Urban Bias in Capital Allocation: Evidence from China*

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Abstract

In many autocratic states, rural societies tend to receive lower levels of investment and the equity consequences of such biases against rural societies are well recognized. However, little is known about whether the observed urban-rural gaps in investment are due to allocation distortions favoring urban areas, or higher productivity of urban areas attracting more capital. In this paper, we use microdata on firms from urban and rural areas of China to measure the extent and patterns of the urban-rural gap in the return to capital. First, we find that urban firms access capital at favorable terms. Second, this urban-rural gap is primarily driven by state-owned enterprises, suggesting that allocation choices by the state, as opposed to investment constraints faced by nonstate rural enterprises, represent the more relevant factor for the underinvestment of capital in rural areas. Finally, we document how the urban-rural gap in capital allocation varies across important market and political factors, namely, the level of financial development, the geographic proximity of an urban area to the centers of power, and the level of state control over the local economy.

Keywords: Urban bias, inequality, autocracies, capital allocation, China.
JEL Classification: O18, R51, R12.

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1 Introduction

Even though the vast majority of the poor in developing countries reside in rural areas (IFAD, 2017), autocratic states are often considered to favor urban residents in resource allocation. The underinvesment of capital in rural areas has thus been viewed as a major impediment to efficiency and urban-rural equity (Ades and Glaeser, 1995; Davis and Henderson, 2003; Hodler and Raschky, 2014). In his highly influential book, for example, Lipton (1977) singled out urban bias, that is, favoritism toward urban areas in resource allocation, as one of the most important reasons for global poverty in developing countries.

However, despite much emphasis on the presumed role of urban bias for economic underdevelopment in autocracies, there is limited empirical evidence on whether urban areas access capital at favorable terms than their rural counterparts. Thus far, the evidence is confined mostly to urban-rural differences in per capita spending on public goods (Majumdar et al., 2004; Bezemer and Headey, 2008). However, larger per capita public expenditures may not necessarily reflect bias toward urban residents 'if there are greater relative benefits of such expenditures' (Chen et al., 2017, p 69). For example, with a larger population and better connectivity to other places, urban areas potentially represent efficient investment destinations (Arnott and Gersovitz, 1986; Mourmouras and Rangazas, 2012). Using micro data on nonstate and state enterprises in China, we address this challenge of measuring whether

urban areas face a lower cost of capital than their rural counterparts.

China provides a particularly useful context to empirically examine the patterns of urban bias in capital allocation. First, many scholars consider China's government to be emblematic of urban-biased autocracies (Chan and Zhang, 1999; Wallace, 2013). In dictatorial regimes, locations close to government centers tend to be the political arenas where nondemocratic contests for influence take place (Ades and Glaeser, 1995). Often, urban revolutions present a major source of risk for the survival of autocratic governments (Shifa, 2013). Due to their geographic concentration and proximity to centers of political power, urban residents can thus pose greater threat to the state than do their rural counterparts, causing the state to redirect resources to urban areas to avert such threats (Bates, 1981). China fits this narrative well (Perkins and Yusuf, 1984; Yang and Cai, 2000). Thus, from the political economy perspective of urban bias, China provides a relevant context.

Second, the Chinese setting presents us with relatively rich data to estimate the gap in investment returns between urban and rural firms and examine how the gap varies across a number of important factors. Among others, Williamson (1988) and Majumdar et al. (2004) cite data limitation as the primary factor for the lack of empirical evidence on the urban-rural gap in investment returns. The micro data used in this paper help us address this difficulty. Importantly, the data enable us to estimate the urban-rural investment gap for the state and the nonstate sectors separately. Unlike nonstate firms, the government has a relatively free hand to manipulate resource

allocation by state-owned enterprises (SOEs). Hence, by separately measuring the urban-rural gap for the state and nonstate sectors, we are able to examine whether urban bias is indeed primarily a feature of government investment. The significant diversity across China's prefectures also provides the opportunity to explore how the urban-rural gap varies across important political and market factors, such as the level of development in the financial market, the geographic proximity to power centers, and the state control of the local economy.

Third, despite its rapid urbanization over the past four decades, China still has a large rural sector. In 2016, for example, the number of employed persons in rural areas was above 361 million, or about 47 percent of total employment in the economy.[1] China is also known for its stark urban-rural gap in living standards, where rural areas tend to lag considerably behind their urban counterparts (Kanbur and Zhang, 1999; Wu and Perloff, 2005; Sicular et al., 2007; Akay et al., 2012; Xie and Zhou, 2014). Hence, China provides a context in which the allocation of resources between urban and rural areas can have profoundly relevant implications for both production efficiency and distributive equity (Au and Henderson, 2006a,b; Adamopoulos et al., 2017).

Our primary data source is the Annual Survey of Industrial Production (1998–2007) in China. The survey includes all SOEs and nonstate-owned en-

[1]The figure is based on data from China Statistical Yearbook 2018 (National Bureau of Statistics of China, 2018).

terprises with annual sales of more than 5 million RMB, covering most of the industrial output in China. The survey provides information on the prefectures in which enterprises are located. Importantly, it also reports whether an enterprise is located in the urban districts of the prefecture (*shixiaqu*), which are the core urban centers within prefectures. Since urban districts are also the seats of the prefectures' governments, their residents are located closer to centers of political power than are residents outside these districts. Within each prefecture, we thus define the urban districts as *urban areas* and the areas outside the urban districts as *rural areas*.

Using data on capital stock, output and other relevant variables, we measure the gap in return to capital between enterprises located in urban and rural China. Under some standard assumptions, estimated returns to capital should equalize across firms as long as the capital market is free from distortions. A higher return among some firms implies that those firms face a higher cost of capital, as they are unable to expand their capital stock until returns are equalized. Our focus on the within-prefecture comparison of urban and rural areas has the advantage of minimizing the effect of confounding factors due to the vast geographic variations across regions in China.

We find that return to capital among urban firms tend to be lower than those among rural firms, indicating that rural firms face a higher cost of capital. More importantly, this urban-rural gap is driven primarily by SOEs. For nonstate firms, the gap is found to be quite negligible. This difference between SOEs and nonstate firms underscores that the urban-rural gap is

primarily a feature of investment patterns by the state (as opposed to the nonstate sector).

We then turn to how the urban-rural investment gap varies along market and political factors that could affect the gap (Mertzanis, 2020). Although we do not have random variations in these market and political factors to establish their causal effects, the empirical results point out how changes in these factors could matter for urban bias in capital allocation. We first examine how the urban-rural investment gap varies with the level of development in the local financial market. We find that greater development of local financial markets, as measured by access to local banks, is associated with a lower urban-rural gap in return to capital.

Next, we examine the heterogeneity of the urban-rural investment gap with respect to two political covariates, namely, the prefecture's status in the political hierarchy and the share of SOEs in the local economy. An often-emphasized motivation for favoring the urban population is avoiding instability in regions that are close to the centers of political power, such as capitals (Davis and Henderson, 2003). We thus examine how the urban-rural investment gap depends on whether the prefecture is a provincial capital (i.e., the seat of the provincial government). In this regard, one could expect that maintaining urban stability could have a greater importance in the urban districts of provincial capitals, as those areas are the political and economic centers of the province. This could incentivize the government to invest more in urban districts of the provincial capitals with the aim of raising incomes

for the residents and minimizing their dissent. On the other hand, the potential influx of rural-urban migrants induced by larger urban-rural income gaps could lead to further population increases in the urban districts of provincial capitals and, hence, threaten the fiscal sustainability of subsidizing economic privileges for the urban residents (Ades and Glaeser, 1995). Given the proximity of residents of provincial capitals to government centers, one could expect that this rural-urban migration is of greater political concern in provincial capitals. Thus, the government could have a greater incentive to invest in rural areas of provincial capitals to narrow the income gap between the urban districts and the nearby rural areas and, hence, minimize rural-urban migration within the provincial capitals. Therefore, it is not a priori obvious how the government's incentives to overinvest in urban areas vary in response to changes in the political hierarchy of the prefecture. We find that the urban-rural investment gap does not show a significant difference between provincial capitals and other prefectures, suggesting that the government's tendency to overinvest in urban areas within a prefecture does not rise with the prefecture's proximity to power centers.

In an urban-biased regime, strong control of the local economy by the state could intensify the urban-rural gap in resource allocation for a number of reasons. For example, the government's direct control (through firm ownership in the form of SOEs) could enable it to discriminate against immigrant workers who seek jobs at urban SOEs (Song, 2016), enabling the state to sustain a higher level of the urban-rural wage gap while suppressing

rural-urban migration through employment discrimination at urban SOEs. A higher share of SOEs in the local economy could also result in a lower level of competitive pressure in product and factor markets, which could undermine market pressures against distortions. We therefore examine whether the urban-rural investment gap varies with the dominance of the state sector in the prefecture. We measure the state's dominance in the prefecture's economy using the share of workers employed by SOEs in the prefecture (out of the total employment in the prefecture). We find that as the state's dominance in the prefecture's economy increases, the urban-rural investment gap tends to rise significantly.

