The Origins of Private Sector Entry in China's Economic Transformation *

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Abstract

China's economic transition features private sector growth alongside the strengthening of the state economy, especially after the state-owned enterprises (SOEs) reform in the late 1990s. We explore the paradoxical co-expansion of state and private economies and find that the mass private sector entry stemmed from the exit of the once-vast collective economy, while SOEs had been restructured and retained monopoly power and failed to facilitate the private economy. The collective-private transformation is more pronounced in low SOE presence, competitive, downstream, and labor-intensive industries. Most private sector entry was not driven by ownership relabeling or privatization, but by broader resource reallocation within the nonstate sector. China's private sector has institutional roots in the collective forms of the planned economy, which retained residual market activity and enabled a smoother transition to reform.

Keywords: SOE reform, Market entry, COEs, Private enterprise, Transformation

JEL Codes: J63, P31, M21

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1 Introduction

China's market-oriented transition began in the late 1970s, but permission to file bankruptcy and privatization of SOEs, called SOE reform, was delayed until the late 1990s (Brandt and Rawski, 2008; Hsieh and Song, 2015). The reform aimed to address the inefficiencies of the state economy; thereafter, SOEs had been restructured and continued to dominate numerous industries (Szamosszegi and Kyle, 2011; Naughton and Tsai, 2015). At the same time, the reform had triggered a surge in market entry, expanding the private sector's share, and driving resource reallocation and productivity growth (Brandt, Van Biesebroeck, and Zhang, 2012; Jiang, Zheng, and Zhu, 2024; Song, Storesletten, and Zilibotti, 2011). Within nearly a decade, the private sector has grown from a minor role to a major part of the economy. Intuitively, the common narrative often attributes mass entry and rapid development of the private economy to the exit or privatization of SOEs, but causal evidence for this claim is lacking.[1] In contrast, a growing body of literature casts doubt on the effectiveness and gains of SOE privatization(Berkowitz, Ma, and Nishioka, 2017; Brandt, Kambourov, and Storesletten, 2025; Huang, Li, Ma, and Qian, 2021). This study revisits this key transformative period of China's economy and documents the true driver behind the rise of the private economy.

We start the analysis by illustrating the dual, seemingly contradictory, growth of the state and private sectors during the reform period. As shown in Figure 1, following the reform initiated at the end of 1997, the state sector was downsized in terms of employment and SOEs numbers, but the total assets and output of the entire state economy continually grew. These stylized facts indicate that many loss-making SOEs have truly gone private or bankrupt, but restructured SOEs expanded the state economy and further strengthened their monopoly power(Rubens, 2023). Moreover, SOEs are not, as often said, only retained in specific sectors (Naughton, 2017). Table 1 shows that SOEs had expanded in most provinces and industries

[1]Based on province-level data, Fang, Li, Wu, and Zhang (2023) found that after the reform, there is a positive correlation between the reduction in the SOEs workforce and the entry of private firms. In section 3, we will discuss how the endogeneity of this relationship may lead to qualitatively bias.

until at least 2002. Hence, the surge of private firms into state-dominant sectors was nearly impossible as SOEs would keep posing entry barriers(Brandt et al., 2025).[2] Surprisingly, private enterprises have increased the speed of market entry since 1998, as shown in Figure 2. In addition, China's economy has achieved sustained growth during 1998-2000 and avoided the recession experienced by other transition economies during their privatization processes (Kornai, 1994; Estrin, Hanousek, Kočenda, and Svejnar, 2009).[3] Therefore, the seamless co-evolution of state capitalism and a growing private economy in China presents an intriguing paradox.

We offer an explanation to reconcile the paradox by considering another neglected but huge public sector in the mid-1990s, the collective sector, which has faded away nowadays.[4] Collectively owned enterprises (COEs)—including urban collective enterprises and rural township and village enterprises (TVEs)—have been a consistent part of China's public economy since the inception of the planned system in the 1950s. Although COEs held a secondary position within the public sector and were concentrated in non-strategic industries, they contributed 36% of total industrial output in 1995, surpassing the 34% share of SOEs. As a main part of the public economy, COEs are inevitably involved in the reform. However, COEs took a divergent reform path and rapidly withdrew as compared to SOEs (can be seen in Figure 1). By comparing data from the Chinese Industrial Census for 1995 and 2004, we observed a rapid decline in the numbers, employment, and industrial output of COEs. As shown in Table 1, this decline occurred uniformly across regions and industries, resulting in the near disappearance of this once-vast public sector. We propose that it is the complete withdrawal of COEs, not the restructuring of SOEs, that vacated the market

[2]It was not until 2005 that the State Council implemented the "36 Clauses", marking the first formal attempt to specify areas open to private sector entry(Qian, Ru, and Xiong, 2024). Therefore, the observed surge in private firm entry following the reform cannot be simply attributed to a relaxation of formal entry barriers in state-dominated sectors, highlighting the need to explore deeper institutional mechanisms.

[3]The reform drove the privatization of the national economy, since the share of domestic private enterprises accounting for the total industrial output increased from 3.9% in 1998 to 29.6% in 2008.

[4]Previous studies often overlook collective enterprises either by excluding them from the sample (e.g.,Fang et al., 2023) or by grouping them with SOEs, treating them as institutionally similar (e.g.,Cheremukhin, Golosov, Guriev, and Tsyvinski, 2024).

space which facilitated the entry of private enterprises.

This hypothesis is tested using a generalized difference-in-differences approach. Prior to the reform, the economy was burdened by inefficiencies and distortions stemming from public ownership of SOEs and COEs. Cities with a higher concentration of insolvent or loss-making SOEs and COEs were under greater pressure to reform, as these distortions signaled more urgent local needs for reform. Accordingly, the share of insolvent or loss-making SOEs and COEs serves as a direct proxy for the severity of pre-reform distortions and thus for the intensity of the anticipated reform shock. The identification strategy exploits two dimensions of variation: (1) cross-city differences in the prevalence of financially distressed SOEs and COEs prior to the reform, and (2) the temporal change before and after the reform implementation.

We aggregate the total employment in insolvent and loss-making SOEs and COEs, divide it by the non-agricultural population at the city level, and use these to measure the reform intensity in the state and collective sectors, respectively.[5] These two intensity variables are strong predictors of actual layoffs or employment reductions.[6] The Pearson correlation coefficient between SOE reform intensity and actual layoffs is 58%, indicating that employment in insolvent and loss-making SOEs captures labor redundancy and is a good predictor of subsequent layoffs. The correlation between the employment of loss-making and insolvent COEs and the real employment reductions ranges from 54% to 79%.[7] Since the state sector underwent restructuring while the collective sector was essentially withdrawn, these two intensity variables, respectively, capture the degree of SOE restructuring and COE withdrawal.

