks.

Our analysis focuses on cross-regional variation. To calculate the regional GDP gaps, we obtain preliminary growth rates at the provincial and city levels from China's *Statistical Annals*, published by the National Bureau of Statistics in mid-year, before the final audit of GDP growth rates is completed and before any subsequent revisions. These figures are most relevant for local officials' performance evaluations and for setting growth targets for the subsequent year.

To assess whether a region's infrastructure investment in a given year decreases with its GDP gap for the same year, we use provincial infrastructure investment data from the *Statistical Yearbook of Chinese Investment in Fixed Assets*, which reports fixed asset investment by province and industry. Infrastructure-related investment is measured by aggregating data from four sectors: *Production and Supply of Electricity, Gas, and Water; Transport, Storage, and Postal Services; Information, Computer Services, and Software;* and *Water Conservancy, Environment, and Public Facility Management*. Since the Yearbook ceased publication in 2018, we estimate 2018–2022 infrastructure investment using provincial infrastructure investment growth rates from the NBS.[16]

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[14] Our reported share of infrastructure investment is higher than that in Song and Xiong (2024), who exclude infrastructure sectors like telecommunications that are not government-funded. In contrast, we use infrastructure data directly from the NBS, which includes private-sector investments. This inclusion does not affect our analysis of the elasticity of infrastructure investment to the GDP gap, as private infrastructure investment is unlikely to respond to the gap in meeting local government growth targets.

[15] The firm revenue data, sourced from the National Bureau of Statistics (NBS), covers the revenue of industrial enterprises above a designated size.

[16] While the National Bureau of Statistics provides provincial-level infrastructure investment data, equivalent city-level data is unavailable. City-level estimates, based on aggregated expenditures, are often incomplete and less reliable due to data limitations. Therefore, our analysis focuses on the provincial level, where data is more comprehensive and consistent.

To quantify infrastructure investment, we construct the *normalized infrastructure change* as follows: the year-over-year change in a province's infrastructure investment (from year *t-1* to year *t*) is divided by the province's GDP in year *t-1* and multiplied by 100 to express the change as a percentage of GDP.

We regress each province's normalized infrastructure change in year t on the GDP gap for the same year, controlling for key economic factors. To account for variations in the GDP gap driven by underlying economic fundamentals, we include GDP growth rate in year t as a primary control. Additional controls include log GDP per capita, sectoral composition (secondary and tertiary sectors), provincial CPI inflation, and lagged infrastructure investment from the previous year. The regression also incorporates province and year fixed effects to control for unobserved heterogeneity across provinces and over time. After these controls, the GDP gap coefficient isolates the effect driven specifically by variations in a province's growth target.

Table 4 presents the regression results based on data from all provinces between 2004 and 2022. Across all specifications, the GDP growth rate coefficient is positive and significant, confirming a strong correlation between infrastructure investment and GDP growth. This result aligns with expectations, as stronger GDP growth increases demand for infrastructure, while infrastructure investment, in turn, contributes to economic expansion.

Even after controlling for GDP growth and other fundamental factors, all regression specifications consistently reveal a significant negative correlation between normalized infrastructure change and the GDP gap. This indicates that when a province's GDP growth rate falls short of its target, it compensates by increasing infrastructure investment.

Notably, adding year fixed effects in Column (2) compared to Column (1) leads to a substantial drop in the GDP gap coefficient, indicating that year fixed effects capture significant time-based variations. A key source of this variation is price adjustments specific to infrastructure investment, which may differ from the general CPI index.

In Columns (3) and (4), we introduce dummy variables for GDP gap values of 0, -0.1%, and 0.1%. The dummy for a GDP gap of 0 (i.e., when the target is exactly met) is positive and significant, while the other two are insignificant. This suggests that provinces significantly increase infrastructure investment to ensure they meet growth targets. The additional investment is substantial—approximately 1.25% of GDP—indicating that when provinces meet their target, they invest 1.25% of GDP more than when they narrowly miss or exceed it.

This finding aligns with Lyu and others (2018) and Gong, Shen and Chen (2025), which identify discontinuities around zero in the distribution of actual vs. target GDP growth rates in China's regional GDP data. Our analysis shows that local governments meet their growth targets not only through GDP overreporting but also by actively increasing infrastructure investment.

Across Columns (2)–(4), the GDP gap coefficient remains stable at approximately -0.4, indicating that a 1% shortfall in meeting the GDP target is associated with a 0.4% increase in infrastructure investment as a share of provincial GDP. Notably, this negative relationship between the GDP gap and infrastructure investment is a broader structural pattern, extending beyond the localized incentives to over-report GDP growth near the threshold for meeting targets.

While this effect is significant, our approach likely underestimates the full impact of growth target pressure. By measuring differential investment across regions with varying GDP gaps, it captures relative adjustments but not the baseline effect. During an economic slowdown, all regions—even those exceeding their targets—may increase infrastructure investment, further masking the full extent of target-driven spending.

For robustness, we test an alternative specification by replacing the current year's growth rate in the GDP gap with the previous year's, alleviating potential endogeneity concerns. Here, the past growth rate serves as a control for the natural growth trajectory. Column (5) reports the results, showing a highly significant coefficient of -0.69, indicating an even stronger impact of growth targets on infrastructure investment.[17]

Columns (6) and (7) present results for two sub-sample periods: 2004–2008 and 2009–2022. The findings remain consistent with the full sample, as the GDP gap coefficient remains negative and similar in magnitude to Column (2), though its statistical significance declines in the shorter sub-samples. These results indicate that provincial governments consistently used infrastructure investment as an intervention tool both before and after the 2008 global financial crisis.

Overall, Table 4 supports our hypothesis: provinces falling short of growth targets significantly increase infrastructure investment to close the gap. This suggests that during growth slowdowns, as more regions miss their targets, infrastructure investment surges to offset the shortfall.

Such macroeconomic management measures have contributed to China's sustained infrastructure investment over the past four decades, resulting in some of the world's most advanced networks. The country now has the longest high-speed rail network, spanning over 40,000 km, connecting nearly all major cities at speeds exceeding 350 km/h. Its highway network, the world's second-largest, extends over 160,000 km, ensuring efficient logistics. Major cities like Beijing, Shanghai, and Shenzhen operate extensive metro systems, collectively transporting millions of passengers daily.

[17] We have also applied the Local Projection (LP) method of Jordà (2005) to estimate the impulse response of provincial infrastructure investment to past GDP growth gaps. Unreported results show significant responses over the subsequent three years, with magnitudes comparable to the contemporaneous regression reported in Table 4.

Despite these achievements, the economic efficiency of China's infrastructure remains debated. Ru (2018) finds that government-subsidized credit for infrastructure boosts private sector performance. Banerjee, Qian, and Duflo (2020) report moderate but positive effects of transportation infrastructure on GDP per capita. Qian, Ru, and Xiong (2024) examine its impact on firm productivity from 2000 to 2009, focusing on the 2005 *36 Clauses* policy, which aimed to improve conditions for private enterprises. They find strong productivity gains induced by infrastructure investment before the policy, but post-policy effects were significant only in provinces that explicitly adopted policy reforms to support private firms. The overall net effect post-*36 Clauses* was negligible, likely due to diminishing returns. Given China's continued infrastructure spending, returns have likely declined further in recent years.

The diminishing returns of infrastructure investment may help explain the disconnect between GDP growth and other economic indicators—such as firm revenue growth, household demand, and TFP growth—observed in 2011-2019. While infrastructure investment has played a key role in achieving growth targets, its impact on broader economic expansion appears increasingly limited, especially in recent years, following decades of extensive infrastructure development.

IV. Land Sales

Land sales are a key revenue source for local governments. Under China's constitution, land is state-owned, with urban land administered by local governments, making them the monopolistic sellers of land in Chinese cities. As reviewed by Gyourko and others (2022), revenue from land sales peaked at over 8 trillion yuan in 2020, accounting for approximately 80% of local governments' total budgetary income that year.[18]

In the context of our analysis, fiscal pressure on local governments to finance countercyclical interventions and meet growth targets likely incentivizes them to increase land sales, using this revenue to fund infrastructure investments and other economic measures. We analyze this hypothesis in this section, focusing on the city level.

We obtain data on land transaction revenue from the *China Land & Resources Almanac*, which includes transactions of all types of land—industrial, commercial, residential, and others.

[18] Xiong (2023) argues that in the early stages of China's urban development, land sales effectively incentivized local governments to invest in infrastructure and stimulate local economies. The pricing of land in the real estate market reflects long-term expectations of a city's economic prospects, which are strongly influenced by local government planning and initiatives. As a result, China's real estate market is shaped not only by market forces but also by the frictions and policy shocks inherent in the state-controlled system, which directly impact local governments' motives and strategies for selling land.

The dataset also covers all revenue-generating transaction methods, including bidding, auctions, listings, and negotiated transfers. When the Statistical Yearbook lacks data for a specific city in a given year, we supplement it by aggregating micro-level data from the *Landchina* website to estimate land transaction revenue for that period.

We construct the city-level *normalized land sale change* by calculating the year-over-year change in total land sale proceeds for each city, dividing it by the city's GDP in the previous year, and multiplying by 100 to express it as a percentage of GDP.

We then regress each city's normalized land sale change in year t on the GDP gap for the same year, using the same control variables as in the previous analysis. The city's GDP growth rate in year t serves as a key control to account for variations in the GDP gap driven by underlying economic fundamentals. The regression also includes city and year fixed effects to account for unobserved heterogeneity across cities and over time.

Table 5 presents the regression results. Across all specifications, normalized land sale change is positively and significantly correlated with GDP growth, consistent with the intuition that a stronger economy drives higher real estate demand. More importantly, even after controlling for GDP growth, normalized land sale change remains negatively and significantly associated with the GDP gap. This finding indicates that when a city faces a greater shortfall in meeting its growth target, it responds by increasing land sales, generating additional revenue to fund infrastructure investment and other economic interventions.