Our paper contributes to the literature on urban bias. Mourmouras and Rangazas (2012) develop a model in which the government may favor investing in the provision of urban services to attract international capital in the context of a small open economy. A number of theoretical models show the political origins of urban bias. For example, Majumdar et al. (2004) study how better access to information by urban residents could give them greater political influence. Shifa (2013) shows how the leader's desire to extract agricultural rents could increase urban bias in economies that derive a larger share of their GDP from agriculture. We complement this literature by shedding empirical light on the patterns of urban bias.

Our study also complements the literature on the spatial distribution of economic activities and the urban-rural inequality. Bezemer and Headey (2008) document that bias against the rural sector remains a persistent fea-

ture of many low-income countries with respect to a variety of public policies. Using the case of petroleum subsidies, Kim and Urpelainen (2016) show that due to the threat of urban unrest in response to rising fuel prices, autocratic states tend to provide larger petroleum subsidies. Baum-Snow et al. (2017) show that radial highways and ring roads redistribute economic activities from central cities to surrounding regions. Lee and Luca (2018) find that firms in large cities are less likely to report financial constraint as a problem, and this pattenr diminishes in richer countries. Chen et al. (2017) show that the political bias by Chinese politicians contributes to a higher level of investment and faster growth among favored cities. Using cross-country panel data, Davis and Henderson (2003) find that policy biases in favor of primate cities (e.g., capitals) result in greater urban concentration. Our paper contributes to this literature by highlighting the urban-rural gaps in investment. According to international standards, the urban-rural income gap in China is large and explains about 26 percent of the overall inequality across the country (Sicular et al., 2007). The literature explains inequality using physical capital, human capital, or relocation costs from rural areas to urban areas (Fleisher et al., 2010; Young, 2013; Hnatkovska and Lahiri, 2016). Our result highlight the potential role of investment bias toward urban areas, particularly by the state sector.

The remainder of the paper is organized as follows: Section 2 provides some institutional background to China's context. In Section 3, we present the empirical framework. Section 4 introduces the data and present some

descriptive evidence on urban bias. We report estimation results in Sections 5 and 6. We conclude in Section 7.

2 Institutional background

2.1 Policy biases toward SOEs and urban areas

Our empirical study crosses two important features in Chinese politics and the economy, namely, the dominant role of SOEs and urban-biased politics. China's economy is highly dominated by SOEs, whose significance is formally enshrined in the constitution wherein " . . . the state ensures the consolidation and growth of the state economy" (Article 7). During our sample period, as much as half of China's non-agricultural GDP is estimated to be produced by SOEs (Szamosszegi and Kyle, 2011). Due to their clout in China's politics and economy, SOEs receive preferential treatment from the state and the state-dominated financial system. Compared to nonstate–owned enterprises, SOEs tend to have cheaper access to credit from banks, which are mostly owned by the state (Boyreau-Debray and Wei, 2005; Song et al., 2011). In contrast, private firms face strong discrimination in credit markets and they have to rely on their earnings or the social network of the firm owners to finance their investment (Riedel et al., 2007). SOEs also face less regulatory barriers to entry (Brandt et al., 2018) and have preferential access to input and output markets (Szamosszegi and Kyle, 2011). Given the extensive support that SOEs receive from the state, they are considered

to be "too successful", with the belief that their profit comes at a cost of the overall efficiency of the economy (Hsieh and Song, 2016).

Politically, SOEs serve as institutional vehicles to advance the CPC's policy goals. For example, SOEs provide secure urban jobs with generous welfare benefits and, hence, help maintain political stability in cities (Song, 2018). Since SOE executives are political appointees and their promotion prospect is determined by the political leadership, they have a strong incentive to follow the government's policy objectives (Chen et al., 2011).

Policies in China are far from uniform among different regions: the government tends to favor urban residents much more than their counterparts in rural areas. The most salient aspect of this bias is the hukou system, that limits migration from rural areas to urban areas and grants favorable benefits to urban residents through social policies, such as employment opportunities, education, pension, medical care and public housing. Under the hukou system, rural immigrants are subject to strong discrimination in terms of the availability of public services (Chan and Zhang, 1999). The rural land regime in China is another urban biased as it ties peasants to their village and limits their opportunity to move to job centers (Chang and Brada, 2006; Shifa and Xiao, 2020).

2.2 The urban-rural divide in the administrative hierarchy of China

Since the 1978 reform to reorganize the economic administration, China's governance has become considerably decentralized, wherein the center delegates administrative and policy decisions to local governments (Huang, 2008). Situated just under provinces in the political and administrative hierarchy, prefectures have particularly become central players in China's decentralized rule (see Figure 1 for map of prefectures in our sample.).[2] While they are promoted or demoted based on their record concerning local economic growth and political stability, prefecture leaders have assumed significant power and autonomy in the policy implementation within their jurisdictions (Li and Zhou, 2005; Huang, 2008; Xu, 2011), enabling them to use their autonomy to advance their economic and political goals in the allocation of capital (Chen et al., 2011). Their close ties with local bank officials also affords them 'substantial influence over bank lending decisions' (Szamosszegi and Kyle, 2011), enabling them to steer cheap loans to their preferred projects (Durkin, 2019).

Figure 1 here.

Figure 1: Map of prefectures

An important feature of the decentralization was a tendency, within each

[2]The administrative and political hierarchy in mainland China (i.e., excluding Hong Kong, Macao, and Taiwan) consists of the central state, provinces, prefectures, and local administrative units within prefectures (such as districts and counties).

prefecture, to be biased in favor of urban residents. First, each prefecture is *administratively* divided into "urban districts", *shixiaqu*, and the surrounding rural areas, *xian* (see Figure 1). The urban districts are more densely populated, industrialized and prosperous than their rural counterparts (Chung and Lam, 2010). Importantly, urban districts are often considered to have greater say in matters of local governance (Donaldson, 2017). While the prefecture governments are seated in the urban districts, they have administrative power over both urban districts and rural counties. The urban districts are thus the economic and political capitals of prefectures. This control of rural counties by the urban-centered prefecture governments is argued to have resulted in biased policies against the rural population. Local governments are often blamed for being "more responsive to the needs of the urban population," with disproportionate emphasis on urban areas with regard to promoting investment (Tao et al., 2009, p. 363). To achieve their goal of urban stability, local leaders steer loans into projects (including investment by SOEs) to provide jobs and social benefits for the urban population (Durkin, 2019). A number of popular expressions describe this imbalance between urban areas and rural counties: "city extorting county (*shiguaxian*), city squeezing county (*shijixian*), and city living off county (*shichixian*), . . ." (Yang and Wu, 2015, p. 333). Our empirical analysis focuses on such biases in capital allocation between the urban districts and the rural counties within prefectures.

3 Empirical framework

In estimating the urban-rural gap in the cost of capital, we use the commonly utilized average revenue product approach (Dollar and Wei, 2007; Hsieh and Klenow, 2009; Chen et al., 2017). One derives the estimation equation by using the firm's profit maximization condition, which sets the marginal revenue product to equal to the cost. Directly estimating the firm's first-order condition is not feasible because the marginal revenue product is not observable in the data. Often, one only observes average revenue, i.e., revenue per quantity of input. An appealing feature of the average revenue approach is that it transforms, under certain assumptions, the first-order condition so that one can use the observable average revenue (instead of the unobservable marginal revenue) to estimate the parameters in the first-order condition.

Consider a firm whose output is a Cobb-Douglas function of capital (K) and labor (L):

$$Y_j = A_j F(K_j, L_j) = A_j K_j^{\alpha} L_j^{1-\alpha}, \qquad [1]$$

where A_j is the TFP level for firm j. The firm TFP could depend on factors internal to the firm, such as quality of its management, and/or external factors like the level of local agglomeration. The firm's profit is given by

$$\max_{L_j, K_j \geq 0} \pi_j = P_j A_j K_j^{\alpha} L_j^{1-\alpha} - W_j L_j - R_j K_j, \qquad [2]$$

The prices of output, labor and capital are denoted by P_j, W_j and R_j, respectively.[3] To maximize [2], the first-order conditions for capital set the marginal revenue product of capital ($MRPK$) equal to the marginal cost (R):

$$MRPK_j \equiv \alpha P_j A_j K_j^{\alpha-1} L_j^{1-\alpha} = R_j \qquad [3]$$

The firm's product price (P_j) and the cost of capital (R_j) could differ based on firm attributes, such as location and industry. Our focus is on the differential in the price of capital between firms located in rural and urban areas. Combining the production function [1] and the first-order condition for capital [3], one obtains the equation that relates the average revenue product of capital ($ARPK$) with the cost of capital:

$$ARPK_j = \frac{1}{\alpha} R_j, \qquad [4]$$

where $ARPK$ is given by

$$ARPK_j = \frac{P_j Y_j}{K_j} \qquad [5]$$

In the data, one observes only $ARPK$ (but not $MRPK$ and R). According to equation [4], all else being equal, an increase in the firm's price of capital