The empirical results support our hypothesis. Cities that underwent a more extensive SOE restructuring did not experience a higher influx of private enterprises compared to other

[5]We also measure based on change of the product market with the share of the output of the insolvent and loss-making SOEs and COEs at the city level. We obtain consistent conclusions.

[6]The actual number of layoffs is likely endogenous, as local governments gradually adjust reform policies based on local economic conditions, while the central government grants some autonomy to local authorities(Huang, Li, Ma, and Xu, 2017). As a result, we do not use the real number of layoffs as a measure of public enterprise sector reform intensity.

[7]There are no official statistics on COE layoffs.

cities. This suggests that SOE restructuring had no positive effect on the entry of private enterprises. In contrast, cities that experienced a greater COE withdrawal saw a significantly higher number of private enterprises being established, indicating that COE withdrawal facilitated private sector entry. The estimated coefficients reveal that for every increase of 10,000 employees from insolvent and loss-making COEs, approximately 213 private enterprises were established annually, on average. These findings remain robust when considering alternative measures of intensity variables and accounting for other confounding factors, such as pre-reform pilot programs, intercity labor migration, and place-based stimulus policies.

Two alternative explanations are considered. First, we carefully rule out the dominance of either the purely relabeling or privatization story, in which all private enterprises were simply relabeled or privatized from COEs, especially collective TVEs. We provide evidence to show that a one-to-one pattern of ownership relabeling cannot fully account for the magnitude or heterogeneity of the private sector expansion we observe. Meanwhile, privatization is not a credible explanation for the difference in the effects of SOE restructuring and COE withdrawal on private entry, since the scale of privatization is also noticeable in the SOEs sector (see Table A10). The more direct result is that the COE withdrawal has promoted wholly foreign-owned enterprises and self-employed manufacturers, both of which are unlikely to have been relabeled or privatized from COEs. Therefore, we consider that the reallocation of resources occurred within the nonstate sector and *de novo* private enterprises account for the majority of entrants, which are induced by the market space released by the withdrawal of COEs. Second, export-driven activities and WTO accession may explain the simultaneous expansion of the state and private sectors. Even so, it cannot explain the difference between the effects of SOE restructuring and COE withdrawal on private sector entry. The baseline regression incorporates pre-reform export intensity, which helps account for the potential demand effects of exports. Additionally, by including the shock of trade liberalization as a control variable, we find that the impact of COE withdrawal on private sector entry remains significant.

The finding of the irrelevance of SOE restructuring with private enterprises entry supports the theoretical prediction in Brandt et al. (2025), which argues that the state economy posted entry barriers for potential entrepreneurs. We find that the extent of the reduction of COEs output and assets is positively correlated with the extent of COE withdrawal. However, the output and assets of SOEs did not show significant changes in the cities exposed to greater reforms in SOEs sector (see Table 8). [8] Consequently, we propose that the restructured SOEs continuously posed entry barriers for new private enterprises although it also freed up labor resources. We test the entry barriers mechanism by adopting industry heterogeneities. Given that SOEs predominantly and continually occupied specific industries, we find that the collective-to-private shift is more pronounced in industries with a low share of SOEs, competitive, and downstream industries.

If the COE withdrawal vacated the market share for potential entrepreneurs, new entrants should primarily be driven by the emergence of market opportunities rather than necessity. A nationally representative sample from the Chinese Private Enterprise Survey reveals that during the post-reform period, only a minority of new private enterprises were founded by necessity-driven entrepreneurs who started their businesses due to being laid off. To further strengthen this argument, we highlight the entry of wholly foreign-owned enterprises, where the entrepreneurs were clearly not laid-off domestic workers. We confirm that COE withdrawal is associated with opportunity-driven entry.

We then explore the mechanism from the perspective of resource reallocation within the nonstate sector. The labor market liberalization resulting from the reform, accompanying a significant influx of skilled workers into the workforce, could thus trigger human capital reallocation. By analyzing the Chinese Private Enterprise Survey data, we observe a reorganization in new private enterprises of both employees and entrepreneurs who quit from the former public enterprises. We also find that the impact of COE withdrawal on the private sec-

[8] Morever, the average output of industrial SOEs was three times that of private enterprises in 1998. In 2008, this ratio had increased to 13 times (with the ratio for fixed assets increasing from 11 to 45 times), highlighting the rapid expansion of the size advantage of SOEs over private enterprises. See data illustrated in Figure A1.

tor is more pronounced in labor-intensive manufacturing industries than in capital-intensive ones. Therefore, we confirm the mechanism that COEs went bankrupt, freeing up market share and human capital that contributed to the entry of *de novo* enterprises, primarily driven by opportunity.

Finally, we examine the effect on the quality of private sector entry and size expansion of the private economy. The results show that the private entrants are not of low quality as they exhibited comparable survival rates over the long term. The COE withdrawal was associated with an increase in employment, registered capital, profit, value added, industrial output, and fixed assets in the private sector. Therefore, mass entry has contributed to the rapid and lasting expansion of the private sector in cities where the collective sector has experienced a more substantial retreat.

This paper contributes to a broader literature that seeks to explain the institutional foundations of China's market transition and helps to address the central question of why China was able to embrace market forces without undergoing systemic collapse. Scholars have emphasized the role of incremental reforms (Naughton, 1995), local experimentation and fiscal decentralization (Qian and Weingast, 1997; Chen, Li, and Zhu, 2024), dual-track pricing reforms that avoided distributional shocks (Lau, Qian, and Roland, 2000), and adaptive informal institutions that allowed markets to emerge within the planned economy (Xu, 2011). Building on this literature, our paper identifies a previously underappreciated institutional legacy: the collective sector. We argue that COEs, rooted in the planned economy and many of which were established as early as the 1950s and continued to emerge through the 1990s, responsive to market incentives, played a pivotal transitional role in enabling private sector development alongside a dominant state sector. In line with Cheremukhin et al. (2024), we emphasize the importance of pre-1978 institutional foundations in deepening our understanding of China's economic development.

More specifically, previous studies in the literature on TVEs have explicitly pointed out that collective ownership will not dominate private ownership within a regular economic envi-

ronment (Tian, 2000), and the effective disappearance of collective TVEs coincides with the rise of the private sector (Huang, 2008; Kung and Lin, 2007; Garnaut, Song, Yao, and Wang, 2012; Xu and Zhang, 2009). To the best of our knowledge, we are the first to document the causal link and add to the positive role of urban COEs which was largely ignored in the literature. We move beyond the conventional focus on ownership conversion or privatization *per se*. Instead, we show that the long-standing collective sector laid an institutional foundation for extensive *de novo* private sector entry by nurturing market mechanisms, entrepreneurial behavior and human capital.