The regression coefficient, highly consistent across Columns (1)-(3), indicates that a 1% shortfall in meeting the growth target is associated with an approximately 0.068% increase in land sales relative to the city's GDP. Given that a city's regular budget typically accounts for less than 20% of GDP and land sales for even less than 10%, this represents a substantial effect, underscoring the real estate sector's critical importance to local government finances. However, it remains insufficient to fully finance the observed 0.4% of GDP increase in infrastructure investment reported in Table 4, underscoring the necessity of additional funding mechanisms.

Furthermore, the results show that when a city exactly meets its growth target, it tends to sell significantly more land—approximately 0.40% of GDP—compared to scenarios where it narrowly misses or exceeds its target. This finding further highlights the role of land sales as a key tool for financing countercyclical interventions aimed at achieving growth targets.

Column (4) presents a robustness check, replacing the current year's growth rate in the GDP gap with the previous year's. The coefficient remains similar to the main result in Column (1), though the t-statistic decreases slightly to 1.89, supporting the robustness of the main finding.

Overall, our findings indicate that cities increase land sales in response to shortfalls in meeting their growth targets. This increase underscores that local governments' efforts to meet

growth targets are not merely statistical adjustments but involve concrete actions with substantial economic consequences.

Since land sales critically depend on local real estate demand, our findings highlight the real estate sector's key role in the fiscal health of local governments. In this regard, our analysis complements Chang, Wang, and Xiong (2024), who show that local governments heavily reliant on land sales and land-collateralized debt intervened more aggressively in the real estate market during the COVID-19 pandemic (2020–2022) to stabilize prices.

Extensive research has examined China's real estate boom and its subsequent downturn post-2020. Fang and others (2016) and Glaeser and others (2017) attribute the housing price surge to optimistic homebuyer expectations amid sustained economic growth. Rogoff and Yang (2021, 2024a) highlight excessive housing construction during the recent real estate boom, particularly in third-tier cities, where negative net migration to first- and second-tier cities exacerbates concerns over excess housing supply. In relation to our analysis, the limited alternative fiscal revenue sources in third-tier cities made them more reliant on land sales to finance local interventions, ultimately fueling over-construction in these areas.

While land sales contribute substantially to local government spending, they are constrained by local real estate demand, which may not be sufficiently elastic to support mid-year countercyclical interventions—a limitation confirmed by our analysis. As a result, when land sales alone prove insufficient, local governments increasingly turn to debt financing, which we examine in the next section.

V. Local Government Debt

China's leverage surged after 2008. Figure 5 presents macro leverage trends (2000–2023) across four sectors: central government, local government, non-financial firms, and households. Before 2008, the macro leverage ratio (total debt-to-GDP) remained stable at around 140%. It then spiked to 180% during the 2008–2010 stimulus, continued rising until 2016, stabilized at 240% (2017–2019), and climbed further to 280% in 2023 amid COVID-19.

Notably, Local Government Financing Vehicles (LGFVs) are classified as non-financial firms, meaning official local government debt in Figure 5 excludes LGFV liabilities. Under this classification, central and local government debt remained relatively stable, with official local government debt rising moderately from 11% of GDP (2008) to 32% (2023). In contrast, non-financial firms' debt surged from 95% to 168%, driving most of the overall debt increase. Household debt also grew sharply, from 18% to 64% of GDP over the same period.

To analyze LGFV debt, we use data from *Qiye Yujingtong*, a vendor that systematically classifies LGFVs based on firm registration records and business activities. This dataset is widely used in recent studies on China's local government debt, though it may still be incomplete due to potential misclassification of some LGFVs. The dataset includes LGFV-issued bonds, bank loans, and non-standard financing instruments, covering the period 2015–2022. [19]

Figure 6, based on this dataset, offers a more comprehensive view by aggregating LGFV liabilities with official local government debt for 2015–2022. The figure shows that aggregate local government debt surged from approximately 42% of GDP in 2015 to nearly 69% in 2022—a significantly larger increase than the rise in official local government debt reported in Figure 5.

V.A. Local Debt Response to GDP Gaps

We examine how local government debt responds to growth target shortfalls, focusing on the city-level relationship between debt and the GDP gap. For each city-year, we measure the outstanding balance of official local government bonds, LGFV debt, and their combined total, all normalized by GDP and expressed as percentages.

We then regress each normalized debt balance on the GDP gap, controlling for the same variables as in previous analyses. GDP growth rate remains the key control to adjust for underlying economic fundamentals. The regression also includes city and year fixed effects to account for unobserved heterogeneity across cities and over time.

Table 6 presents the regression results, showing that local government debt is uncorrelated with GDP growth, suggesting that borrowing is driven specifically by pressure from the GDP gap rather than cyclical growth fluctuations.

Specifically, Column (1) shows that changes in official local government bonds are negatively correlated with the GDP gap, though the relationship is not statistically significant. In Column (2), changes in LGFV debt exhibit a significant negative correlation with the GDP gap, with a 1% shortfall in GDP growth linked to a 0.63% of GDP increase in LGFV debt.

Column (3) shows an even stronger relationship: a 1% GDP gap corresponds to a 0.76% of GDP increase in total local government debt (official bonds + LGFV debt). This effect is significantly larger than the estimated increase in land sales (Table 5), highlighting that debt financing—rather than land sales—was the primary tool for local governments' economic interventions during 2015–2022.

[19] Note that LGFV debt classified by this data vendor may not fully align with government audits of local government debt, as acknowledging a firm's borrowing as LGFV debt would imply a central government repayment guarantee, leading to reluctance in officially recognizing certain liabilities.

Column (4) presents a robustness check by replacing the current year's growth rate in the GDP gap with the previous year's. The coefficient remains consistent with Column (3), though the t-statistic decreases slightly to 1.86, reinforcing the robustness of the main finding.

This enormous increase in local debt strongly reinforces our earlier findings that pressure from growth targets not only leads to statistical management but also drives substantial real actions taken by local governments. The 0.76% GDP increase in local government debt per 1% GDP gap is substantial, exceeding the 0.4% GDP increase in infrastructure investment reported in Table 4. This larger magnitude may reflect several factors. First, local governments likely employed broader interventions beyond infrastructure, including industrial policies, grants, and subsidies to attract firms and investment. Second, some economic interventions may have included "perk" projects, facilitating rent-seeking and corrupt practices, as evidenced by prosecutions of local officials for aggressively using debt to fund local projects tied to corruption.

As discussed, our analysis compares leverage increases across cities with varying GDP gaps, which inherently reflect local governments' economic interventions. The estimated 0.76% rise in local government debt per 1% GDP gap does not account for baseline debt increases in cities that exceed their growth targets. However, it provides a rough estimate of debt growth driven by aggressive targets.

Previous research links the post-2008 stimulus to the surge in local debt, as matching funds were required for central infrastructure funding (Bai, Hsieh, and Song, 2016; Chen, He, and Liu, 2020). Further evidence (Cong and others 2019; Huang, Pagano, and Panizza 2020) suggests that debt-financed fiscal spending during this period crowded out private investment. However, the continued rise in local government debt after the stimulus ended in 2010 remains less understood. Notably, from 2011 to 2019—a period of seeming stability between the stimulus and COVID-19—the sustained growth in local government debt is particularly puzzling.

V.B. The Stable Period of 2011-2019

China's growth trajectory from 2011 to 2019 was remarkably stable, as shown in Figure 1. After the 2008 global financial crisis and the stimulus of 2008–2010, growth slowed from double digits to a more sustainable 6 percent before the COVID-19 outbreak, yet remained steady. Unlike the cyclical swings typical of most economies, China's growth displayed unusual consistency.

However, this apparent stability masked significant challenges. The massive 4 trillion yuan post-crisis stimulus fueled a rapid expansion in infrastructure and real estate, shielding the

economy from global turmoil. But as the stimulus ended in 2010, demand for key industries like steel, aluminum, coal, cement, and glass collapsed, leaving a legacy of overcapacity. IMF estimates show average capacity utilization plunged from 80 percent in 2007 to 60 percent by 2011.[20] Regional governments, fearing economic fallout, resisted capacity cuts, prolonging the problem. The Producer Price Index (PPI) remained negative from 2011 to 2016, signaling persistent deflationary pressure.

To counter these headwinds, the government deployed a mix of monetary and fiscal policies. The central bank cut interest rates six times and lowered the reserve requirement ratio seven times, ensuring liquidity and lower financing costs. Meanwhile, the central government launched large-scale infrastructure projects—railways, highways, urban transit, and power grids—while encouraging local governments to do the same. A key initiative, the shantytown reform, upgraded urban housing and helped absorb excess housing inventory in smaller cities.

In 2015, China intensified supply-side structural reforms to address overcapacity. The government mandated capacity cuts in industries like steel and coal, shutting down inefficient and non-compliant factories while setting explicit reduction targets. Fiscal support for displaced workers helped mitigate social unrest, reinforcing the transition toward a more sustainable economic structure.

These interventions helped stabilize China's GDP growth, but at a high cost. While initiated by the central government, they were ultimately executed by local governments as part of their own efforts to meet growth targets. Our analysis estimates the burden on local governments during this period. As shown in Figure 2, the average city-level GDP target (weighted by city GDP) consistently exceeded national GDP growth from 2011 to 2019, leading to persistently negative GDP gaps. These gaps narrowed from over -4% at the start of the decade to around -1% in its latter half, cumulatively reaching 18.4%. Applying the estimated slope, this translates into a local government debt increase of $18.4\% \times 0.76 = 14.0\%$ of GDP.

This is a substantial figure, closely aligning with the increase in local debt shown in Figure 6. Moreover, since this simple estimate does not account for baseline effects, the actual debt increase driven by pressure to meet GDP targets is likely even higher.