[3]Note that differences in the cost of capital may result not only from differences in market interest rates but also from any incentives that distort the firm's investment. For example, SOEs may have objectives other than profit maximizing (such as promoting political stability). If such a firm happens to have a higher level of capital stock due to, say, the government's decision to over-invest in the firm because of motives other than profit maximizing, this would be interpreted as the firm having a cheaper access to capital.

results in a proportionate increase in the output-capital ratio. This holds because as the price of capital increases, the firm substitutes away from capital, so fewer units of capital (and more units of labor) are used per unit of output. One then infers the relative price of capital faced by a group of firms (e.g., urban firms) as compared to some benchmark set of firms (e.g, rural firms) from the observed differences in the output-capital ratio. Let $\bar{R}$ denote the cost of capital for some benchmark group of firms, such as the average cost of capital for rural firms. Let $(1-\beta)\bar{R}$ denote the average cost of capital for urban firms, so that β measures the extent of preferential access to capital enjoyed by urban firms (as compared to their rural counterparts). Taking the log of [4], the equation to estimate β is given by

$$\log ARPK_j = Urban_j * \log(1-\beta) + \log \bar{R} - \log \alpha + \epsilon_j \quad [6]$$

$$\approx -\beta * Urban_j + \log \bar{R} - \log \alpha + \epsilon_j \quad [7]$$

A useful feature of this equation is that $ARPK$ is independent of the productivity term A_j, as a potential correlation between firm TFP and its location choice could bias the estimation of β. This is particularly important since urban firms could be more productive than their rural counterparts due to, for example, more productive firms selecting into cities, a higher level of agglomeration, better access to public services in urban areas, and a greater availability of skilled workers (Rosenthal and Strange, 2004; Di Giacinto et al., 2013; Behrens et al., 2014). If two firms have different levels

of productivity while facing the same cost of capital, they employ different quantities of capital, but they will have the same level of $ARPK$. That is, more productive firms employ a larger quantity of capital so that [4] holds. As noted by, among others, Dollar and Wei (2007) and Chen et al. (2017), the simple relationship between $ARPK$ and the cost of capital in Equation [4] is possible by virtue of the Cobb-Douglas assumption. However, we have also checked the robustness of our results using an estimation framework that does not require the production function to be Cobb-Douglas (to be discussed later).

Since the capital share may differ across industries, we allow α to vary across industries by including industry fixed effects. The inclusion of industry fixed effects has an added advantage since firms in different industries may face different demand curves. For example, consider the case where firms set prices according to the demand equation:

$$P_{js} = P_s \left(\frac{Y_s}{Y_{js}} \right)^{\frac{1}{\sigma_s}}. \qquad [8]$$

P_{js} is the product price for firm j operating in industry s, σ_s is the industry-specific elasticity of substitution between products by firms within industry s, and P_s denotes the price of the composite good Y_s:

$$Y_s = \left(\sum_i Y_{is}^{\frac{\sigma_s - 1}{\sigma_s}} \right)^{\frac{\sigma_s}{\sigma_s - 1}} \qquad [9]$$

The profit-maximizing level of capital employed by the firm now becomes:

$$\frac{\sigma_s - 1}{\sigma_s}\alpha_s \left(\frac{P_{js}Y_{js}}{K_{js}}\right) = R_{js} \qquad [10]$$

where $(\sigma_s - 1)/\sigma_s$ is the monopoly mark-up in industry s. Thus, the inclusion of industry fixed effects helps account for differences not only in production technology but also in other industry-specific factors such as markups.

China is a vast country, and there is enormous geographic variation in the levels of economic development. For example, prefectures in the coastal east are more developed and dominated by more advanced sectors than those in the interior west. The composition of sectors and the intensity of market competition within an industry is likely to vary across regions. Moreover, prefectures could vary in other aspects that could affect investment decisions, such as culture, ethnic composition, education and resource endowments. In addition to allowing for variations across sectors, one thus needs to account for potential variations across regions. We do this by including prefecture fixed effects, so we focus on urban-rural gaps *within prefectures*.

Over the decade covered by our sample, the Chinese economy underwent significant transformation. Some of these are macro–level changes, such as China's accession to the WTO, inflation and demand shocks. However, many of the changes could be region specific, and different sectors might be affected differently depending on their locations. For example, the privatization of SOEs under economic reform is likely to have a more pronounced effect in

regions that have a higher share of existing SOEs. We thus include year fixed effects and, owing to the large sample size of our data, we are able to allow the year fixed effects to vary by prefectures and sectors. That is, we narrow down the urban-rural comparison to a set of firms within the same year, industry and prefecture. In summary, our regression equation is given by

$$\log(ARPK_j) = -\beta \times Urban_j + \mathbf{\Gamma X}_j + \epsilon_j \quad [11]$$

where $\mathbf{X}_j$ is a vector containing the interaction of prefecture, sector and year fixed effects.

4 Data and descriptive evidence

4.1 Data

Our firm-level data source is the China Annual Survey of Industrial Firms (ASIF), covering each year from 1998 to 2007. Conducted by the National Bureau of Statistics, ASIF collects data on all SOEs plus other firms with annual sales of over 5 million RMB. The survey thus covers most of the industrial output in China. The industrial sectors in our analysis mostly consist of manufacturing firms (about 90%) and utilities.

As is commonly done to clean the ASIF data, we drop a small share of observations with entries that seem erroneous. First, we drop a few firms with implausible entries. These include observations with nonpositive values

for net assets and value added (output).[4] We also drop observations with nonpositive values for employment and labor compensation (wage or fringe benefits). Finally, we remove outliers by first ordering all observations by the ratio of value added to net assets (our dependent variable) and then dropping the top 2% and bottom 2% of the observations.[5] Table 1 presents the summary statistics of our data.

The survey provides location information that is detailed enough to identify a firm's prefecture and whether the firm is located in the urban districts (*shixiaqu*). We use this information to define a dummy variable *Urban*, which equals 1 if the observation is from an urban district. Otherwise, *Urban* is set to equal 0. We have data on both urban and rural firms for 320 prefectures in China. Of the nearly 1.8 million observations in our sample, about half are located in urban districts. Most of the observations (71%) are from the more prosperous eastern provinces of China, where economic activities tend to be concentrated. The western, middle and northeastern provinces constitute the remaining 10%, 13% and 6% of the observations, respectively. In China's political hierarchy, provincial governments are the second most powerful government layers (below the central state and above the prefecture government). About 15% of the observations are from provincial capitals, i.e., prefectures that are seats of the provincial governments. These prefectures tend to be significantly richer than other prefectures. Nominal GDP

[4] Observations are dropped if either the pretax or after-tax value added is negative.

[5] As a robustness check, we have also undertaken the analysis using firm value-added net of VAT, and found similar results.

data from the National Bureau of Statistics[6] suggests a very large income gap, even though some of this difference could reflect overestimation for the GDP of provincial capitals (e.g., due to underestimation of the urban population and cost of living). For example, after accounting for province and year fixed effects, the nominal per capita GDP of provincial capitals over our sample period exceeds that of the other prefectures by about 77%.

We consider two alternative indicators for the state ownership of a firm. The first indicator is based on the information directly provided by the survey regarding whether the state has a controlling share in the firm. This indicator for state ownership, $StateControl$, is a dummy for whether the firm is controlled by the state according to the survey information. Based on this definition, about 15% of the observations in our data are considered SOEs. As a robustness check, we also use an alternative indicator of state ownership, $StateMajority$, which we define using detailed survey data on the ownership share of the firm's total paid-up capital. We categorize a firm as an SOE if the state's share of paid-up capital is 50% or above.[7] As seen from means and standard deviations, these two measures are quite consistent with each

[6]National Bureau of Statistics of China, *China City Statistical Yearbook 1999-2008*, Beijing: China Statistics Press, 2018.

[7]The survey provides data on the share of capital owned by (1) the state, (2) individual persons, (3) cooperatives, (4) legal persons, and (5) entities outside mainland China. "Legal persons" refers to institutions (e.g., investment funds) whose individual owners are not identified in the data. Since many of these legal persons could indeed be controlled by the state, considering all legal persons as nonstate owners would wrongly classify some SOEs as nonstate firms and, hence, undercount the number of SOEs. We thus categorize a firm as SOE if either (a) more than half of its capital is paid-up by the state or (b) the sum of the share of the state and legal persons is above 50% *and* the firm is reported to be controlled by the state.