We develop a new empirical strategy to identify the consequences of SOE reform, and the results add to the growing debate in the literature about state capitalism in China (Allen, Cai, Gu, Qian, Zhao, Zhu, et al., 2024; Fang et al., 2023; Naughton and Tsai, 2015; Naughton, 2017; Szamosszegi and Kyle, 2011). First, mainstream narratives often use significant reductions in SOE employment and the declining share of SOE output to describe the downsizing of the state sector since the late 1990s. However, we present an overall picture of state restructuring which is characterized by a reduction in employment and firm quantity, but a sharp increase in the scale of output and total assets. Aligning with our viewpoints, Naughton (2017) highlighted that there is no industry in which the state economy has completely disappeared in China. Second, previous studies have confirmed the positivity of SOE reform by examining SOE privatization, decentralization, and the performance of privatized SOEs (Bai, Lu, and Tao, 2009; Estrin et al., 2009; Huang et al., 2017). We differ in finding that SOE restructuring was not the driver for mass entry in the private sector, which is corroborated with conclusions regarding the limited effect of the SOE reform (Berkowitz et al., 2017; Brandt et al., 2025; Hsieh and Song, 2015; Huang et al., 2021).

This paper also relates to a large body of literature on economic transitions. Privatization serves as a core pathway for transformation in transitional countries, and existing research has extensively explored the issues surrounding privatized enterprises (Megginson and Netter,

2001; Djankov and Murrell, 2002; Jefferson and Su, 2006; Estrin et al., 2009), we differ in emphasizing the extensive margin of *de novo* private sector entry. We highlight that adequate market space transferred from the public to the private sector is a prerequisite for efficient resource utilization by entrepreneurs in a transition economy, which is the key to the success of market-oriented transition (McMillan and Woodruff, 2003; Brandt et al., 2012; Song et al., 2011). Our findings also highlight that the reallocation of the labor force by entrepreneurs plays a crucial role in China's transition.

The remainder of the paper is structured as follows. Section 2 describes the background of China's public sector reform in the late 1990s and the conceptual framework. Section 3 introduces the empirical strategy and displays our data. Section 4 presents our main results. The discussion is in Section 5. Section 6 offers our conclusions.

2 Background and Conceptual Framework

2.1 Institutional Background

2.1.1 Pre-reform situations and the collective economy

In the context of the transition of China, compared to other transition economies, it exhibits two notable characteristics, which were critical premises for SOE reforms in the late 1990s. First, China gradually established market mechanisms beginning in the late 1970s. This transition was driven by incremental and experimental reforms. The introduction of a dual-track system allowed market prices to coexist alongside planned allocations, fostering competition, and improving resource efficiency without dismantling the state-controlled framework (Brandt and Rawski, 2008). Despite various minor SOE reforms since 1978, the rigid system of the state economy remained largely untouched, and urban areas remained dominated by the public sector until the mid-1990s (Groves, Hong, McMillan, and Naughton, 1994). In 1995, prior to permitting SOEs to declare bankruptcy, the public sectors repre-

sented 87% of total urban employment and 70.4% of total industrial output, with 34.1% of this output coming from the SOE sector and 36. 3% from the COE sector.

Second, prior to the legal recognition of private ownership, China permitted the development of nonstate economic activity from the establishment of the planned system in the 1950s through the reform era into the 1990s, resulting in a collective sector that, by the 1990s, rivaled the state sector in scale (Xu, 2011).[9] The collective sector was a largely neglected but significant part of China's public enterprise system. In definition, COEs are collectively owned by community members or specific groups, such as employees, residents, or even SOEs, and are affiliated with various levels of government. Collective ownership introduced a unique dichotomy within the public sector of the economy, a distinction not observed in other transitional economies (Naughton, 1994a). These enterprises, lacking clear ownership, resemble the 'third form' of ownership described by Kornai (1990), and operate in a form that was neither state-owned nor privately owned. Both urban COEs and collective TVEs operated under collective ownership.[10] While the latter are well known for their entrepreneurial role since the 1980s, the former have received comparatively little attention in the existing literature (Weitzman and Xu, 1994; Putterman, 1997; Kung and Lin, 2007).[11]

Since the establishment of the planned economic system in the 1950s, the state sector had long prioritized heavy and strategic industries. However, to alleviate persistent shortages of light industrial and consumer goods in urban areas, governments gradually acquiesced

[9]During the socialist transformation of the 1950s, millions of self-employed handicraft producers were reorganized into collectively owned production cooperatives, laying the institutional foundation for the urban collective sector. At the same time, the collectivization of agriculture led to the creation of rural communes and brigade-level collective organizations, which later evolved into TVEs and provided the organizational basis for rural industrialization in the reform era.

[10]It is important to distinguish between COEs and TVEs. While the term TVE emerged in official discourse around 1984 to describe rural collective or private enterprises operating under market-oriented reforms, the collective ownership form itself has much deeper historical roots. COEs were institutionalized during the socialist transformation of the mid-1950s, especially through the 1956 campaign to transform handicraft and small-scale industries into collectively owned production units. As such, COEs represent a core component of public ownership distinct from, yet parallel to, state ownership. In our study, we treat TVEs—particularly those under collective ownership—as a subset of COEs. This distinction is crucial for understanding the institutional continuity between the planned economy and China's market-oriented transition.

[11]TVEs included both collective and private forms. Jin and Qian (1998) show that the relative share of collective versus private TVEs varied significantly across regions, shaped by central government influence, local administrative capacity, and the degree of market development.

to—and in some cases actively encouraged—the development of the collective sector. In rural areas, the collectivization of agriculture during this period also gave rise to commune- and brigade-run enterprises, which later evolved into TVEs during the reform era. Unlike SOEs, which were concentrated in capital-intensive sectors such as heavy industry and upstream resource extraction, COEs focused on labor-intensive activities, including light manufacturing, consumer goods, and services.