Since most of the local debt increase occurred through off-balance-sheet LGFV debt, this suggests that local government interventions exceeded the scale set by the central government's macroeconomic management, which provides monetary and fiscal support to local governments. It is unlikely that the central government was unaware of local governments' heavy reliance on LGFV debt, even if the precise amount remained uncertain. Its prolonged tolerance of such debt

[20] See the "IMF China Article IV assessment", IMF 2013.

expansion likely reflects a strategic choice in enforcing financial discipline on local governments, particularly amid challenges in meeting national growth targets, as argued by Chang, Liu and Yang (2024).

Song and Xiong (2024) develop a macroeconomic model linking local government borrowing to local leaders' career incentives, showing how debt financing fuels rapid regional growth at the cost of long-term sustainability. Our findings align with this view but go further by identifying the GDP gap as a direct measure of pressure on local leaders. We connect this pressure to China's broader economic planning framework, offering deeper insights into the dynamics behind rising local government debt.

As widely recognized by academics and policymakers, rapid credit expansion can pose a significant threat to financial stability. Reinhart and Rogoff (2009) document this recurring pattern over 800 years and across 66 countries, highlighting how excessive debt accumulation often precedes financial crises. Similarly, the sharp rise in local government debt poses risks to China's financial stability.

Beyond fiscal sustainability concerns, high local government leverage can crowd out private investment—arguably an even greater cost to the economy. The crowding-out effects of local government debt on private sector financing, as documented by Cong and others (2019) and Huang, Pagano, and Panizza (2020) in China's post-2008 stimulus, may also help explain the disconnect between GDP growth and other key economic indicators—such as firm revenue, household demand, and TFP growth—during 2011–2019, as discussed earlier. This dynamic may have also contributed to China's productivity slowdown after 2008, as documented by Brandt and others (2024).

VI. Dynamic Adjustments of Growth Targets

The significant costs incurred by local governments to meet their growth targets underscore the importance of setting targets at appropriate levels. In principle, growth targets should align with natural growth rates, yet determining these rates is fraught with uncertainty and debate. For instance, Justin Lin has argued that 6% growth is sustainable for China until 2035, whereas Lawrence Summers, as early as 2014, predicted that China would converge to the global mean of 2%.[21] This stark divergence highlights a fundamental challenge for policymakers: how to set credible targets amid deep economic uncertainty.

[21] See Cheng, Wang, and Xiao (2021) for an analysis of China's growth potential using a global value chain position index, which measures the contribution of high-skilled labor to total domestic value added. Their findings indicate that China's growth potential remained at 7–8% during 2010–2015, aligning with realized growth rates.

Unlike traditional central planning, economic planning in China's hybrid economy operates with greater flexibility, granting regional leaders both incentives and discretion to manage local economies. In principle, growth target setting functions as a two-way feedback loop between the central and local governments, spanning multiple administrative levels. The national target serves as a benchmark for provincial and city-level targets, while realized growth rates from the past year and local government feedback influence targets at higher levels, enabling policymakers to adjust strategies based on ground-level economic conditions.

However, bureaucratic frictions complicate this process. In this section, we examine a central question: how do the central and local governments set their growth targets? We first document a ratchet effect in local target setting, then explore whether the central growth target is set too high, offering a broader discussion on its implications.

VI.A. The Ratchet Effect in Setting Local Targets

Local governments have strong incentives to set overly ambitious targets, contributing to the top-down amplification documented earlier. Setting ambitious targets serves as a signal of determination and commitment to superiors, while also mobilizing and coordinating subordinates to achieve the goal—despite the substantial costs of pursuing such overly ambitious objectives.

These incentives create a ratchet effect in how local officials adjust growth targets in response to changing economic conditions. During economic booms, local officials are incentivized to raise targets quickly, often exceeding their own economic assessments to stay competitive in the GDP tournament. In contrast, during economic slowdowns, they may hesitate to lower targets, fearing that doing so could signal weakness to superiors, undermine their leadership, and demotivate subordinates. This ratchet effect weakens the alignment between growth targets and economic fundamentals, leading to overly ambitious targets and exacerbating overinvestment, particularly during downturns.

The provincial and city-level growth targets, as shown in Figure 2, illustrate this ratchet effect. During the rapid acceleration of China's growth rate before 2008, growth targets at both the provincial and city levels steadily increased. This trend became even more pronounced during the brief GDP surge from 2008 to 2010, driven by China's post-2008 economic stimulus, when provincial and city-level targets significantly overshot actual growth rates. However, despite the subsequent slowdown in GDP growth, these targets were only gradually adjusted downward and consistently remained above the realized growth rate in the years that followed.

Table 7 systematically analyzes how regional growth targets respond to past GDP gaps. In the baseline specification, we regress the dummy variable $D[Target_{i,t+1} > Target_{i,t}]$, which

indicates whether the growth target of region i in year t+1 exceeds its target from the previous year,[22] on three key variables: $Gap_{i,t}$, the region's GDP gap in year t; a dummy variable $D[Gap_{i,t} \geq 0]$, indicating whether the region met its growth target in year t; and the interaction term $D\left[Gap_{i,t} \geq 0\right] \cdot Gap_{i,t}$, which measures the extent to which the target was exceeded.

The coefficient on $Gap_{i,t}$ captures the baseline effect, showing how the likelihood of raising the growth target responds to a negative GDP gap. The coefficient on $D[Gap_{i,t} \geq 0]$ reflects the discrete increase in this likelihood when the previous target is met. Finally, the coefficient of the interaction term $D\left[Gap_{i,t} \geq 0\right] \cdot Gap_{i,t}$ measures how the likelihood of raising the growth target increases as the extent of exceeding the previous target grows.

To control for economic fundamentals, we include variables such as local GDP growth rate, GDP per capita, sectoral composition (shares of the secondary and tertiary sectors), and CPI inflation. Additionally, we incorporate year and region fixed effects to account for unobserved heterogeneities. Our analysis employs both OLS and Logit regressions at the provincial and city levels.

At the provincial level, reported in Columns (1) and (2), a clear asymmetry emerges. The coefficient on the GDP gap is positive but not statistically significant, suggesting a minimal baseline effect of negative GDP gaps on target-setting. However, in the Logit regression, the coefficients for $D[Gap_{i,t} \geq 0]$ and $D\left[Gap_{i,t} \geq 0\right] \cdot Gap_{i,t}$ are positive and highly significant, indicating a strong response of growth targets to positive GDP gaps. This asymmetry in responses to positive and negative GDP gaps confirms the ratchet effect, where targets are more likely to rise when exceeded but not equally adjusted downward when missed.

At the city level, reported in Columns (3) and (5), the results remain consistent, again showing substantially stronger responses to positive GDP gaps. Unlike at the provincial level, the coefficient on the GDP gap is positive and statistically significant in both OLS and Logit regressions, indicating that even negative GDP gaps can influence target-setting at the city level. More importantly, the coefficients for $D[Gap_{i,t} \geq 0]$ and $D\left[Gap_{i,t} \geq 0\right] \cdot Gap_{i,t}$ remain positive and highly significant, reinforcing the stronger responsiveness of growth targets to positive GDP gaps. Notably, the coefficient for the interaction term exceeds the baseline coefficient, underscoring that exceeding the previous target has a stronger impact on raising future targets.

To examine how provincial targets influence city-level adjustments, we expand the regression to include $D[Target_{p,t+1} > Target_{p,t}]$, a dummy variable indicating whether the provincial target in year t+1 increased relative to year t, and its interaction with the city's own

[22] We use this dummy variable instead of the change in the growth target to account for potential nonlinearity in how growth targets are adjusted in response to previous growth outcomes.

GDP gap in year t. The results, reported in Columns (4) and (6), show that the coefficient of $D[Target_{p,t+1} > Target_{p,t}]$ is positive and highly significant across both OLS and Logit regressions, confirming that provincial target increases lead to higher city-level targets.

However, the interaction term is negative and highly significant, suggesting that when the provincial target is raised, the city-level target becomes less responsive to its own negative GDP gap. This implies that higher-level target increases exacerbate the ratchet effect at the lower level, reinforcing top-down amplification in growth target setting.[23]

Overall, Table 7 provides clear evidence of the asymmetric adjustment of growth targets in response to previous growth outcomes. This ratchet effect causes growth targets to be adjusted too slowly during economic slowdowns, leading local governments to set overly optimistic targets that do not fully reflect economic conditions.

VI.B. Are Central Targets Set Too High?

Central growth targets play a crucial role in shaping China's economic trajectory. They anchor regional targets and amplify the ratchet effect in local target adjustments. To keep central targets aligned with evolving economic conditions, it is essential to filter out the top-down amplification in local targets while effectively incorporating feedback from local governments.

There is little doubt that the central government recognizes local governments' incentives to inflate their targets—it may even leverage this tendency to help ensure national targets are met. However, whether it has fully accounted for the distortions introduced by this amplification remains uncertain. The fact that national targets have been consistently achieved makes it harder to argue that they have been set too high. Ultimately, though, the key question is whether the economic costs of achieving these targets outweigh the benefits.

Beyond the usual justifications for ambitious growth targets, one argument for maintaining high targets is the need to sustain employment. Economic stability remains a priority, and high growth is often seen as a safeguard against rising unemployment. Another argument is that in recent years, local officials appear to have lost incentives to drive economic development—a phenomenon often described as "lying flat." [24] A high national growth target may serve as a disciplinary tool, keeping local governments under pressure to actively pursue economic expansion and preventing complacency in policymaking.

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[23] Due to the short sample period, our panel is not large enough to statistically examine how changes in national targets influence the adjustment of provincial targets. However, we expect that national target increases would similarly exacerbate the ratchet effect at the provincial level, reinforcing the tendency for growth targets to be adjusted upward more easily than downward.

[24] Consistent with this, Song and Xiong (2024) highlight a decline in career incentives for local officials after 2008.