Table 1: Descriptive statistics

	Observations	Mean	Std.
Urban	$1,814,416$	0.49	0.50
State ownership			
StateControl	$1,814,416$	0.149	0.356
StateMajority	$1,806,914$	0.139	0.346
Region (count):			
Eastern provinces	1,243,430 (70.6%)	—	—
Northeast provinces	110,735 (6.3%)	—	—
Middle provinces	226,850 (12.9%)	—	—
Western provinces	181,465 (10.3%)	—	—
Provincial capital	$1,814,416$	0.153	0.360
log($ARPK$)	$1,814,416$	0.189	1.232
log value added per worker	$1,814,416$	3.866	1.1305
Bank branches (per 10,000 population)	$1,775,217$	1.205	0.860
SOE employment share	$1,814,416$	0.279	0.229

Notes: The firm level data are from the Annual Survey of Industrial Production (1998-2007). Data on the number of bank branches are from China Banking Regulatory Commission. *Urban* is a dummy for whether the firm is located in an urban area. *StateControl* equals 1 if the state is reported to have a controlling share in the firm. Otherwise, *StateControl* equals 0. *StateMajority* equals 1 if the state is majority share owner. Otherwise, *StateMajority* equals 0. *Provinicial capital* equals 1 for firms located in provincial capitals.

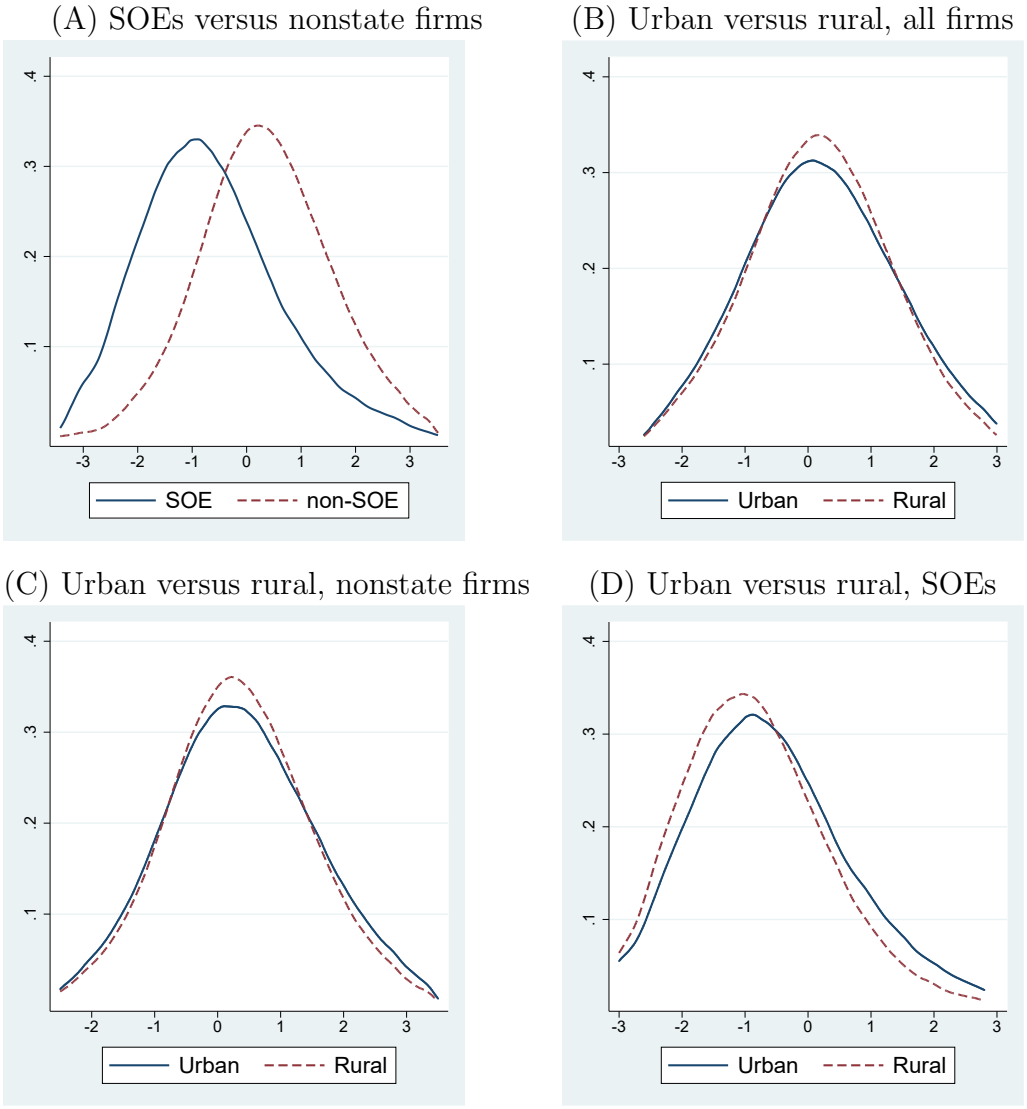
other. They are also highly correlated (with a correlation coefficient of 0.96).

4.2 Visual patterns of the urban-rural investment gap

We begin with a preliminary visual inspection of the descriptive patterns. Although such a descriptive summary does not account for confounding factors, it provides a transparent look at the data. Since the cost of capital equals $\alpha \times ARPK$, all else equal, $ARPK$ is proportional to the cost of capital (see equation [4]). Figure 2 shows the distribution of $\log ARPK_j$ for four pairs of groups. Panel A compares SOEs and nonstate firms. The distribution plot for SOEs is distinctively shifted to the left, mimicking the well-known fact that China's SOEs have a much lower level of capital productivity than nonstate firms. In Panels B, C and D, we undertake urban-rural comparisons among three pairs of firm categories. Panel B presents the urban-rural comparison for the sample of all firms in our data. In Panels C and D, we repeat the urban-rural comparison separately for nonstate firms and SOEs, respectively.

Among the sample of all firms and nonstate firms (Panels B and C), the urban-rural gap in $ARPK$ does not appear to feature bias in either direction. Panel D shows that rural SOEs have a lower level of $ARPK$ than urban SOEs. Taken at face value, this pattern would suggest that rural SOEs have a cheaper access to capital, counter to what one would expect given China's urban-centered politics.

However, our preliminary exploration suggests that the lower level of



Notes: This figure presents the distribution of average revenue product of capital ($\log ARPK_j$) without considering difference in capital intensity across sectors. Panel A compares SOEs and nonstate enterprises. Panel B compares urban and rural enterprises. Panels C and D repeat the urban-rural comparison separately for nonstate enterprises and SOEs, respectively.

Figure 2: Distribution of $ARPK$ (log scale)

$ARPK$ among rural firms could be due to differences in the capital share of industries between urban and rural areas, instead of a cheaper access to capital by rural firms. Since the cost of capital equals $\alpha \times ARPK$ (see equation [4]), all else equal, $ARPK$ would be lower for firms with a higher value of α. Thus, if rural SOEs tend to operate in capital intensive sectors, they may have a lower level of $ARPK$ even if they do not necessarily have a cheaper access to capital. The patterns in Figure 3 suggest that this may indeed be the case.

The figure portrays whether firm location (i.e., urban or rural) and ownership patterns vary with capital intensity in the firm's sector. Each dot in the figure represents a sector. In Panel A, the vertical axis represents the number of rural SOEs in each sector (as a share of urban SOEs in the sector, in log scale). Panel B plots the number of rural nonstate enterprises as a share of urban nonstate firms. The horizontal axis in both panels is a measure of capital intensity of the sector. As an approximate indicator for a sector's relative capital intensity, we consider the average capital-output ratio among all *nonstate* firms in the sector:

$$\hat{\log \alpha_s} = \frac{1}{N_s} \sum_i \log \frac{K_{js}}{P_{js} Y_{js}}, \qquad [12]$$

where N_s is the number of firms in sector s. If distortions in capital markets do not vary across sectors, this ratio would be proportional to the actual capital

share in the production function.[8] We include only nonstate enterprises in computing [12] since investment decisions by SOEs are likely to be affected by distortionary political considerations, which could make the estimated indicator deviate further from the true capital share.

The figure reveals two interesting patterns. First, according to Panel A, SOEs are more likely to be located in rural areas as the capital intensity of their sector increases. Second, according to Panel B, the location of nonstate firms does not tend to vary systematically along with the sector's capital intensity.

Furthermore, according to Figure 4, some of the gap in $APRK$ between SOEs and nonstate firms could also be due to differences in the capital share. The figure shows the relationship between ownership patterns and capital intensity. It plots the number of SOEs as a share of the total number of firms in each sector. One observes that the share of SOEs increases with the sector's capital intensity.