COEs have long functioned as pragmatic institutional solutions, addressing pressing needs such as job creation and consumer goods shortages, while sidestepping ideological conflict. In the era of planned system, China's political business cycle saw alternating right and left policies, leading to dynamic adjustments in the role of the collective economy as a complement to SOE (Cheremukhin et al., 2024; Xu, 2011). In the late 1970s and 1980s, even some SOEs funded collectively owned factories to resettle sent-down youth returning to urban areas and employ the offspring of SOE workers.[12] As a result, COEs have consistently held a subordinate political status relative to SOEs. The government's guiding principle for collective enterprises is "*du li he suan, zi fu ying kui*" (independent accounting and self-responsibility for profits and losses), which emphasized relatively financial autonomy. Most COEs were affiliated with county or township governments, which operated under a more decentralized administrative structure. Reflecting their institutional origins and governance structure, COEs were typically more responsive to market forces than SOEs, more flexible in resource allocation, and less subject to direct intervention from the central government.

2.1.2 The reform and divergent paths among SOEs and COEs

By the 1990s, most SOEs and COEs were plagued by low productivity, financial struggles, and workforce redundancies (Meng, 2003). The genuine determination emerged at the end of 1997 when economic reform became imperative due to the enormous losses caused by

[12]Since rural-to-urban population mobility was largely restricted, the spontaneous establishment of TVEs in rural areas has mainly absorbed a large surplus of rural labor.

SOEs and COEs, which had severely hindered China's economic development.[13] The central government designed a three-year SOE restructuring reform from 1998 to 2000. The primary objective of the reform was to address the financial losses of large and medium-sized SOEs, and the key measure being "*Jian yuan zeng xiao*" (reducing staff and increasing efficiency), aimed at alleviating the labor burden on SOEs to boost productivity. Given the gravity of the layoff issue and the pervasive involvement of SOEs in nearly every aspect of urban life, the reform not only affected SOEs themselves but also led to widespread systemic transformations, including the establishment of a bankruptcy system, an enhanced legal framework for property rights, housing market privatization, and changes to the urban labor market(Brandt and Rawski, 2008).

It is important to note that the government did not characterize the reform as SOE privatization, nor did it seek to privatize the entire state-owned sector, as no government document makes any reference to such an effort. A more accurate term for the reform is SOE restructuring. Widely recognized as "*grasp the large and let the small go*"(Hsieh and Song, 2015), SOE restructuring can be roughly categorized into two key aspects: consolidation of thousands of large SOEs to create larger and more competitive entities, and privatization or bankruptcy of numerous small and medium-sized loss-making SOEs. Restructuring efforts could involve mergers or reorganizations in which financially stable SOEs acquire struggling and debt-laden companies(Hu, 2000). Rubens (2023) illustrates this process in the tobacco industry, where smaller manufacturers were closed and the market consolidated into several state-owned monopolies. Consequently, this restructuring of the state economy led to the closure of tens of thousands of SOEs and massive layoffs. Meanwhile, an intended outcome was a larger state sector controlled by a smaller number of hyperscale SOEs.

As Figure 1 shows, the number of SOEs and employment in the state sector has decreased dramatically since 1997, but the total industrial output and assets have expanded steadily.

[13]The pilot of SOE reform began in 1994 across 18 cities. However, the primary objective of the central government was to address the issues of economic overheating and inflation that emerged in 1994 when the CPI increased to 24. 1%. This objective was achieved in 1997 when the CPI was 2. 8%, leading to a shift in focus toward the widespread reform of SOEs.

This implies that many SOEs exit, but part of the SOEs survived and maintained the total size of the original state economy. Moreover, as mentioned before, SOE restructuring was not driven by specific regions or industries. Table 1 shows that in the three-year reform period of 1998-2000, 30 of the total 31 provinces experienced a reduction of firm number and employment in SOEs, but none of them experienced a decrease in industrial output and value added (or all of them increased since no provinces maintained the values). Similarly, at the industry level, 35 of the 38 industrial sectors experienced firm exits and employment reductions by SOEs, but only 4 experienced a decrease in industrial output.

Although the reform primarily targeted SOEs, COEs were inevitably involved. As reform measures allowed the withdrawal of public ownership and promoted private ownership, the already inefficient collective economy became increasingly uncompetitive. However, COEs were largely overlooked in state restructuring due to their lower political status, non-strategic role, and weaker bargaining power. The government's attitude and approach to COEs during the reforms differed significantly from SOEs. For example, bankruptcy laws for SOEs included special provisions that were not extended to nonstate enterprises, including COEs.[14] Meanwhile, the 1994 tax-sharing reform significantly reduced local governments' fiscal revenues and weakened their incentives to continue operating collective TVEs (Kung and Lin, 2007). When the central government formally permitted public enterprises to exit in 1997, many local governments took the opportunity to offload loss-making COEs, accelerating their withdrawal. Consequently, the exit of COEs occurred more rapidly and extensively than that of SOEs.

For COEs, Figure 1 shows a clear trend of decreasing firm numbers, employment, and industrial output. According to data from the China Industrial Statistics Yearbook, the share of COEs in total industrial output fell to 3.9%, compared to 34.8% for SOEs in 2008.

[14]In 1994, the State Council launched a special bankruptcy initiative—"Notice on Issues Related to the Bankruptcy of SOEs on a Trial Basis in Several Cities" (Document No. 59)—which applied only to state-owned industrial enterprises in designated pilot cities (initially 18, later expanded to 111 by 1997). SOEs in non-pilot cities could only undergo bankruptcy under the general Bankruptcy Law, which was revised in 2002 to incorporate these provisions. By contrast, bankruptcies of nonstate enterprises, including COEs, remained subject to the Civil Procedure Law.

Table 1 illustrates the decline in firm numbers, employment size, output, and value added of COEs in most provinces and industries from 1997 to 2004 (or COEs that exceeded designated size from 1999 to 2002), indicating a complete retreat of COEs across regions and industries. As a result, COEs that generated losses were quickly abandoned, and the collective sector was eventually withdrawn altogether.

2.1.3 The surge of private sector

Following the opening in 1978, the private economy began to recover (Garnaut et al., 2012). In urban areas, self-employed businesses played a pragmatic role in the 1980s, particularly in absorbing sent-down youth returning from rural areas. Then the government gradually allowed private enterprises to gain legal status. However, the dominant position of the public sector remained largely unchanged until the mid-1990s. In 1995, while 144 million urban employees worked in state and collective sectors, only 4.85 million were employed in private enterprises and 15.6 million were self-employed.[15] Song et al. (2011) find that the private sector remained relatively small until 1997, with most of the transition occurring thereafter.

In cooperation with the three-year plan for SOE restructuring, to encourage the development of the private economy became a strategy to ease the pressure on employment. The central government progressively standardized the framework of a more market-driven social security system, effectively replacing the job security once provided by SOEs with a market-based system (Dong and Xu, 2009). Local regulations on private sector entry were relaxed and supportive policies were implemented to address the reemployment pressures of laid-off workers and the influx of new labor forces. These measures, in turn, strengthened *de facto* private property rights.[16] Hostility to and restraint on private equity have been greatly reduced.