While these motivations are valid, they must be weighed against significant costs. Beyond the high debt burden, rigid growth targets constrain local policy flexibility. Since the onset of market reforms, local governments have played a central role in China's economic development, as highlighted by Xu (2011), Qian (2017), Zhou (2018), and Song and Xiong (2024). A key driver of China's success has been local policy experimentation, which has allowed for adaptation to regional conditions. However, strict national targets limit the ability of local governments to respond dynamically to economic challenges. Recent research by Wang and Yang (2024) finds a decline in local policy experimentation, while Fang, Li, and Lu (2025) document how local industrial policies increasingly mirror central directives, reinforcing a broader trend of policy centralization at the expense of regional adaptability.

Another cost is the diminishing role of market forces in information discovery and resource allocation. When economic outcomes are primarily driven by state planning, firms and investors shift their focus away from economic fundamentals and instead react to government signals, as theorized by Brunnermeier, Sockin, and Xiong (2022) and Sockin and Xiong (2024). This weakens the ability of markets to efficiently allocate resources, making policymaking less responsive to real economic conditions. The result is often an inefficient resource allocation, with capital flows dictated more by political priorities than by economic fundamentals.

Prolonged intervention through growth targets may have also shaped China's economic structure. Rogoff and Yang (2024b) highlight that real estate and infrastructure construction have accounted for over 30% of China's GDP in recent years, likely facing diminishing returns. Huang et al. (2024), through an analysis of China's production network, show that construction and real estate have become the most central sectors in the economy, particularly after 2008. Unlike other industries that have become less synchronized with national economic cycles, construction and real estate remain highly correlated with state-driven macroeconomic fluctuations. This underscores the deep entanglement between macroeconomic management and China's economic structure. Construction remains heavily dependent on government infrastructure projects, while real estate plays a critical role in financing local governments through land sales and collateralized debt. As a result, both sectors have become primary transmission channels for macroeconomic regulation, reinforcing their dominance in the Chinese economy.

While growth targets play a crucial role in economic planning, they also create systemic distortions, including increased reliance on debt, reduced policy flexibility, weakened market efficiency, and distorted economic structure. Whether China can balance economic stability with adaptability will depend on how it refines its growth targeting framework to address mounting structural challenges.

China's current challenges—persistent overcapacity and weak consumer demand—closely resemble those of 2014–2015. Similar macroeconomic management measures may once again be deployed, but another debt-fueled intervention risks exacerbating existing vulnerabilities. With debt levels already high, continued reliance on this approach could further strain the economy, weaken fiscal stability, and crowd out private investment, ultimately making long-term growth more difficult to sustain.

VII. Conclusion

This paper examines how China manages its hybrid economy by setting growth targets and using macroeconomic management to ensure their fulfillment. Analyzing the cascading structure of local growth targets reveals a dual reality. On one hand, government interventions have consistently secured national growth targets over the past two decades. On the other, this success has come at significant costs—rising local government debt, increased centralization of policymaking, and an economic structure increasingly skewed toward construction and real estate.

More concerningly, the intense focus on headline GDP growth has led to a disconnect between GDP growth and broader economic prosperity, including firm performance, household well-being, and productivity gains. If achieving GDP targets does not translate into real economic benefits for firms and households, then the framework—despite its apparent success in meeting official figures—may be falling short of its broader economic objectives. This disconnect calls for a reassessment of China's economic management framework.

At a minimum, our analysis urges policymakers to take a more cautious approach when setting national growth targets, particularly during periods of economic slowdown. Given their role in anchoring local targets and reinforcing the ratchet effect, national targets should be designed with greater flexibility to reduce unintended distortions in local economic management.

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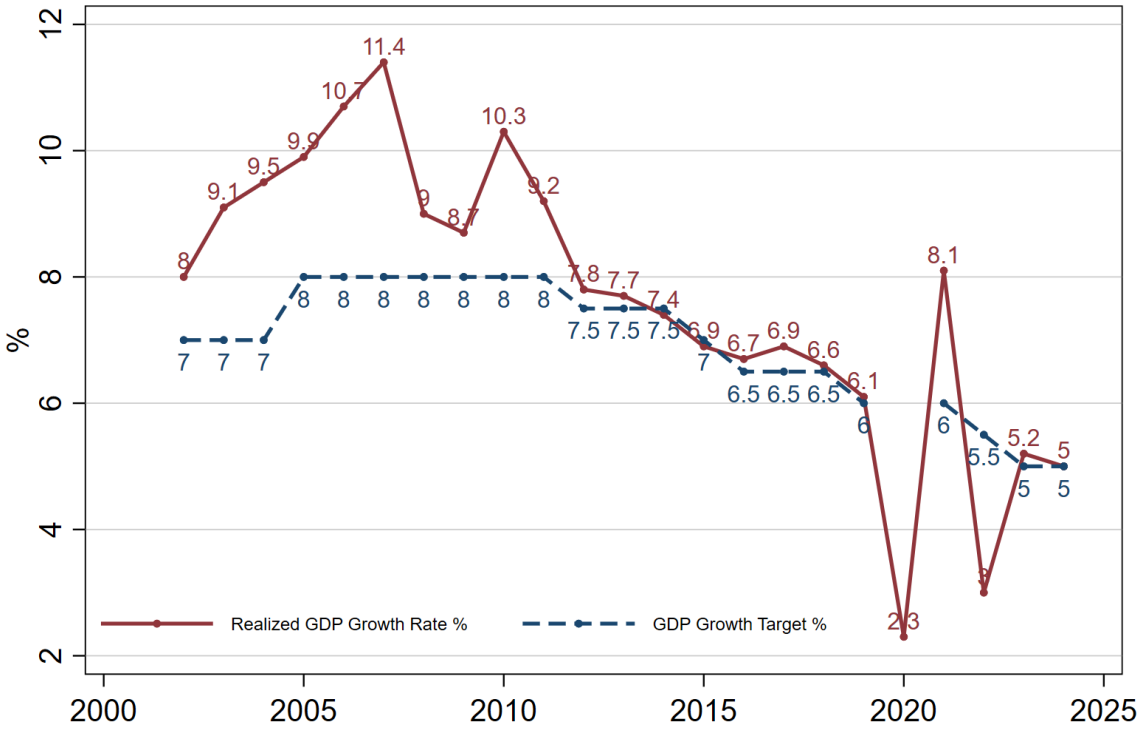
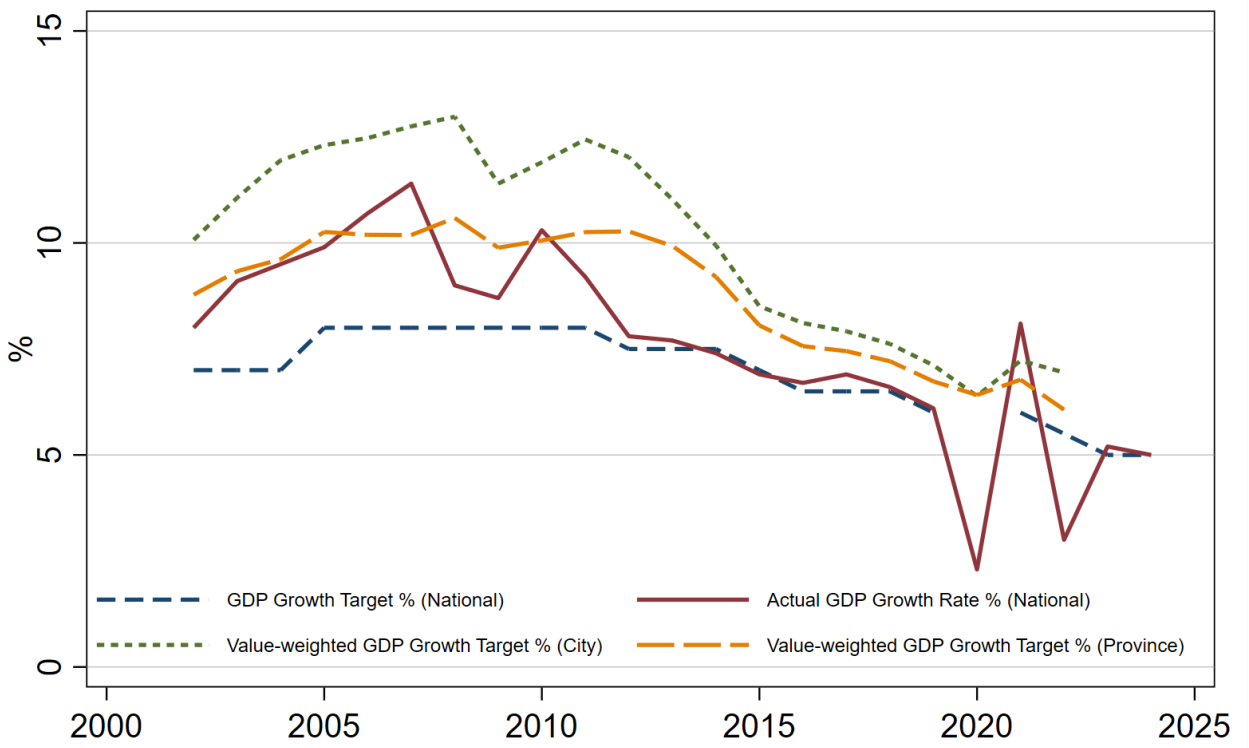
Figure 1: Annual Growth Targets and Realized Growth Rates