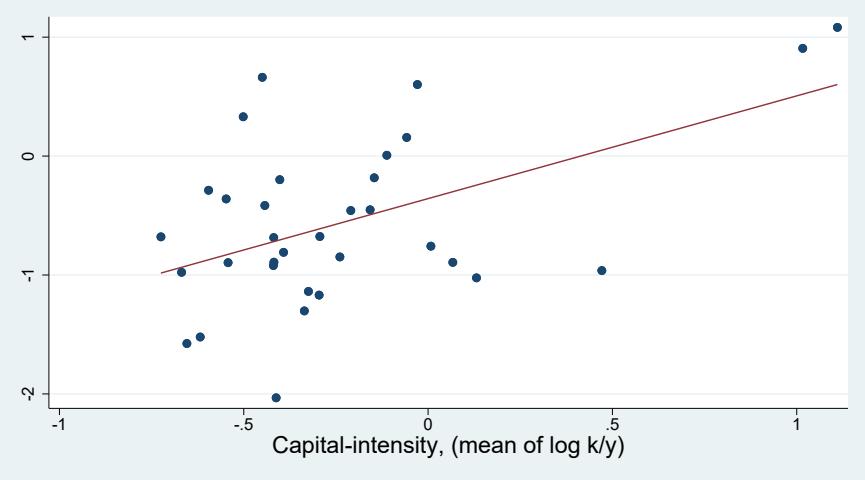
Thus, the patterns in Figures 3 and 4 suggest that some of the gaps in the distribution of $ARPK$ could be due to differences in firms' sectors. If SOEs are overrepresented in capital-intensive sectors, as suggested in Figure 4, their $ARPK$ is bound to be lower even if they do not have cheaper access

[8] For example, assume that $R_j = Re_j$ where R is a constant and the distribution of e_j is log normal. Then, it follows from [3] that

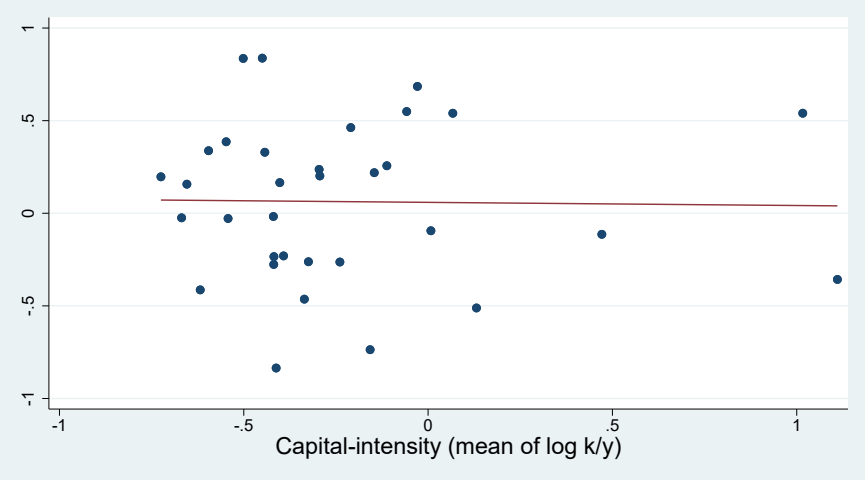
$$\log \frac{K_{js}}{P_{js}Y_{js}} = \log \alpha_s - \log R - \log e_j$$

If the average capital cost does not vary systematically across sectors (so that R is constant), then [12] provides a consistent estimate of $\log \alpha_s$ up to a scale.

Panel (A): Number of rural SOEs (as a share of urban SOEs)

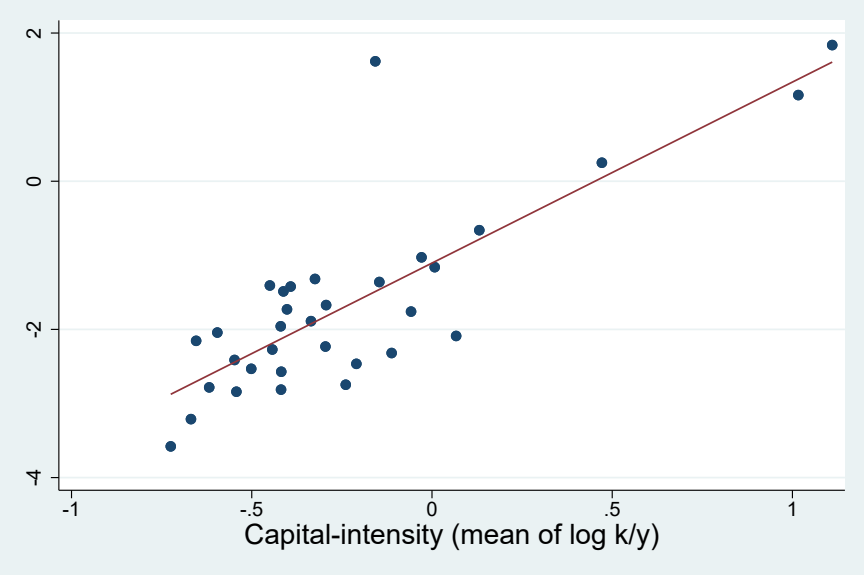


Panel (B): Number of rural nonstate firms (as a share of urban nonstate firms)



Notes: Each dot represents an industrial sector. The horizontal axis is capital intensity of the sector in log scale. Panel A plots the relationship between the number of rural SOEs (as a share of the number of urban SOEs) and capital intensity, in log scale. Panel B plots the relationship between the number of rural nonstate enterprises (as a share of the number of urban nonstate enterprises) and capital intensity, in log scale.

Figure 3: Sectoral capital intensity and the urban-rural distribution of firms

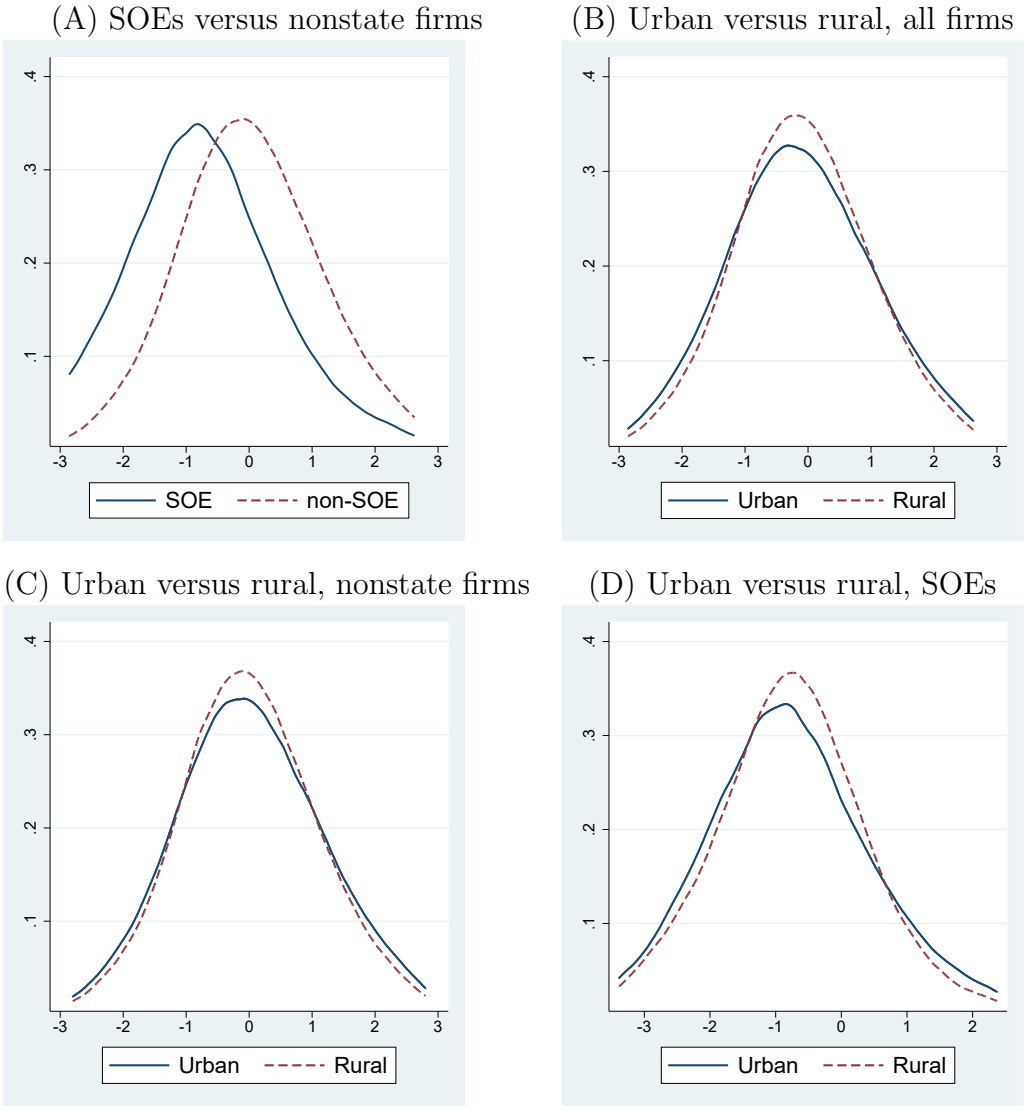


Notes: Each dot represents an industrial sector. The horizontal axis is capital intensity of the sector in log scale. The vertical axis is the number of SOEs (as a share of all firms) in the corresponding sectors, in log scale.