[15] Data source is *China Statistical Yearbook*, 1996: Table 7-1.

[16] The *de jure* private property rights strengthened gradually. The 1982 Constitution initially state that only self-employment was allowed and private enterprises was not recognized. The amendment to the Constitution in 1988 included the private economy in the Constitution, recognizing its legal status and affirming that it was a complement to the socialist public economy. The 1999 constitutional amendment affirmed that the private sector and other non-public sectors are an essential part of a socialist market economy.

The private economy has accelerated its expansion since the reform. As depicted in Figure 2a, the number of newly registered private enterprises exhibited rapid growth from 1993 to 2008, especially after 1998. Millions of private enterprises and self-employed businesses sprang up like mushrooms. By the end of 2008, there were a total of 28.74 million registered self-employments with 81.95 million employees, and 3.87 million registered private enterprises employing 93.87 million people.[17] For the scale of private economy, Figure 2b shows the industrial output of domestic private enterprises increased every year in the sample period with a rapid growth rate. Consequently, as Song et al. (2011) calculated, the proportion of private enterprises as a percentage of total industrial enterprises increased from 4% in 1998 to 56% in 2007.

2.2 Conceptual Framework

A central question in the literature on transition economies is how market forces emerge and private enterprises develop. In an ideal scenario, if a planned economy was to transition into a free-market economy with government-owned enterprises allowed to go bankrupt, the advantages of private ownership would force unprofitable and inefficient government-owned enterprises to exit. The resources they had occupied would be reallocated by entrepreneurs, leading to the emergence of a large number of private enterprises (either newly-established or privatized) and significant productivity improvements (Kornai, 1990).[18]

However, if we introduce a friction into this transition process—namely, selective and incomplete bankruptcy measures, where some government-owned enterprises are allowed to fail while others are protected and strengthened—the outcomes could differ. This pattern reflects the reality of China's policy environment in the late 1990s. Drawing on the insti-

[17] Data source is *China Economic Census Yearbook 2008: Table 1-05, 1-23.* The employment size of self-employment and private enterprises in urban areas are 36.09 and 51.24 million, respectively, based on *China Statistical Yearbook, 2009*: Table 4-1.

[18] Laid-off managers, particularly from the public sector, became entrepreneurs. Fang et al. (2023) noted high-skilled SOE layoffs boosted entrepreneurship in the 1990s. While their study primarily examined individual labor supply decisions, we aim to comprehend the dynamics of private sector entry within the broader context of economic transition and market structure.

tutional characteristics of the pre-reform period, we examine China's privatization process under such frictions and develop a conceptual framework to guide our empirical analysis. In particular, we propose a mechanism that differentiates between two types of public firms, SOEs and COEs, to explain the divergent patterns of private sector entry observed during the reform era.

Selective Restructuring and Entry Barriers from SOEs. According to industrial organization theory, incumbent firms enjoy rents derived from their established positions, and new entrants must overcome entry barriers and incur initial entry costs (Gilbert, 1989; McAfee, Mialon, and Williams, 2004). When restructured SOEs dominate existing markets and expand their market share through administrative advantages, private enterprises face significant entry barriers and high initial costs, making it difficult to penetrate markets controlled by SOEs. These restructured SOEs retained considerable market power, administrative support, and access to resources, thereby creating persistent institutional and market barriers to entry for private firms.

Moreover, entry barriers were not limited to market share. In the presence of dominant SOEs, potential private entrants often faced discrimination in access to credit, land, and business registration channels. These distortions, rooted in China's dual-track governance structure, imply that regions with heavier SOE presence might not necessarily experience a surge in new private enterprises following SOE reform.

Hypothesis 1. In cities with deeper SOE restructuring, the entry of new private enterprises remains limited due to persistent entry barriers and resource concentration in restructured SOEs.

Full Exit and Entrepreneurial Reallocation from COEs. In contrast to SOEs, COEs were generally subject to full-scale withdrawal during the reform period. As firms with ambiguous property rights, decentralized governance, and limited political protection, COEs were more vulnerable to market exit under reforms. Drawing from property rights theory

(Hart and Moore, 1990; Tian, 2000), we argue that the dissolution of COEs freed up physical assets, human capital, and market space, allowing entrepreneurs to reallocate these resources and establish new private firms.

Notably, China's earlier price liberalization and labor mobility reforms created an institutional environment conducive to such reallocation. The COEs, often embedded in local economies, acted as incubators of entrepreneurial talent and managerial expertise. Their exit thus represents not only a quantitative reduction in public ownership, but also a qualitative transformation that enabled broader market development.

Hypothesis 2. In cities with greater COE withdrawal, the resulting reallocation of entrepreneurial resources facilitates substantial private sector entry, including both newly created firms and privatized former COEs.

This theoretical framework guides our empirical analysis. We use cross-city variation in pre-reform SOE and COE characteristics to capture the intensity of restructuring and withdrawal, and test their differential impacts on the entry of private enterprises. Our results provide insight into how institutional legacies and reform strategies shaped China's non-disruptive market transition (Lau et al., 2000; Naughton, 1995).

3 Empirical Design and Data

3.1 Identification strategy

3.1.1 The city-level intensity of reform in SOEs and COEs

One of the main reasons for the losses and insolvency of public enterprises is the excessive number of redundant jobs, and public enterprises could not freely dismiss the redundant employees. The key scheme in the reform is that SOEs employees and COEs employees are laid off to reduce the burden. Therefore, the intensity of reform in the state and collective sectors could be directly measured by employment decreases in the public sectors, including

involuntary layoffs and voluntary turnover to the private sector (Giles, Park, and Cai, 2006).

However, using actual layoffs or declines in employment as a measure of the intensity of the reform raises several concerns about endogeneity. First, official labor statistics report only SOE layoffs, excluding those in COEs. Second, SOE layoffs are likely endogenously determined by local economic conditions, as the reform was largely executed by local officials at their discretion (Gan, Guo, and Xu, 2018; Huang, Liu, Ma, and Xu, 2024; Li, 2003). For example, a higher presence of private enterprises could create more job opportunities, prompting local governments to allow more layoffs in both SOEs and COEs. Third, while employment declines in COEs could serve as a measure, they include voluntary turnover, which is similarly influenced by local economic conditions, such as private sector development.