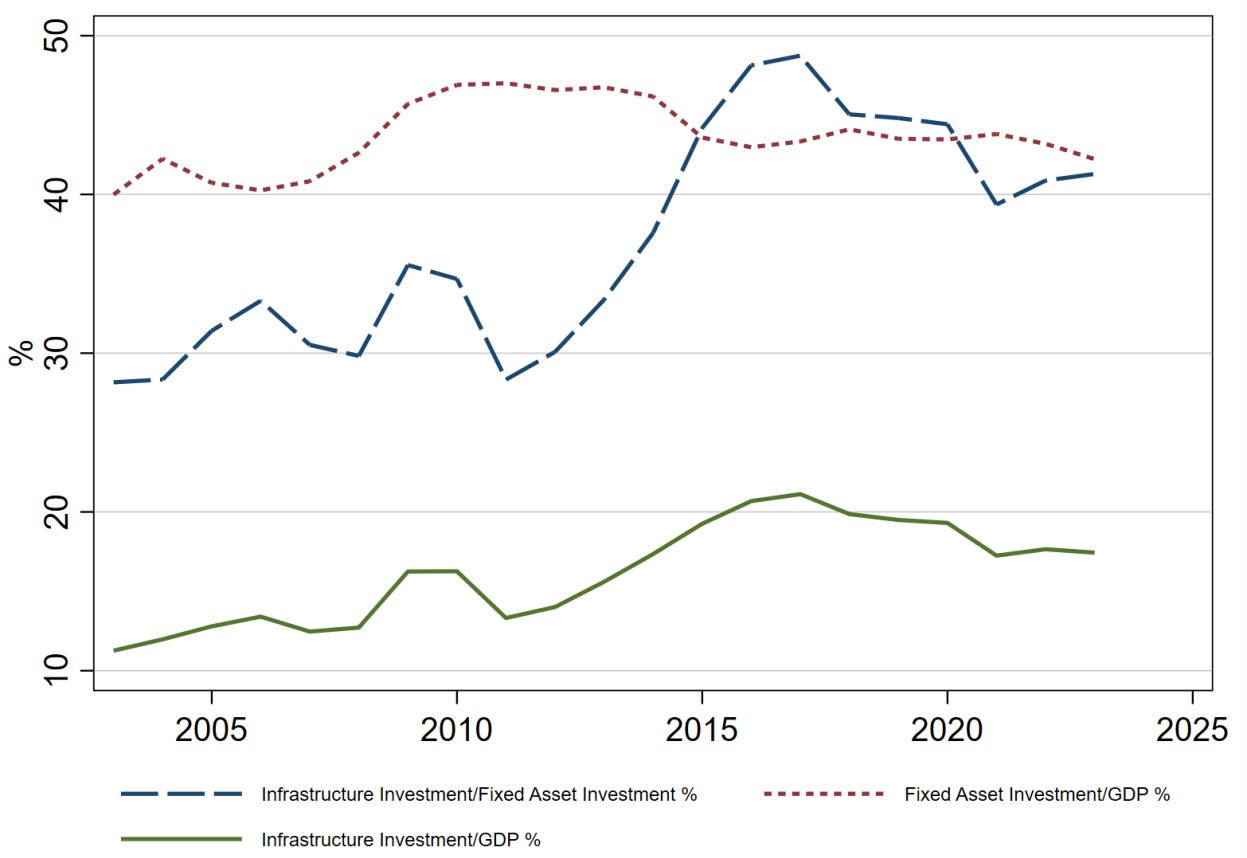
This figure presents China's annual GDP growth targets alongside its initially reported GDP growth rates from 2002 to 2024. The growth rates are based on the preliminary figures released in the State Council's Work Report at the beginning of the following year. These figures may be subject to revisions after audits conducted by the National Bureau of Statistics. Data Source: National Bureau of Statistics; Annual Reports on the Work of the Chinese Government.

Figure 2: China's GDP Growth Targets across National, Provincial, and City Levels



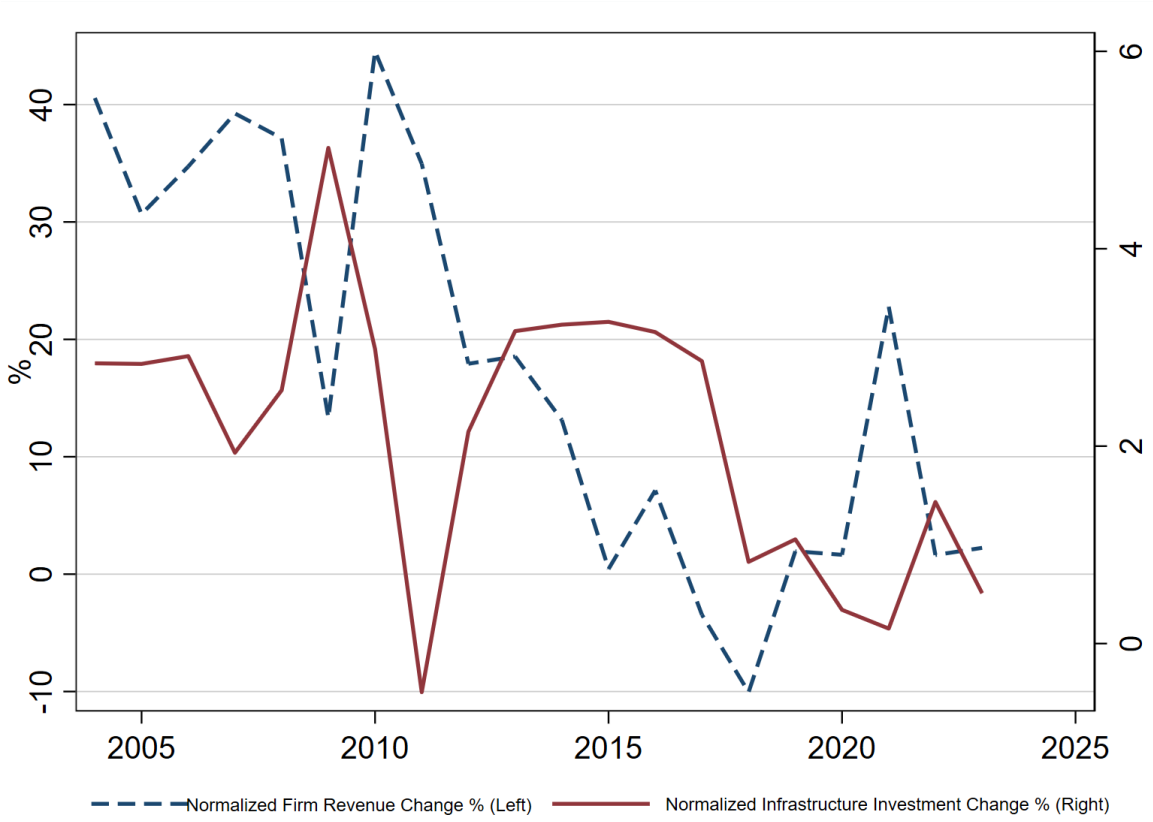
This figure displays China's annual GDP growth rate alongside GDP growth targets set at the national, provincial, and prefecture-city levels. The value-weighted GDP growth target is weighted by local GDP, with targets set by their respective levels of government. Actual GDP growth rates are based on the preliminary figures released in the State Council's Work Report at the beginning of the following year, which may be revised after audits by the National Bureau of Statistics. Data Source: China Statistical Yearbooks and the Annual Report on the Work of the Chinese Government.

Figure 3: China's Infrastructure Investment



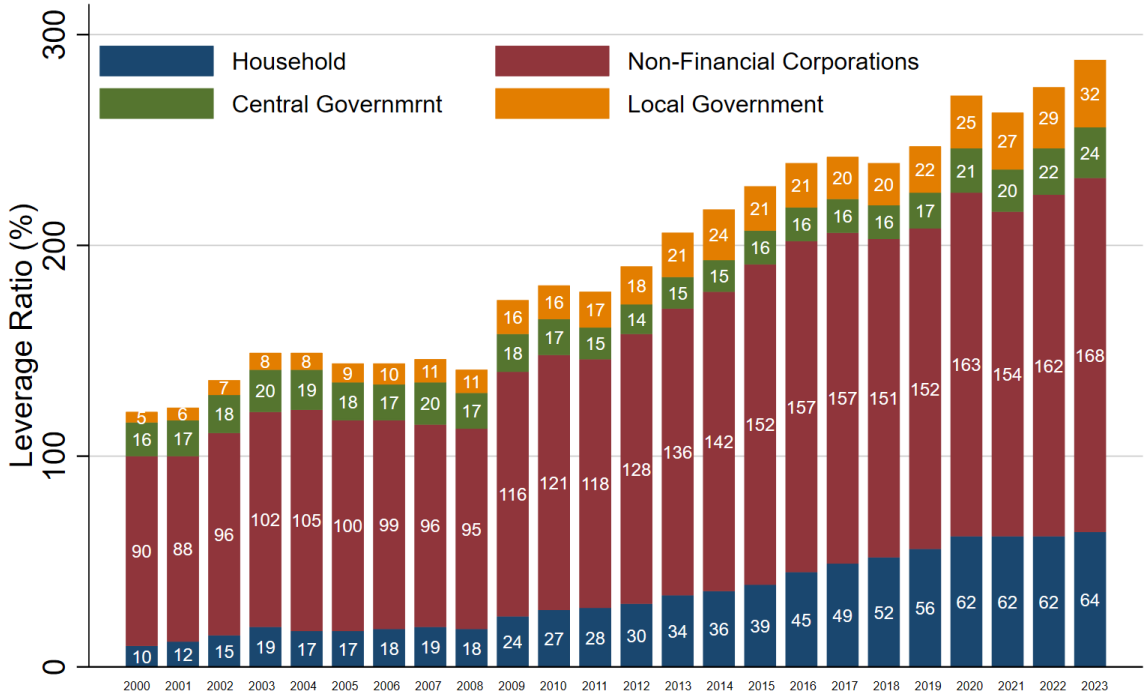
This figure illustrates the proportions of infrastructure investment and fixed asset investment relative to total GDP at the national level. It also presents the share of infrastructure investment as a percentage of total fixed asset investment. Data Source: National Bureau of Statistics.