Figure 4: Sectoral capital intensity and the number of SOEs (as a share of all firms)

to capital. Similarly, the higher tendency of rural SOEs to engage in capital-intensive sectors could be driving their lower $ARPK$.

Figure 5 displays the distribution of $ARPK$ after adjusting for differences in capital intensity across sectors, i.e., the distribution of $\log \hat{\alpha}_s + \log ARPK_j$ instead of $\log ARPK_j$. Compared to the earlier plot in Figure 2, there are two interesting differences. First, the gap between state-owned and nonstate-owned firms narrows, suggesting that some of the gap in Figure 2 is due to the sectoral composition of SOEs and nonstate firms. More notably, the plots for rural and urban SOEs have mostly switched positions, where rural firms now seem to face a higher cost of capital. This strongly suggests the



Notes: This figure presents the distribution of $(\log\hat{\alpha}_s + \log ARPK_j)$, i.e., average revenue product of capital after accounting for differences in relative capital intensity across sectors. Panel A compares SOEs and nonstate enterprises. Panel B compares urban and rural enterprises. Panels C and D repeat the urban-rural comparison separately for nonstate enterprises and SOEs, respectively.

Figure 5: Distribution of $ARPK$ (log scale)

need to account for sector-specific differences in inferring capital returns from $ARPK$, as we do in our regression analysis in the next sections.

5 Empirical results on urban-rural investment gap

5.1 Benchmark result

Table 2 presents the results from our benchmark regression. We report the urban-rural gap in the return to capital among SOEs and nonstate firms. Bootstrapped standard errors are in parenthesis.[9] Column [1] reports the estimated urban-rural gap (i.e., $-\beta$ in equation [11]) for the sample of all firms. The return to capital for urban firms is 7% percent lower than that for rural firms. The difference is statistically significant. In columns [2], we present the difference between SOEs and nonstate enterprises. The gap between SOEs and nonstate enterprises is also significant. The estimated return for SOEs is 0.63 log points less than that for nonstate enterprises. This result reaffirms the long-acknowledged fact that SOEs have cheaper access to capital. In columns [3] and [4], we report the estimated urban-rural gaps separately for SOEs and nonstate enterprises, which reveal a stark difference between these two groups. For SOEs, the urban-rural gap is about 9% and statistically significant. At just under 2%, the gap by nonstate enterprises is quite

[9]The bootstrapping is undertaken using 1000 repetitions.

small. The level of urban-rural gap exhibited by SOEs, compared to that of nonstate enterprises, is thus larger by about 8 percentage points. Column [5] shows that this difference is also statistically significant.

Table 2: Urban-rural gap in capital allocation and state onwership, benchmark results

	[1] All	[2] All	[3] SOE	[4] non-SOE	[5] [3]-[4]
Urban	-0.07***		-0.09***	-0.02***	-0.08***
	(0.01)		(0.01)	(0.01)	(0.01)
SOE		-0.63***			
		(0.01)			
R-squared	0.23	0.25	0.36	0.17	0.27
Observations	1,814,416	1,814,416	299,949	1,544,467	1,814,416

Notes: The dependent variable is $\log ARPK$. Columns [1] and [2] include all firms. Column [3] shows that urban SOEs have a lower MPKR than rural SOEs. Columns [3] and [4] include state- and nonstate-owned firms, respectively. Column [5] shows the difference between state- and nonstate-owned enterprises with respect to the urban-rural gap in returns to capital. Bootstrapped standard errors are in parentheses. All columns include the interaction of prefecture, year and sector fixed effects. *Significant at 10%, **significant at 5%, ***significant at 1%.

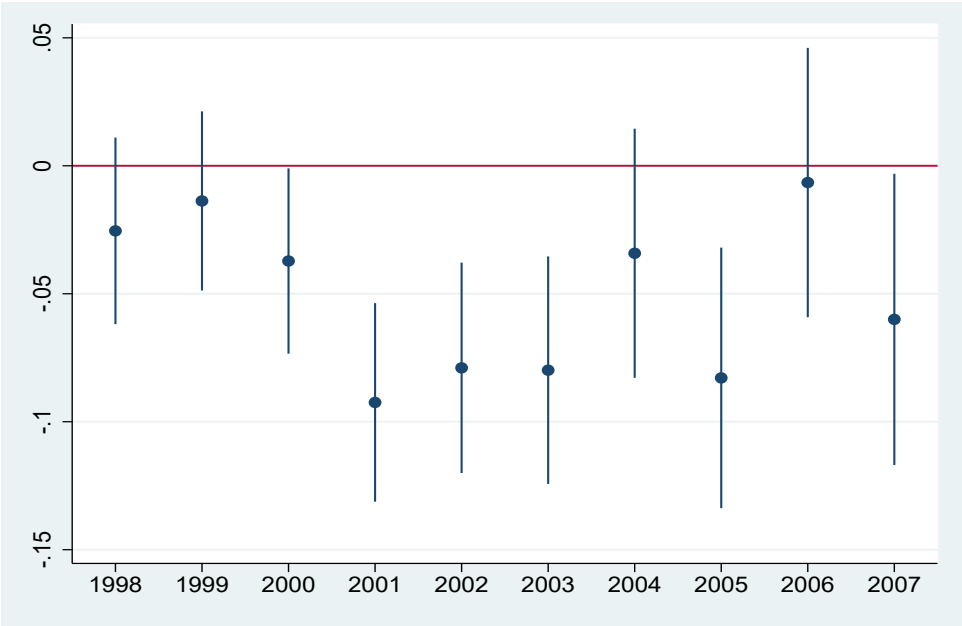
Thus, the overall picture from Table 2 is that, among nonstate enterprises, the urban-rural gap is quite negligible. Instead, urban bias in capital allocation appears to be driven primarily by SOEs.

5.2 Robustness

We now turn to a series of empirical checks to scrutinize the robustness of the main result that SOEs feature a significantly higher urban-rural gap. We first investigate whether the results are driven by some particular outliers rather

than representing a more general pattern. In Figure 6, we check whether the result is driven by unusually extreme outcomes in some particular years. We focus on our main coefficient of interest—the difference between SOEs and nonstate firms with respect to the level of the urban-rural gap in return to capital (i.e., column [5] of Table 2). Despite the substantial change in China's economy over the sample period and the composition of the firms in our sample, the difference between SOEs and nonstate firms with respect to the urban-rural gap remains remarkably stable. Although the coefficients are not statistically significant for some of the years, their signs for each year are consistent with the average coefficient. SOEs display a higher level of urban-rural gap in every year covered by our sample. This result indicates that the level of urban bias among SOEs is not an anomaly of some years. It rather happens to be a notably enduring feature of capital allocation in China.

Table 3 presents further robustness checks to outliers. In Panel A, we trim the sample by dropping 5% of the observations in both tails of the $ARPK$ distribution (i.e., a total of 10%). This helps verify whether a few sets of firms with extreme values of $ARPK$ may drive the results. In Panel B, we restrict our sample to only large firms, in which we drop 10% of the observations in the left tail of the employment distribution. Since SOEs tend to be larger, dropping smaller firms helps limit the comparison between SOEs and nonstate firms to those that are of relatively comparable size. Finally, in Panel C, we drop firms engaged in the production and supply of electricity,



Notes: This figure displays, for each year during 1998–2007, the difference between SOEs and nonstate enterprises with respect to the urban-rural gap in returns to capital.

Figure 6: The difference between SOE versus nonstate firms with respect to the urban-rural gap in returns to capital

heat, gas and water, so as to focus on manufacturing enterprises.

In all of the robustness checks in Table 3, the baseline result remains robust. The urban-rural gap is predominantly a feature of SOEs.

Table 4 reports the sensitivity of our results to alternative measures of the key variables. In Panel A, we repeat the estimation exercise using the alternative definition of state ownership: a firm is categorized as an SOE if at least half of its paid-up capital is provided by the state.