To address the above concerns, we leverage a measure which is rooted in pre-reform data. As shown in Figure 1, SOEs employment and COEs employment have changed slightly from 1993 to 1996, witnessing a stark decline in 1997.[19] Thus, the employment in 1995 represents the stable state prior to the reform. Importantly, since the labor redundancies have maintained for many years, the status of labor redundancy in 1995 offers a reliable predictor for the 1997-initiated reform and the subsequent surge in layoffs. Therefore, we used data from the 1995 Chinese Industrial Census (CIC) to measure the intensity of the reform for the state and collective sector in each city.[20].

Specifically, we classify SOEs and COEs with negative equity or operating losses as insolvent or financially distressed enterprises—those most likely targeted for closure or privatization under the reform.[21] This classification is grounded in the policy logic of the late 1990s, which aimed to allow inefficient and unviable public enterprises to exit the market.

[19]Figure A5 shows that the SOE share of urban employment declined rapidly after 1997.

[20]Given China's longstanding industrialization strategy, the industrial domain emerged as the dominant economic sector, accounting for most of the layoffs. For instance, in 1997, of the 6.4 million layoffs, 62.5% (or 4.0 million) were from the industrial sector. This is corroborated by Appleton, Knight, Song, and Xia (2006) who, despite oversampled other industries, found 59% of the laid-off populace to be industrial workers.

[21]The metric may suffer from the under-reporting of losses in public companies. We also calculate labor redundancy for profitable and non-insolvent public enterprises, using a simple empirical model to regress employment on firm assets and industry fixed effects and extract the residuals as a measure. The results are consistent.

Cities with a higher concentration of such distressed enterprises faced greater pressure to implement the reform, leading to more pronounced adjustments in the SOE and COE sectors. Thus, the pre-reform shares of insolvent or loss-making SOEs and COEs serve as direct proxies for the severity of local distortions and the intensity of the reform shock.

Using CIC data, we calculate the net exit of SOEs and COEs from 1995 to 2004 in each city. As Figure 3 shows, the number of insolvent or loss-making SOEs and COEs is highly associated with the net exit of SOEs and COEs, with the correlation coefficient of 0.83 and 0.66. The adjusted R-squared of the regression of net SOEs and COEs exits from 1995 to 2004 on the number of loss-making and insolvent SOEs and COEs is 0.69 and 0.44, implying that the variation in public enterprises' exits across cities is mainly explained by their pre-reform likelihood of closing.

We aggregate the employment of SOEs and COEs with loss or insolvency at the city level and normalize by the non-agricultural population, then named as *SOE restructure* and *COE withdraw*, respectively.[22] Essentially, they can capture the potential of reform to unleash its effects. As mentioned above, Figure 4 shows that *SOE restructure* predicts true SOE layoffs well at the province level. We use the 2004 CIC data to calculate city-level employment reductions for SOEs and COEs, respectively.[23] All the figures consistently show strongly positive correlations between the pre-reform potential scale of redundant and true employment reductions in the two sectors.

3.1.2 Empirical model and variables

Our baseline specification employs two generalized difference-in-differences (DID) estimators that compare private sector entry for years before and after the year the reform began

[22]The calculated labor redundancy should be lower than the actual layoffs or labor reductions, as there is likely underreporting of loss-making enterprises. To address this issue, we regress employment on industry dummies and firm asset size, extracting the residual term as a proxy for labor redundancy in profit-making and non-insolvent SOEs and COEs. These residuals are then added in the variables of *SOE restructure* and *COE withdraw*. As shown in Table A7, the results using these alternative treatment variables are largely consistent with the baseline results.

[23]We also used the data from industrial firms 1998-2006 to calculate alternative employment reduction, the results are shown in the Figures A2

(i.e., 1997) among cities that have smaller and greater intensity of SOEs and COEs reform. We start our analysis by separately estimating the effects of reform in each year using the following equation (we take the year of 1993 as reference).

$$\begin{aligned} Private\ entry_{it} = \alpha_0 &+ \sum_{t=1994}^{2008} \beta_{1t}\, SOE\ restructure_i^{95} \times year_t \\ &+ \sum_{t=1994}^{2008} \beta_{2t}\, COE\ withdraw_i^{95} \times year_t + \sum x_i^{95} \times \delta_t \\ &+ \theta_i + \delta_t + \epsilon_{it} \end{aligned} \tag{1}$$

θ_i , δ_t are the city and year fixed effects. $Private\ entry_{it}$ is the number of newly registered private enterprises per 10,000 residents of city i in year t. $SOE\ restructure_i^{95}$ is the employment at the city level of insolvent or loss-making SOEs per 10,000 residents. $COE\ withdraw_i^{95}$ is the employment at the city level of COEs making or insolvent per 10,000 residents. Our difference-in-differences model with a continuous treatment may be subject to issues of treatment effect heterogeneity and negative weighting, as highlighted by Callaway, Goodman-Bacon, and Sant'Anna (2024). To address these concerns, we conduct robustness checks using alternative estimation strategies designed to mitigate such biases.

We add the interaction terms of control variables and year-fixed effects into the regression equation to capture the dynamic change induced by the macroeconomic condition and relevant characteristics before the reform. The vector of X_i^{95} represents nine control variables in 1995. They include non-agricultural population, GDP per capita, fiscal expenditure, education expenditure, and shares of GDP of the second or tertiary industry. We have an export intensity to control for export potential. We aggregate the export sales and total sales of all firms in a city and calculate the pre-reform export intensity as the share of export over total sales at the city level, using the 1995 CIC[24]. In addition, there are two control variables that

[24]As the reforms were being implemented, the Asian financial crisis occurred, spreading a negative shock to China's economy. Since exports were one of the main channels through which the crisis impacted China, including the pre-reform export intensity of each city interacted with time dummies helps to account for the negative effects of the crisis on the economy.

capture the size of the state and the collective economy.

Although we include fixed effects to control for time-invariant confounders at the city level and common time shocks, our empirical strategy may still suffer from two sources of bias. The first arises from unobserved time-varying confounders that are correlated with both private sector entry and the intensity of SOE and COE reforms. For instance, local economic cycles may differ across regions with varying reform intensities and may also be correlated with dynamic private sector entry. The second source of bias stems from cross-sectional variables that are correlated with the intensity of SOE and COE reforms and influence heterogeneous responses to entrepreneurship.

The dynamic effects of SOE and COE reform intensity on private enterprise entry show near-zero impacts prior to the reform, which helps to rule out the presence of time-varying confounders (i.e., the first source of bias). Subsequently, we include interaction terms between observed pre-reform variables and time dummies to isolate the independent effect of reform intensity on private enterprise entry as much as possible. Specifically, we incorporate a set of pre-reform covariates into the regression model—denoted as the variable vector $\boldsymbol{X}_i^{95}$—that are likely related to the intensity of SOE and COE reforms, private sector entry, or both.