Figure 4: Normalized Changes in Firm Revenue and Infrastructure Investment



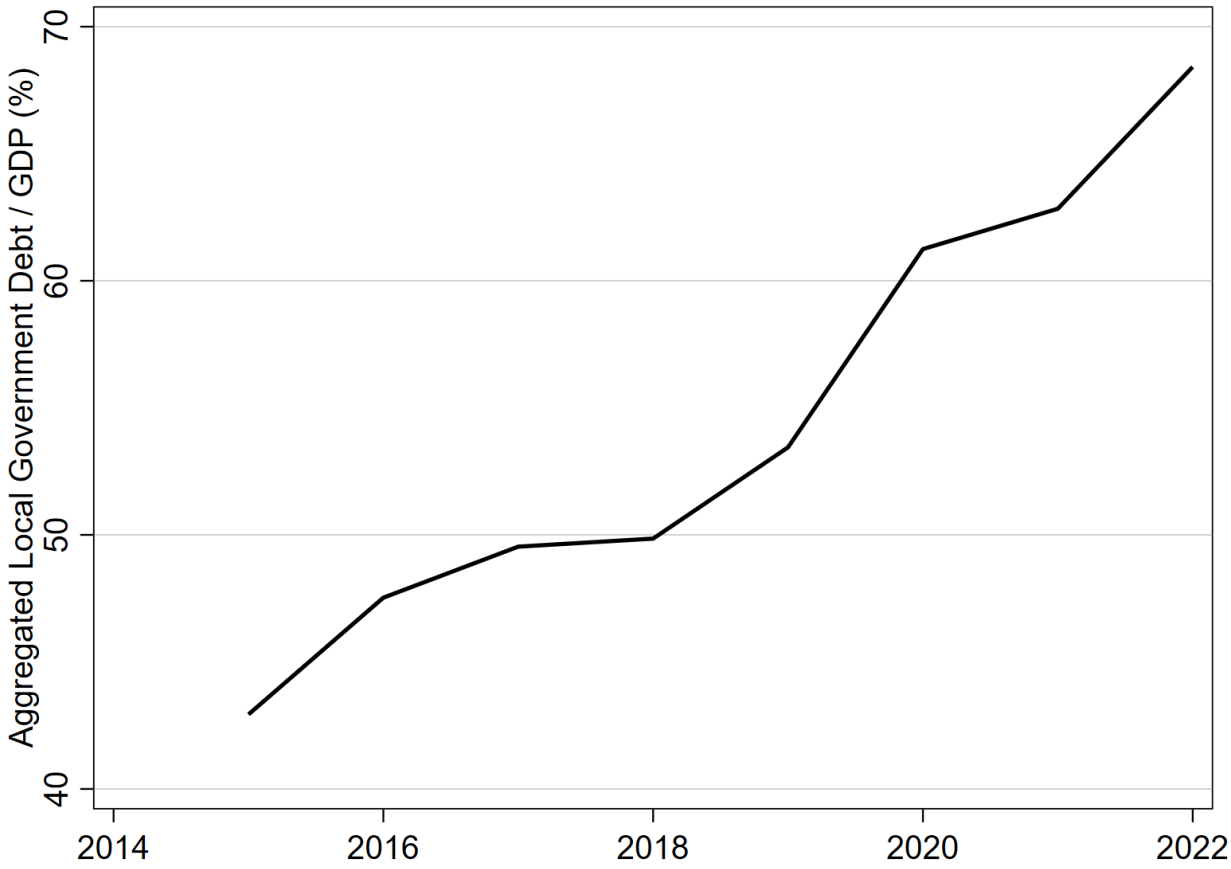
This figure illustrates normalized changes in firm revenue and infrastructure investment in China. Firm revenue is the revenue of industrial enterprises above a designated size, as defined by the National Bureau of Statistics. Normalized firm revenue (infrastructure investment) change is calculated as the year-over-year change in firm revenue (infrastructure investment) divided by the previous year's GDP. Data Source: CSMAR, Wind.

Figure 5: China’s Macro Leverage



This figure illustrates the trend of China's macro leverage across the household, non-financial corporate, local government, and central government sectors. The leverage ratio for each sector is calculated as total debt divided by national GDP. Notably, local government financing vehicle (LGFV) debt is excluded from the local government sector but included in the non-financial corporate sector. Data Source: National Institution for Finance & Development.

Figure 6: Local Government Debt



This figure illustrates local government debt (broad measure) as a percentage of national GDP. The broad measure includes both official local government debt and Local Government Financing Vehicle (LGFV) liabilities. Data Source: Qiyeyujingtong.

Table 1: Firm Revenue Growth and GDP Growth

	(1)	(2)
	Firm Revenue Growth Rate$_{i,j,t}$	
	2002-2008	2011-2019
GDP Growth Rate$_{i,t}$	1.771**	-0.065
	(2.36)	(-0.14)
Firm Revenue Growth Rate $_{i,t-1}$	-0.119***	-0.120***
	(-6.51)	(-10.91)
Ln(Asset) $_{i,j,t}$	0.317***	0.222***
	(8.70)	(14.08)
Leverage $_{i,j,t}$ (%)	-0.001	-0.001*
	(-0.57)	(-1.81)
SOE Share $_{i,j,t}$	0.073	0.424***
	(0.81)	(6.83)
Ln(GDP per Capita) $_{i,t}$	-0.039	-0.074
	(-0.36)	(-0.74)
Secondary Sector$_{i,t}$ (%)	0.005	-0.002
	(0.62)	(-0.16)
Third Sector$_{i,t}$ (%)	0.009	0.003
	(1.13)	(0.30)
Inflation$_{i,t}$ (%)	0.006	0.024**
	(0.53)	(2.19)
Constant	-6.978***	-3.998***
	(-5.78)	(-3.65)
Year FE	YES	YES
Firm FE	YES	YES
Observations	7,322	20,521
Adj. R-squared	0.068	0.079

This table presents regression results on the revenue growth rate of publicly listed firms, excluding those in the financial industry, in relation to the GDP growth rate of the province where their headquarters are located. Columns (1) and (2) cover the sub-sample periods 2002–2008 and 2011–2022, with the sample starting in 2002 to ensure adequate data coverage before 2008. The dependent variable $Firm\ Revenue\ Growth\ Rate_{i,j,t}$ denotes the annual revenue growth rate of the firm j in province i. The dependent variable, Firm Revenue Growth Rate, is the firm's annual revenue growth rate, while the main independent variable, $GDP\ Growth\ Rate_{i,t}$, is the GDP growth rate for province i in year t. Controls include the lagged revenue growth rate, provincial economic indicators (realized GDP growth rate, GDP per capita, secondary and tertiary industry shares, and CPI), and firm-level characteristics (total assets, leverage ratio, and state-owned share proportion). All specifications include year and firm fixed effects. Robust standard errors clustered at the firm level are used, with t-statistics reported in parentheses. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *.

Table 2: Consumption Growth and GDP Growth

	(1)	(2)
	Consumption Growth Rate$_{i,t}$	
	2002-2008	2011-2019
GDP Growth Rate$_{i,t}$	0.895**	0.060
	(2.28)	(0.18)
Consumption Growth Rate $_{i,t-1}$	-0.121**	-0.639***
	(-2.55)	(-3.13)
Ln(GDP per Capita) $_{i,t}$	-0.017	0.651***
	(-0.22)	(8.73)
Secondary Sector$_{i,t}$ (%)	0.006**	0.002
	(2.65)	(0.37)
Third Sector$_{i,t}$ (%)	0.006**	0.008
	(2.32)	(1.53)
Inflation$_{i,t}$ (%)	0.006	-0.020**
	(1.08)	(-2.08)
Constant	-0.305	-7.245***
	(-0.47)	(-9.40)
Year FE	YES	YES
Province FE	YES	YES
Observations	217	279
Adj. R-squared	0.619	0.602

This table presents regression results on the consumption growth rate in relation to the GDP growth rate at the provincial level. Columns (1) and (2) report results for the sub-sample periods 2002–2008 and 2011–2022, with the sample extended to 2002 to ensure sufficient pre-2008 data coverage. The dependent variable, $Consumption\ Growth\ Rate_{i,t}$, represents the growth rate of total retail sales of consumer goods in the province i. The main independent variable, GDP Growth Rate, is the provincial GDP growth rate. Regressions control for the lagged consumption growth rate and provincial economic indicators, including realized GDP growth rate, GDP per capita, secondary and tertiary industry shares, and CPI. All specifications include year and province fixed effects. Robust standard errors clustered at the provincial level are used, with t-statistics reported in parentheses. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Table 3: TFP and GDP Growth

	(1)	(2)
	$TFP_{i,t}$	
	2002-2008	2011-2019
GDP Growth $Rate_{i,t}$	0.160**	0.038
	(2.00)	(0.42)
$TFP_{i,t-1}$	-0.120***	-0.156***
	(-4.19)	(-6.50)
Ln(GDP $per\ Capita$) $_{i,t}$	0.028	-0.027
	(1.31)	(-1.39)
Secondary $Sector_{i,t}$ (%)	-0.001	0.004**
	(-1.12)	(2.52)
Third $Sector_{i,t}$ (%)	-0.002**	0.004**
	(-2.28)	(2.38)
$Inflation_{i,t}$ (%)	-0.008**	-0.004
	(-2.18)	(-0.81)
Constant	0.346*	0.369**
	(1.70)	(2.11)
Year FE	YES	YES
City FE	YES	YES
Observations	1,560	1,766
Adj. R-squared	0.829	0.802

This table presents regression results on total factor productivity (TFP) in relation to GDP growth at the city level. Columns (1) and (2) correspond to the sample periods 2002–2008 and 2011–2022, respectively. The dependent variable $TFP_{i,t}$ is city *i*'s total factor productivity in year *t*, estimated using the Stochastic Frontier Analysis (SFA). The main independent variable, $GDP\ Growth\ Rate_{i,t}$, is the GDP growth rate of city i in year t. All regressions control for lagged TFP and key city-level economic indicators, including GDP growth rate, GDP per capita, sectoral composition (secondary and tertiary industry shares), and provincial inflation rate. Year and city fixed effects are also included. t-statistics (in parentheses) are based on robust standard errors clustered at the province level. Statistical significance is denoted by ***, **, and * for the 1%, 5%, and 10% levels, respectively.