In Panel B, we relax the Cobb-Douglas assumption and instead use data on wages to estimate the urban-rural gap in the cost of capital. From Euler's

Table 3: Urban-rural gap in capital allocation and state onwership, robustness checks

	[1] All	[2] All	[3] SOE	[4] non-SOE	[5] [3]-[4]
Panel A: drop 5% on both tails					
Urban	-0.06***		-0.07***	-0.02***	-0.05***
	(0.01)		(0.01)	(0.01)	(0.01)
SOE		-0.44***			
		(0.01)			
R-squared	0.23	0.25	0.36	0.17	0.27
Observations	1,632,972	1,632,972	217,139	1,415,837	1,632,972
Panel B: drop the 10% smallest firms					
Urban	-0.09***		-0.13***	-0.03***	-0.10***
	(0.01)		(0.01)	(0.01)	(0.01)
SOE		-0.63***			
		(0.01)			
R-squared	0.23	0.25	0.36	0.17	0.27
Observations	1,632,115	1,632,115	241,257	1,381,858	1,632,115
Panel C: exclude utility firms					
Urban	-0.07***		-0.11***	-0.02***	-0.09***
	(0.01)		(0.01)	(0.01)	(0.01)
SOE		-0.64***			
		(0.01)			
R-squared	0.23	0.25	0.36	0.17	0.27
Observations	1,755,543	1,755,543	223,824	1,531,719	1,755,543

Notes: This table reports further robustness checks to outliers. Panel A presents the estimation results after dropping 5% of the observations in both tails of the ARPK distribution. Panel B presents the results for large firms by dropping 10% of the observations in the left-tail of the employment distribution. Panel C presents the results after dropping firms engaged in the production and supply of electricity, heat, gas and water. Bootstrapped standard errors are in parentheses. All columns include the interaction of prefecture, year and sector fixed effects. *Significant at 10%, **significant at 5%, ***significant at 1%.

Table 4: Urban-rural gap in capital allocation and state onwership, sensitivity analysis

	[1] All	[2] All	[3] SOE	[4] non-SOE	[5] [3]-[4]
Panel A: SOE definition based on ownership share					
Urban	-0.07***		-0.09***	-0.02***	-0.07***
	(0.01)		(0.00)	(0.00)	(0.01)
SOE		-0.64***			
		(0.00)			
R-squared	0.23	0.25	0.37	0.17	0.27
Observations	1,702,293	1,702,293	225,581	1,476,712	1,702,293
Panel B: Relax the Cobb-Douglass assumption					
Urban	-0.10***		-0.11***	-0.05***	-0.06***
	(0.00)		(0.01)	(0.00)	(0.00)
SOE		-0.77***			
		(0.01)			
R-squared	0.23	0.25	0.36	0.17	0.27
Observations	1,632,115	1,632,115	241,257	1,381,858	1,632,115

Notes: This table reports the sensitivity of the benchmark results to alternative measures of key variables. Panel A reports the estimation results by defining an enterprise as a SOE if at least half of its paid-up capital is provided by the state. Panel B reports the results using data on wages to compute the cost of capital. Bootstrapped standard errors are in parentheses. All columns include the interaction of prefecture, year and sector fixed effects. *Significant at 10%, **significant at 5%, ***significant at 1%.

theorem for linearly homogeneous functions, it follows that

$$R_j K_j + W_j L_j = P_j Y_j \quad [13]$$

$$\Longrightarrow \frac{P_j Y_j - W_j L_j}{K_j} = R_j \quad [14]$$

To check the sensitivity of our results to the Cobb-Douglas assumption, we use Equation [14] along with data on wages to estimate the urban rural gap in the cost of capital. Our new dependent variable is the log of $(P_j Y_j - W_j L_j)/K_j$. The advantage of this method is that we do not need to restrict the production function to be Cobb-Douglas. The downside is that one has to use information on wages, whose reliability could be of some concern. However, it is noteworthy that the information we use is only the total wage bill (instead of, e.g., wage per worker). Thus, data inaccuracy issues are perhaps not as bad as in the case where one needs to use wage per labor input (instead of the total wage bill) or the quantity of labor (as in, for example, Hsieh and Klenow (2009)).

We source the wage data using information on workers' compensation in the survey. We calculate total compensation to workers by adding all wage and nonwage benefits (subsidies for medical, pension, insurance, welfare and housing spending). To minimize the risk of including inaccurate wage entries, we have also checked our results after dropping outlier observations, namely, dropping 5% of the observations on both tails of the distribution of the new dependent variable (a total of 10%). Nevertheless, this trimming is not found

to affect the results.

According to Panel A of Table 4, the results remain similar when considering our alternative definition of state ownership. Panel B also shows that the pattern remains the same when we define our dependent variable using the wage data. In both panels, urban firms have a lower return to capital than rural firms, and this urban-rural gap is more pronounced among SOEs.

6 The role of financial markets and political factors

We now examine how the urban-rural gap varies across important political and market factors that could affect the gap. We first inspect how the gap varies along with the development of local financial markets, as a better developed financial market may help counter the problem of credit access. Many scholars of urban bias in dictatorial regimes (including China) emphasize that since regions close to government centers tend to be the political arenas where nondemocratic contests for influence occur, such regions tend to receive favorable treatment by the government (Ades and Glaeser, 1995). We thus examine how the urban-rural gap varies depending on the prefecture's proximity to power centers. We do this by comparing prefectures that house provincial governments and those that do not. Finally, we study how the gap changes with the level of direct control of the local economy by the state, as a higher level of control may offer the government a greater leverage

to align the flow of resources with its preferred political objectives. Although the empirical results point out how changes in these market and political factors could matter for urban bias in capital allocation, the results need to be interpreted with caution as we do not have a random assignment of these factors to establish their causal effects.

6.1 Development of local financial markets

The development of financial markets could reduce the costs of external credits for firms and, hence, improve the efficiency of resource allocation (Rajan and Zingales, 1998; Fisman and Love, 2004). Moreover, by increasing market pressure to stay profitable, greater competition among banks could decrease their willingness to discriminate against rural borrowers. The significant variation in the levels of financial development across prefectures provides us with the opportunity to examine the relationship between urban-rural investment gap and the level of financial development of the prefecture.

China's financial market is far from fully developed (Keller et al., 2021). In 2007, the most recent year in our data, the median prefecture in our sample had about one bank branch per 10,000 people. This number is also close to the mean number of bank branches per 10,000 population (about 1.1). According to World Bank (2018), this puts China right at the middle of the 220 countries for which World Bank provides such data.

We measure the development of the local financial market by the number of bank branches in a prefecture per 10,000 population. Table 5 reports our re-

Table 5: Urban-rural gap in capital allocation and development of local financial market

	[1] All firms	[2] SOEs	[3] non-SOE
Urban	-0.10***	-0.20***	-0.07***
	(0.02)	(0.02)	(0.02)
$Urban \times (Bank\ per\ 10,000\ pop)$	0.06***	0.11***	0.05***
	(0.01)	(0.02)	(0.01)
SOE	-0.62***		
	(0.01)		
R-squared	0.24	0.35	0.17
Observations	1,775,217	253,222	1,521,995

Notes: The variable ($Bank\ per\ 10,000\ pop$) is the number of bank branches per 10,000 population. Columns [1], [2] and [3] report the results for the whole sample, state-owned, and nonstate-owned enterprises, respectively. Bootstrapped standard errors are in parentheses. All columns include the interaction of prefecture, year and sector fixed effects. *Significant at 10%, **significant at 5%, ***significant at 1%.

sults. The coefficient on the interaction term $Urban \times (Bank\ per\ 10,000\ pop)$ measures how the urban-rural gap in capital returns depends on the availability of banks in the prefecture. Column [1] reports the results for the whole sample. We find that the urban-rural gap in capital allocation tends to decrease as the accessibility of financial services (as measured by number of bank branches) increases. In our sample of firms, the standard deviation of bank branches per 10,000 population is 0.86 (see Table 1). Hence, according to the coefficient in column [1], an increase in the bank-population ratio by one standard deviation is associated with a 0.052 log points decrease in the urban-rural gap in capital returns. In columns [2] and [3], we report the results for SOEs and nonstate enterprises separately. Interestingly, an increase

in access to banks affects the gap not only among nonstate enterprises but also among SOEs. That is, the gap in access to capital between urban and rural SOEs also decreases with an increase in the development of the local financial markets. This result suggests that development of the local financial market could mitigate the urban bias in capital allocation.

6.2 Provincial versus nonprovincial capitals

In non-democracies, residents close to power centers (such as capitals) are often presumed to wield greater political power, and hence, geographic proximity of a region to power centers could result in a larger inflow of resources (Ades and Glaeser, 1995; Chen et al., 2017). In China's political and administrative hierarchy, provincial governments are the most powerful units next to the central government. Within each province, the provincial government is the highest authority and overlooks the administration of all prefectures within its jurisdiction. Given China's vast geographic area and population size (with a mean population of about 43 million per province), a provincial government overlooks a relatively large political and economic unit. We thus examine if the urban-rural gap differs depending on whether the prefecture is a provincial capital, i.e., the seat of the provincial government.

If the government attributes greater importance to the political stability of urban areas of provincial capitals, this could have a counteracting effect on the urban-rural investment gaps within provincial capitals. On the one hand, the greater concern for stability in urban areas of provincial capitals

Table 6: Urban-rural gap in capital allocation, Provincial versus non provincial prefectures

	[1] Provincial	[2] Non-Provincial	[3] Provincial	[4] Non-provincial
Urban	-0.06***	-0.07***	0.01**	-0.02***
	(0.01)	(0.00)	(0.00)	(0.01)
Urban*SOE			-0.11***	-0.07***
			(0.02)	(0.01)
R-squared	0.19	0.23	0.25	0.28
Observations	277,816	1,536,600	277,816	1,536,600

Notes: This table reports the results for two groups of prefectures—provincial capitals versus other prefectures. Columns [1] and [3] include firms in provincial capitals. Columns [2] and [4] include firms in other prefectures. Bootstrapped standard errors are in parentheses. All columns include the interaction of prefecture, year and sector fixed effects. *Significant at 10%, **significant at 5%, ***significant at 1%.

could incentivize the government to invest more in those urban areas, with the aim to raise incomes for the urban residents and, hence, minimize their dissent.