In particular, cities with a larger state (collective) economy may have more SOEs (COEs) exposed to reform. If this is the case, the *SOE restructure* and *COE withdraw* could capture the size of the state (collective) economy rather than the impact of the reform. To address this concern, we have two control variables in the regression equation which are measured with the proportion of SOEs and COEs employment size among total labor forces in a city, respectively, calculated based on the 1995 CIC. This ensures that the two intensity variables reflect the extent of reform in the state and collective sectors, rather than the employment size of these sectors. The definition of main variables is shown in Table A1.

After presenting a year-by-year dynamic specification, we use a standard generalized DID

specification of the following main estimation equation.

$$\begin{aligned} Private\ entry_{it} = \alpha_0 &+ \beta_1 \times SOE\ restructure_i^{95} \times Post_t \\ &+ \beta_2 \times COE\ withdraw_i^{95} \times Post_t + \sum X_i^{95} \times \delta_t \\ &+ \theta_i + \delta_t + \varepsilon_{it} \end{aligned} \tag{2}$$

$Post_t$ is a dummy variable that indicates years after 1996. For potential concerns pertaining to the model, our robustness checks will account for the uniqueness of strategic, large, and central government-owned SOEs, the differences between collective TVEs and urban COEs, and the representativeness of the industrial data. In addition, relevant events occurring around the time of the reform, such as pilot programs, WTO accession, and population mobility, will be considered. More importantly, we comprehensively discuss the alternative explanation induced by the privatizations of SOEs and COEs and WTO accession.

The average number of employments in insolvent and loss-making SOEs and COEs is 74.68 and 46.99 (per 10,000 residents), respectively. The average number of private enterprises and self-employments per 10,000 residents is 5.35 and 18.93, respectively. Table A2 reports the summary statistics for these variables.

3.2 Data and sample

For our analysis, we employed a variety of large-scale representative datasets to construct a prefecture-level city panel data that covers 302 cities and a period of 1993-2008.[25] The main data is the Business Registry Dataset which comprises virtually all businesses registered in China's administrative records, including more than 290 million registrations, of which around 120 million are still alive at the end of 2022. The original data is sourced from the National Enterprise Credit Information Publicity System and accessed via the *Tianyancha* database, an officially authorized online distributor of the data.[26] The available business

[25] We report in Table A3 why a sample of 302 cities is obtained from the original 340 cities.

[26] *Tianyancha* website: https://www.tianyancha.com/

registration information includes the date of establishment, address, industry classification, and closure status. It also provides the ownership status of the companies. We define private enterprises as domestic and foreign private enterprises by excluding from the full original sample a sub-sample of self-employed individual businesses, state-owned enterprises, state-controlled enterprises, and enterprises in the financial and public utility sectors.

The Chinese Industrial Census provides extensive information on all industrial companies in China. The census we employed was conducted in 1995, two years before the reform was implemented, offering a comprehensive overview of the state of industrial SOEs nationwide. It contains information on 0.53 million industrial companies. This census covers all industrial SOEs and COEs owned by the government at the township level and above. We use it to construct pre-reform variables. The CIC conducted in 2004 collected extensive information on various aspects of the economy in 2004. By comparing data from it with the 1995 CIC data, we can observe the changes in enterprises over the reform period.

We use the Chinese Private Enterprise Survey (CPES) to obtain more information about enterprises and entrepreneurs. CPES is a nationwide survey of private enterprises in China, which is a nationally representative sample since the survey was conducted in all provinces and municipalities in China and the questionnaires were distributed to one percent of registered private enterprises. Therefore, all the enterprises included in the survey are officially registered entities, sourced consistently from the Business Registry dataset. The survey has been conducted almost once every two years and so far the sample of 13 waves of surveys from 1993 to 2018 is available. The specific question in the data forms the basis for the construction of a specific variable of interest, including the motivations behind entrepreneurial business ventures and the professional background of entrepreneurs and employees in SOEs or COEs.

We utilize the Annual Survey of Industrial Firms (ASIF), which includes comprehensive data on all SOEs and large nonstate enterprises. Using ASIF data from 1998 to 2006, we calculate city-level employment reductions in SOEs and COEs. Furthermore, we address the

privatization process by leveraging the dynamics of ownership transitions observed in the ASIF panel data. We also use some data from some Annually Statistic Yearbooks released by the Chinese Statistics Bureau. The Chinese Statistics Bureau released the number of laid-off workers in each province through 2005. We gathered the actual number of layoffs at the province level from China's Labor Statistics Yearbooks 1998-2005. Regarding the control variables, we also collect data from China City Statistical Yearbooks (CCSY) and China Industrial Statistical Yearbooks (CISY). In addition, China's customs export data set is used to calculate the intensity of city export. Census data is used to address the issue of population mobility. For further details on sample construction, data coverage, classification issues, and discrepancies across data sources, see Appendix B.

4 Empirical results

4.1 Baseline results

We first present the dynamic results and take the year 1993 as a reference. Figure 5 plots the estimators for each year using two different independent variables; the left is for SOEs and the right is for COEs, which support the parallel trend assumption. The coefficient fluctuates around zero before 1997, both for SOEs and COEs, indicating that there is no prereform heterogeneous trend in private enterprise entry with respect to city exposure to reform. Another important takeaway from Figure 5 is that the coefficients of the *COE withdraw* gradually increase after 1997 and reach their peak in 2001, fluctuating thereafter. This suggests that the effect of the reform, while immediate from the initiation, is accumulative in nature.

Table 2 presents the baseline difference-in-difference results with *Entry of Private Enterprise* as the dependent variable. In columns 1-3, fixed effects are included, and in columns 4-6, both fixed effects and control variables are included. As shown in column 4, the coefficient for *SOE restrucure*Post* is insignificant, suggesting that SOE restructuring does not

significantly affect the establishment of private enterprises. In column 5, the coefficient for *COE withdraw*Post* is significant at the level 1%. In column 6, when both independent variables are included, the *SOE restrucure* interaction remains insignificant, while the *COE withdraw* interaction is still significant at the 1% level, with a coefficient of 0.0213. This implies that an increase of 10,000 employees in insolvent or loss-making COEs corresponds to yearly 213 new private enterprises being established post-reform in a sample city.

These findings highlight the distinct roles reforms in the state sector and the collective sector play in facilitating the entry of private enterprises. Given the divergent reform in SOEs and COEs that SOEs were restructured and experienced significant expansion and COEs completely retreated, we consider that surviving SOEs still control the potential market opportunity via taking advantage of their market power and COEs release the market space for private entrepreneurs. Our arguments can build on the conclusion of Brandt et al. (2025), who develop a theoretical model demonstrating that the presence of the state economy in China consistently creates entry barriers for potential entrepreneurs, which we will explicitly examine and discuss in Section 4.4.