Table 4: Infrastructure Investment and GDP Growth Gap

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Normalized Infrastructure Change $_{i,t}$ (%)						
			2004-2022			2004-2008	2009-2022
$Gap_{i,t}$ (%)	-0.535***	-0.404**	-0.407**	-0.409**		-0.358	-0.449*
	(-3.55)	(-2.19)	(-2.20)	(-2.19)		(-1.36)	(-1.89)
$D[Gap_{i,t} = 0]$			1.254**	1.247**			
			(2.59)	(2.66)			
$D[Gap_{i,t} = -0.1]$				-1.057			
				(-1.24)			
$D[Gap_{i,t} = 0.1]$				0.337			
				(0.61)			
GDP Growth $Rate_{i,t-1}$ - $Target_{i,t}$ (%)					-0.692***		
					(-4.14)		
$Ln(Infrastructure_{i,t-1})$	-1.152***	-1.525***	-1.567***	-1.604***	-1.794***	-3.531**	-2.213***
	(-3.88)	(-2.99)	(-3.07)	(-3.07)	(-3.55)	(-2.32)	(-3.07)
GDP Growth $Rate_{i,t}$ (%)	0.676***	0.907***	0.912***	0.916***		0.787**	0.973***
	(4.56)	(5.05)	(5.14)	(5.16)		(2.26)	(3.90)
GDP Growth $Rate_{i,t-1}$ (%)					0.876***		
					(4.59)		
Ln(GDP per Capita) $_{i,t}$	1.133	-1.522	-1.665	-1.650	-1.561	-11.220**	0.024
	(1.63)	(-0.96)	(-1.03)	(-1.02)	(-0.97)	(-2.68)	(0.01)
Secondary $Sector_{i,t}$ (%)	0.018	0.079	0.073	0.076	0.082	-0.051	0.006
	(0.19)	(0.90)	(0.84)	(0.88)	(0.89)	(-0.21)	(0.03)
Third $Sector_{i,t}$ (%)	0.066	0.146	0.134	0.138	0.126	-0.017	0.181
	(0.59)	(1.13)	(1.06)	(1.09)	(0.95)	(-0.07)	(1.00)
$Inflation_{i,t}$ (%)	-0.513***	0.091	0.090	0.081	0.074	-0.073	0.443*
	(-8.59)	(0.60)	(0.58)	(0.53)	(0.45)	(-0.56)	(1.93)
Constant	-9.141	11.437	13.933	13.788	15.020	128.611***	1.872
	(-1.16)	(0.67)	(0.81)	(0.80)	(0.86)	(2.87)	(0.06)
Province FE	YES	YES	YES	YES	YES	YES	YES
Year FE	NO	YES	YES	YES	YES	YES	YES
Observations	588	588	588	588	588	155	433
Adj. R-squared	0.218	0.369	0.372	0.372	0.216	0.312	0.392

This table presents regression results on local infrastructure investment changes in response to the GDP growth gap at the provincial level from 2004 to 2022. The dependent variable, $Normalized\ Infrastructure\ Change_{i,t}$, is the change in infrastructure investment in year *t* divided by the previous year's GDP. The main independent variable, $Gap_{i,t}$, is the difference between actual GDP growth rate and the GDP growth target for province *i* in year *t*. Dummy variables are included to account for specific scenarios: $D[Gap_{i,t} = 0]$, which equals 1 if the realized growth perfectly matches the target, $D[Gap_{i,t} = 0.1]$ and $D[Gap_{i,t} = -0.1]$, which identify cases where the GDP growth gap is 0.1 or -0.1, respectively. In Column (5), the main independent variable is the difference between the previous year's GDP growth rate and the current year's GDP growth target. Columns (6) and (7) report sub-sample regressions for 2004–2008 and 2009–2022, respectively. All regressions control for lagged infrastructure investment and key provincial economic indicators, including realized GDP growth rate, GDP per capita, sectoral composition (secondary and tertiary industries), and provincial CPI. Year and province fixed effects are also included. t-statistics (in parentheses) are based on robust standard errors clustered at the province level. Statistical significance is denoted as ***, **, and * for the 1%, 5%, and 10% levels, respectively.

Table 5: Land Sales and GDP Growth Gap

	(1)	(2)	(3)	(4)
	Normalized Land Transaction Change $_{i,t}$ (%)			
$Gap_{i,t}$ (%)	-0.069**	-0.069**	-0.069**	
	(-2.15)	(-2.16)	(-2.18)	
D[$Gap_{i,t}$ = 0]		0.419**	0.400**	
		(2.14)	(2.04)	
D[$Gap_{i,t}$ = -0.1]			-0.145	
			(-0.47)	
D[$Gap_{i,t}$ = 0.1]			-0.319	
			(-1.32)	
GDP Growth $Rate_{i,t-1}$ - $Target_{i,t}$ (%)				-0.063*
				(-1.89)
Ln(Land Transaction $Value_{i,t-1}$)	-1.425***	-1.423***	-1.422***	-1.376***
	(-13.49)	(-13.40)	(-13.39)	(-12.95)
GDP Growth $Rate_{i,t}$ (%)	0.135***	0.133***	0.135***	
	(4.90)	(4.86)	(4.90)	
GDP Growth $Rate_{i,t-1}$ (%)				0.124***
				(4.43)
Ln(GDP per Capita) $_{i,t}$	0.205	0.205	0.197	0.144
	(0.71)	(0.72)	(0.69)	(0.48)
Secondary $Sector_{i,t}$ (%)	0.016	0.016	0.016	0.009
	(0.91)	(0.91)	(0.95)	(0.49)
Third $Sector_{i,t}$ (%)	0.003	0.002	0.004	-0.002
	(0.12)	(0.11)	(0.17)	(-0.07)
$Inflation_{i,t}$ (%)	0.060	0.058	0.058	0.060
	(0.82)	(0.79)	(0.79)	(0.78)
Constant	14.098***	14.086***	14.080***	14.672***
	(5.12)	(5.16)	(5.15)	(5.08)
City FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	3,754	3,754	3,754	3,658
Adj. R-squared	0.230	0.231	0.231	0.219

This table presents regression results on land transaction changes in response to the GDP growth gap at the city level. The dependent variable is the change in city *i*'s land transaction value in year *t,* divided by its GDP in year *t*−1. The main independent variable, $Gap_{i,t}$, is the difference between actual GDP growth rate and GDP growth target for city *i* in year *t*. Dummy variables are included to account for specific scenarios: $D[Gap_{i,t} = 0]$, which equals 1 if the realized growth perfectly matches the target, $D[Gap_{i,t} = 0.1]$ and $D[Gap_{i,t} = -0.1]$, which identify cases where the GDP growth gap is 0.1 or -0.1, respectively. In Column (4), the main independent variable is the difference between the previous year's GDP growth rate and the current year's GDP growth target. All regressions control for lagged land transaction value and key city-level economic indicators, including local GDP growth rate, GDP per capita, sectoral composition (secondary and tertiary industries), and provincial inflation rate. Year and city fixed effects are included. t-statistics (in parentheses) are based on robust standard errors clustered at the city level. Statistical significance is denoted by ***, **, and * for the 1%, 5%, and 10% levels, respectively.

Table 6: Local Government Debt and GDP Growth Gap

	(1) LG Bond $_{i,t}$	(2) LGFV Debt $_{i,t}$	(3) LG Bond $_{i,t}$ + LGFV Debt $_{i,t}$	(4)
$Gap_{i,t}$ (%)	-0.137	-0.631**	-0.763**	
	(-0.57)	(-1.99)	(-2.11)	
$D[Gap_{i,t} = 0]$	0.602	-0.522	0.081	
	(0.75)	(-0.67)	(0.07)	
$D[Gap_{i,t} = -0.1]$	0.061	0.833	0.894	
	(0.06)	(0.59)	(0.63)	
$D[Gap_{i,t} = 0.1]$	0.924	-1.680	-0.757	
	(1.15)	(-1.36)	(-0.46)	
GDP Growth $Rate_{i,t-1}$ - $Target_{i,t}$				-0.717*
				(-1.86)
GDP Growth $Rate_{i,t}$ (%)	0.118	0.056	0.169	
	(0.53)	(0.18)	(0.47)	
GDP Growth $Rate_{i,t-1}$ (%)				0.158
				(0.52)
Ln(GDP per Capita) $_{i,t}$	-3.419	-0.899	-4.328	-5.068
	(-1.51)	(-0.32)	(-1.26)	(-1.39)
Secondary $Sector_{i,t}$ (%)	-0.219	0.522***	0.302	0.552**
	(-1.18)	(2.82)	(1.22)	(1.97)
Third $Sector_{i,t}$ (%)	-0.063	0.584***	0.518*	0.805**
	(-0.31)	(2.92)	(1.82)	(2.51)
$Inflation_{i,t}$ (%)	-0.480	-0.866	-1.346*	-0.820
	(-1.05)	(-1.56)	(-1.79)	(-1.09)
Constant	71.634***	-15.404	56.547	39.494
	(2.72)	(-0.55)	(1.41)	(0.94)
City FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	1,374	1,374	1,374	1,290
Adj. R-squared	0.777	0.895	0.874	0.879

This table presents regression results on normalized local government debt in response to the GDP growth gap at the city level. In columns (1) and (2), the dependent variables are LG Bond and LGFV Debt, respectively, representing the outstanding balances of official local government bonds (including both general and special bonds) and the total debt accumulated by LGFVs, both expressed as a percentage of GDP. In column (3), the dependent variable is the combined total of LG Bond and LGFV Debt, representing total local government debt. The main independent variable, $Gap_{i,t}$, is the difference between the realized GDP growth rate and the GDP growth target set by the prefectural government. All columns include dummy variables to capture specific gap scenarios. $D[Gap_{i,t} = 0]$ equals 1 if $Gap_{i,t} = 0$, $D[Gap_{i,t} = 0.1]$ and $D[Gap_{i,t} = -0.1]$ equal 1 if $Gap_{i,t}$ is 0.1 or -0.1, respectively. In Column (4), the main independent variable is the difference between the previous year's GDP growth rate and the current year's GDP growth target. All regressions include controls for city-level economic indicators, such as GDP growth rate, GDP per capita, the shares of secondary and tertiary industries in GDP, and provincial CPI. Year and city fixed effects are also incorporated. Robust standard errors are clustered at the city level, with t-statistics reported in parentheses. Statistical significance at the 1%, 5%, and 10% levels is denoted by ***, **, and *, respectively.