On the other hand, due to the concern about rural-urban migration, the government could also have a stronger incentive to invest in rural areas of provincial capitals. A larger urban-rural income gap could increase the incentive of rural residents to migrate to urban areas. This potential explosion in urban population due to the influx of rural-urban migrants could thus threaten the fiscal sustainability of subsidizing economic privileges for the expanding urban population. To mitigate this migration concern, the government could have an incentive to invest in rural areas.[10] This is particularly

[10]In fact, China's government is very much aware of this concern and has a number of policies to restrict rural-urban migration and increase rural investment (Chan and Zhang,

relevant for rural areas within the prefecture, as compared to rural areas outside the prefecture, since the former are located relatively nearer to the urban districts in their own prefecture, and hence, their residents face lower migration costs to move to the urban districts in response to the income gap.[11] As a result, a greater concern for urban stability in the provincial capital could lead to not only a higher level of urban investment, but it could also incentivize the government to invest more in rural areas of the provincial capital. Thus, a priori, it is not obvious whether the potentially higher political power of residents in urban areas of the provincial capitals results in a larger urban-rural investment gap within those prefectures.

In Table 6, we compare the urban-rural investment gap in provincial capitals with the gap in other prefectures. In columns [1] and [2], we report the estimated gap separately for these two groups of prefectures. The urban-rural investment gaps for the two groups of prefectures are quite similar. Column [1] shows that the urban-rural gap in provincial capitals is about 6%. Standing at 7%, the gap for nonprovincial capitals is quite close to that of the provincial capitals and is statistically indistinguishable from the latter.

Columns [3] and [4] show whether the urban-rural gap among SOEs exhibits a systematic difference between provincial capitals and other prefectures. In provincial capitals, the urban-rural gap among SOEs is about 11

1999; Au and Henderson, 2006a).

[11] Moreover, China's system of internal migration restrictions (hukou) tends to impose higher barriers on inter-prefecture migrants than intra-prefecture migrants (Chan and Buckingham, 2008).

percentage points larger than that among nonstate firms. For other prefectures, the gap is 7%, which is 4 percentage points lower than the gap in provincial capitals. However, this difference between the two groups of prefectures is not statistically significant. Although previous studies have noted that politically favored prefectures enjoy lower capital costs (Chen et al., 2017), our result here shows that with regard to within prefecture urban-rural distortions, prefectures with different political status appear to have a comparable trend.

6.3 State control of the local economy

Turning to the relationship between the urban-rural investment gap and the dominance of the state sector in the local economy, one could expect that the gap may increase in prefectures where the government has greater control of the local economy. First, the dominance of the state sector in the prefecture could enable the government to have more direct control over resources to support its favored policies, such as encouraging investment in urban areas. Second, a higher concentration of SOEs in the local economy could decrease the level of competition among existing firms and, hence, undermine market pressures against distortions. Moreover, as we note above (Section 6.2), the potential threat of rural-urban migration could pose a constraint on the state's incentive for overinvesting in urban areas. However, if the state has greater control over the local economy, this threat may not be as binding. This could happen because the government's direct control (e.g., through firm

ownership) could enable it to discourage rural-urban migration by denying employment opportunities at urban SOEs to would-be immigrants, who, in the absence of the employment discrimination by SOEs, could have moved to urban areas in larger numbers in search of better wages (Song, 2016). Thus, as the state acquires greater control over the economy, it can sustain a larger urban-rural income gap with less concern about the threat of rural-urban migration.

Table 7: Urban-rural in capital allocation and SOE share in local economy

	[1] All firms	[2] SOEs	[3] non-SOE
Urban	0.03***	0.04**	0.02***
	(0.00)	(0.02)	(0.00)
Urban*(SOE Share)	-0.16***	-0.21***	-0.14***
	(0.01)	(0.03)	(0.01)
R-squared	0.23	0.36	0.17
Observations	1,805,031	267,420	1,537,611

Notes: The variable *SOE Share* is the the number of workers employed by the SOEs in the prefecture, as a share of the prefecture's total employment. Columns [1], [2] and [3] report the results for the full sample, state-owned, and nonstate-owned enterprises, respectively. Bootstrapped standard errors are in parentheses. All columns include the interaction of prefecture, year and sector fixed effects. *Significant at 10%, **significant at 5%, ***significant at 1%.

As an indicator for the dominance of the state sector in the local economy, we use the share of workers employed by SOEs in the prefecture, out of the prefecture's total employment in our sample. Table 7 presents the results. In the first column, we include all observations in our sample. The variable *SOE Share* is our indicator for dominance of the state sector in the

local economy. The coefficient on the interaction term (between *Urban* and *SOE Share*) is negative and significant, implying that an increase in the dominance of the state sector worsens the urban-rural gap in capital allocation. The magnitude is also not negligible—an increase *SOE Share* by one standard deviation is associated with a 3.7 percentage point increase in the urban-rural gap in the return to capital.

In columns [2] and [3], we repeat the estimation separately for SOEs and nonstate firms. The coefficients reveal that as the share of SOEs increases, the urban-rural investment gap increases among both the SOEs and nonstate firms. However, the increase among SOEs is larger than that among nonstate enterprises. For SOEs, a one percentage point increase in *SOE Share* is associated with a 0.21 percentage point increase in the urban-rural gap in the return to capital, while for nonstate firms, a similar increase in *SOE Share* is associated with a 0.14 percentage point increase in the urban-rural gap. This difference between SOEs and nonstate enterprises is statistically significant. The stronger effect of *SOE Share* among the SOEs suggests that the government may find it more convenient to favor urban investment if it has greater control over the local economy.

Finally, although it is smaller than the effect among SOEs, the significant effect of *SOE Share* on the urban-rural gap for nonstate enterprises is also noteworthy. In the context of China, where political connections are quite important (Jia et al., 2015), it is not implausible that an increase in the clout of the state sector influences resource allocations by the nonstate sector as

well. With the increase in the number of officials working in the state sector, the officials could generally acquire greater influence on the flow of resources even among nonstate enterprises through, for instance, increased influence on input markets and local bank managers.

7 Conclusion

The idea that autocratic governments favor urban areas in capital allocation has long been a central thesis in the development literature. However, empirical evidence on whether urban areas in autocratic states indeed have a cheaper access to capital is lacking. The existing evidence has mostly been limited to a comparison of the total stock of public investment between urban and rural areas. However, a larger stock of capital in urban areas may not necessarily imply inefficient subsidies to urban areas since, owing to their better connectivity and population agglomeration, they could be more efficient investment locations. Our paper fills this important gap in the literature. Using micro data from China, we document the empirical evidence on urban bias in capital allocation.

The results show that the return to capital tends to be lower in urban areas, indicating that firms in urban areas have cheaper access to capital. Importantly, the urban-rural gap in returns to capital is mainly driven by SOEs. For nonstate–owned enterprises, the gap is found to be negligible. This pattern suggests that investment choices by the state, as opposed to

constraints faced by nonstate enterprises in rural areas, are the more likely factor driving the gap. We also document some important variations in the urban-rural investment gap. We find that the gap narrows with increases in the development of local financial markets. We find no significant difference in the urban-rural investment gap between provincial capitals (i.e., prefectures hosting the provincial government) and other prefectures. On the other hand, a greater dominance of the local economy by SOEs is associated with a higher level of urban-rural investment gap.

Although the dataset in our analysis offers the benefit of examining the urban-rural investment gap by nonstate and state sectors within a relatively comparable setting, it is far from comprehensive. Our focus on investment by SOEs in the manufacturing sector leaves out a large portion of government investment in other sectors, such as health care, education and infrastructure. However, we conjecture that our finding on urban bias from the manufacturing data is likely to reflect the broader investment patterns by the state. Unlike other state agencies undertaking public investments (such as government agencies investing in public schools and hospitals), many SOEs have to compete with nonstate firms to make profit, and hence, they are subject to some market pressures against allocation distortions. However, for state agencies that are not subject to such market pressures, they perhaps have a greater room to maneuver resource allocations along political considerations, including bias to urban areas. For example, whereas the marginal return to investment in under-resourced rural schools could be much higher than that

in well-funded urban schools, the market pressure to redirect resources to the rural schools could be lacking. Hence, for urban investment biases in other state sectors, wherein market pressure is virtually missing, our estimates are likely to represent lower bounds. Nonetheless, a more comprehensive picture of the extent of urban bias in all state sectors warrants future research.

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