Table 7: Adjustments in Regional Growth Targets

	(1)	(2)	(3)	(4)	(5)	(6)
	$D[Target_{i,t+1} > Target_{i,t}]$					
	Province		City			
	OLS	Logit	OLS		Logit	
$Gap_{i,t}$ (%)	0.047	0.252	0.041***	0.054***	0.337***	0.558***
	(1.68)	(1.01)	(5.77)	(7.34)	(4.04)	(5.37)
$D[Gap_{i,t} \geq 0]$	0.035	2.587***	0.119***	0.113***	1.405***	1.311***
	(1.14)	(2.68)	(6.66)	(5.98)	(7.43)	(6.51)
$Gap_{i,t} * D[Gap_{i,t} \geq 0]$	0.125***	1.523***	0.061***	0.062***	0.402***	0.375***
	(3.98)	(5.24)	(7.36)	(7.59)	(5.62)	(4.76)
$D[Target_{p,t+1} > Target_{p,t}]$				0.080***		0.415**
				(3.03)		(2.18)
$D[Target_{p,t+1} > Target_{p,t}] * Gap_{i,t}$				-0.024***		-0.244***
				(-4.05)		(-4.57)
$Target_{p,t+1}$				0.071***		0.701***
				(7.60)		(6.94)
GDP Growth $Rate_{i,t}$ (%)	-0.063***	-0.676***	-0.047***	-0.060***	-0.378***	-0.544***
	(-4.38)	(-2.86)	(-9.24)	(-10.96)	(-7.19)	(-8.39)
Ln(GDP per Capita) $_{i,t}$	0.024	-0.039	-0.124**	-0.104**	-0.906**	-0.868**
	(0.14)	(-0.02)	(-2.59)	(-2.19)	(-2.39)	(-2.27)
Secondary $Sector_{i,t}$ (%)	0.005	0.033	-0.003	-0.004	-0.009	-0.021
	(0.68)	(0.39)	(-1.00)	(-1.46)	(-0.46)	(-0.99)
Third $Sector_{i,t}$ (%)	0.006	0.009	0.000	-0.001	0.003	0.001
	(0.69)	(0.09)	(0.00)	(-0.28)	(0.11)	(0.04)
$Inflation_{i,t}$ (%)	0.025	0.226	-0.014	-0.009	-0.154	-0.066
	(0.85)	(0.69)	(-1.11)	(-0.74)	(-1.48)	(-0.61)
Constant	-0.243	-1.702	2.104***	1.496***	11.226***	5.814*
	(-0.14)	(-0.09)	(4.57)	(3.25)	(3.04)	(1.68)
Year FE	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	NO	NO	NO	NO
City FE	NO	NO	YES	YES	YES	YES
Observations	587	392	3,687	3,616	3,611	3,558
Adj./Pesudo R-squared	0.341	0.441	0.322	0.346	0.377	0.404

This table reports the regressions of local GDP growth target adjustment on its previous year's GDP growth gap (actual GDP growth rate minus GDP growth target) during the period from 2004 to 2022. The first two columns represent data at the provincial level, while the last two columns represent data at the city level. Both OLS and Logit regression results are reported in the table. The dependent variable $D[Target_{i,t+1} > Target_{i,t}]$ is a dummy variable indicating whether a province (or city) *i*'s GDP growth target in year *t*+1 exceeds its growth target from the previous year *t*. The primary independent variable, $Gap_{i,t}$, is defined as the actual GDP growth rate minus the GDP growth target for province (or city) *i* in year *t*. $D[Gap_{i,t} \geq 0]$ is a dummy variable indicating whether province (or city) *i* has achieved its target in year *t*, (i.e., $Gap_{i,t} \geq 0$). $D[Target_{p,t+1} > Target_{p,t}]$ is a dummy variable indicating whether a province p's GDP growth target in year *t*+1 exceeds its growth target from the previous year t. All columns include controls for regional economic indicators, such as GDP growth rate, GDP per capita, the proportions of the secondary and tertiary industries in total GDP, and provincial CPI. Year and province (or city) fixed effects are also controlled in all specifications. The t-statistics, derived from robust standard errors clustered at the province (or city) level, are reported in parentheses, with ***, **, and * denoting statistical significance at the 1%, 5%, and 10% levels, respectively.

Appendix Table A1: Summary Statistics

Variable	N	Mean	SD	p5	p25	p50	p75	p95
Panel A: Province Level Data								
Normalized Infrastructure Change (%)	589	2.713	3.595	-3.125	0.737	2.560	4.440	9.190
Normalized Firm Revenue Change (%)	589	15.704	17.188	-11.224	4.180	14.267	27.248	44.468
Gap (%)	588	0.492	2.396	-3.600	-0.600	0.300	2.100	4.400
D[Gap = 0]	588	0.039	0.194	0	0	0	0	0
D[Gap = -0.1]	588	0.017	0.129	0	0	0	0	0
D[Gap = 0.1]	588	0.063	0.243	0	0	0	0	1
D[Gap ≥ 0]	588	0.645	0.479	0	0	1	1	1
D[Target $_{t+1}$ > Target $_{t}$]	587	0.165	0.372	0	0	0	0	1
Ln(Infrastructure$_{t-1}$)	589	7.536	1.113	5.567	6.849	7.605	8.352	9.208
GDP Growth Rate (%)	589	9.533	3.792	3.000	7.100	9.700	12.400	14.900
Ln(GDP *per Capita*) (%)	589	10.508	0.722	9.200	10.019	10.607	11.014	11.586
Secondary Sector (%)	589	44.113	8.859	25.700	39.600	45.355	50.500	55.860
Third Sector (%)	589	45.082	9.859	33.300	38.000	43.337	50.800	62.200
Inflation (%)	589	2.582	1.690	0.397	1.549	2.253	3.199	5.759
Consumption Growth Rate (%)	589	12.855	9.733	-4.460	9.341	14.034	17.426	26.688
Panel B: City Level Data								
Normalized Land Transaction Change (%)	5191	0.613	2.558	-3.229	-0.583	0.349	1.658	5.056
Normalized Firm Revenue Change (%)	4966	17.688	25.199	-19.821	4.755	15.989	30.719	60.487
Ln(Land Transaction Value$_{t-1}$)	5297	12.643	1.756	9.660	11.465	12.721	13.830	15.486
Gap (%)	4582	-0.328	2.930	-5	-1.7	0	1.2	3.8
D[GDP Gap = 0]	4582	0.046	0.210	0	0	0	0	0
D[Gap = -0.1]	4582	0.014	0.118	0	0	0	0	0
D[Gap = 0.1]	4582	0.031	0.172	0	0	0	0	0
D[Gap ≥ 0]	4582	0.502	0.500	0	0	1	1	1
D[Target $_{t+1}$ > Target $_{t}$]	4943	0.266	0.442	0	0	0	1	1
GDP Growth Rate (%)	4644	10.319	4.697	2.800	7.500	10.500	13.600	17.000
Ln(GDP per Capita)	4903	10.401	0.796	8.975	9.886	10.468	10.963	11.629
Secondary Sector (%)	4445	46.080	11.559	26.000	38.910	46.500	53.510	63.400
Third Sector (%)	4433	40.360	10.178	26.200	33.660	39.100	46.430	58.978
LGFV Debt (%)	2229	22.565	21.021	1.380	7.370	15.870	31.280	67.690
LG Bond (%)	2229	22.144	12.335	4.510	14.090	20.300	28.690	45.660
LG Bond + LGFV Debt (%)	2229	44.706	26.189	11.300	26.070	39.560	57.150	98.770
TFP	5301	0.362	0.151	0.111	0.270	0.357	0.450	0.577
Panel C: Firm Level Data								
Firm Revenue Growth Rate (%)	44458	18.770	48.242	-31.593	-2.835	11.274	28.337	84.244
Leverage (%)	44488	45.109	21.248	11.850	28.663	44.542	60.226	80.438
Ln(Asset)	44490	22.039	1.307	20.213	21.118	21.867	22.772	24.512
SOE Share	44490	0.085	0.182	0.000	0.000	0.000	0.018	0.556

This table provides summary statistics for the province-level, city-level, and firm-level variables used in the regression analysis.

Appendix Table A2: Firm Revenue Changes and Local GDP Gap

	(1)	(2)	(3)	(4)
	Normalized Firm Revenue Change$_{i,t}$ (%)			
	Province		City	
$Gap_{i,t}$ (%)	3.135***	1.047	2.600***	0.279
	(5.82)	(1.52)	(10.62)	(0.95)
GDP Growth Rate$_{i,t}$ (%)		2.146***		2.881***
		(3.06)		(11.52)
Constant	14.198***	-5.239	19.871***	-10.788***
	(53.54)	(-0.81)	(323.81)	(-4.05)
Year FE	YES	YES	YES	YES
Province FE	YES	YES	No	No
City FE	No	No	YES	YES
Observations	588	588	4,353	4,353
Adj. R-squared	0.669	0.685	0.451	0.495

This table presents regression results on the relationship between aggregated firm revenue change and the local GDP growth gap. The first two columns represent data at the provincial level, while the last two columns represent data at the city level. The dependent variable is the change in revenue of industrial enterprises above a designated size in province (or city) i in year t, divided by GDP in year $t-1$. The main independent variable, $Gap_{i,t}$, is the difference between actual GDP growth rate and the GDP growth target for province (or city) i in year t. All regressions control for year and province (or city) fixed effects. t-statistics (in parentheses) are based on robust standard errors clustered at the province (or city) level. Statistical significance is denoted by ***, **, and * for the 1%, 5%, and 10% levels, respectively.