Finally, to further support the origins narrative of the collective-to-private transition, we delve into the historical roots of collective enterprises. Using the CIC data, we find that 23% of the 360,000 industrial COEs in our sample were established before 1978, accounting for 27% of total COE output. Prior studies have often focused on rural entrepreneurial TVEs, which primarily emerged in the 1980s and were typically owned by village collectives or township governments. To disentangle the role of legacy versus reform-era COEs, we divide the CIC sample into two groups based on establishment year—pre-1978 and post-1978—and construct separate *COE withdrawal* variables for each. We then include both in our baseline regression. As reported in Table 4, COE withdrawal predicts increased private sector entry in both cohorts, with the effect from pre-1978 COEs being even stronger.

This finding suggests that the collective-to-private transformation was not merely a post-reform phenomenon; rather, legacy COEs played a substantial and distinct role in laying the

institutional groundwork for China's market transition. Since the establishment of the public ownership system in the 1950s, collective enterprises had consistently retained market-responsive features, nurturing entrepreneurial spirit, managerial capacity, and workforce experience, which ultimately provided the institutional foundation for the subsequent rise of the private sector.

4.2 Robustness checks

The objective of this section is to ensure the robustness of our baseline results with respect to the measurement of intensity variables, the contemporaneous policies, the inter-city spillover effects, and the other potential confounders.

4.2.1 Strategic, large, and central SOEs

In the reform, the government's strategy for dealing with certain special SOEs, including those in strategic industries, large SOEs, and central government-owned SOEs, is different from the strategy for other SOEs. First, we address SOEs in strategic industries. During the reform, the central government maintained control over the commanding heights of the economy, ensuring that SOEs in strategic industries, particularly those controlled by the central government, remained state-owned regardless of their performance. Based on the definitions of strategic industries defined by Huang et al. (2017), we drop SOEs in strategic industries and recalculate the *SOE restructure*.

Second, we take large SOEs into account. The core spirit of the reform for SOE restructuring was *grasp the large and let go of the small*(Hsieh and Song, 2015). While smaller SOEs were allowed to go bankrupt or be privatized, large SOEs were more likely to undergo corporatization and remain under state control. Our results might be dominated by large SOEs. To address this concern, we gradually drop the top 0.5%, 1%, and 5% largest SOEs when calculating *SOE restructure*.

Third, we consider central government-owned SOEs, which were less likely to close and

whose restructuring was less dependent on local governments. We remove SOEs owned by the central government when calculating the *SOE restructure*. Using the new measurements above, we reexamine the effect of SOE restructuring and COE withdrawal on private sector entry. The empirical results are presented in Table 4 and we observe consistent empirical results.

4.2.2 Representative of industrial data

Since 1995 CIC data does not include SOEs and COEs in the service industry, we may underestimate or overestimate the extent of overstaffing and inefficiency in SOEs and COEs across all industries. Based on data sourced from the *Chinese Labor Statistic Yearbook* (2003), we compare the difference in employment between 1995 and 2002 in all industries and present it in Table A4. Employees in public services and government agencies are barely affected by the SOEs reform in the later 1990s. We have observed that the decline in employment within the manufacturing sector accounts for nearly three-quarters of the total reduction. Therefore, we consider that the representation of industrial data is roughly appropriate.

In addition, we adjust the original intensity variables by dividing them by the share of industrial employment (or output) in total urban employment (or output) for each city. The adjusted intensities serve as proxies for the share of potential redundancies in all industries in a city, based on the assumption that the intensity of redundancies in service sectors is similar to that in the industrial sector. Table A5 presents consistent results supporting this approach. Given that the industrial sector bears the majority of the burden in shedding redundant workers, combined with the robustness of our findings, we can largely mitigate concerns about the representativeness of industrial data in capturing broader patterns.

4.2.3 The pre-reform pilot programs

Pilot works and exploratory policies had been introduced before the full reforms were introduced at the end of 1997. First, there has been a trial bankruptcy program for SOEs, initiated in 18 cities in 1994 and extended to 111 cities in 1997. Unlike the sweeping reforms that began in late 1997, the 1994 pilot was mainly executed by local governments in pilot cities, thus did not implement major changes, as in-depth measures were difficult to implement without a top-down push from the central government in China. Second, the SOE reform strategy of 'grasp the large and let the small go' was officially proposed in the Fifth Plenary Session of the 14th CPC Central Committee in September 1995. The strategy has opened the door to help some large SOEs, but there has been no substantial progress on widespread SOE bankruptcies or on broad market-oriented reforms of the city's public-led system. Therefore, we do not consider pilot policies prior to the end of 1997 as comparable to national reforms, which can be confirmed by the parallel trend result that the estimated coefficients of the intensity of COEs reform are all insignificant prior to 1998. However, to ensure the robustness of our results against pilot policies, we excluded a subsample of 111 pilot cities. Column 1 of Table 5 shows consistent results, confirming the robustness of our findings to the pilot policies.

4.2.4 Population mobility

During the sample period, a large cross-city migration occurred in China. It is conceivable that many laid-off workers may migrate to more developed cities in search of new jobs in the private sector. Hence, the potential intercity spillover effect of COEs reform on private economy development was induced by large-scale cross-city migrations. First, we consider that the potential intercity spillover effect probably is minor, because almost 70% of intercity migrants are rural residents according to the 2010 census, implying that the laid-off workers are not the main component of intercity migrants. Moreover, we address this concern by removing samples from municipalities and special cities where large population inflow is

likely, i.e., the 4 municipalities, 15 subprovincial cities, 5 special economic zones, and 34 provincial capital cities. The results are presented in Column 3 of Table 5, indicating that our results are robust to the exclusion of the cities that are most attractive to migrants.

Finally, we try to measure and control for the spillover effects caused by population flow. Using the 2000 population census data, we estimate the spillover effect of potential layoffs in each city by considering the intercity migrant flow. For each city, calculating the proportion of the migrants by the original cities, we measure the potential spillover intensity with the sum of SOEs reform and COEs reform derived from other cities weighted by the proportion. As shown in Formulas 3 and 4, the migrant flow of city i is defined as the proportion of the migrant population from city j within the total migrant population in city i. Controlling for $\boldsymbol{SOE\ spillover}_i$ and $\boldsymbol{COE\ spillover}$ ensures that our results account for and rule out potential spillover effects due to population migration.

$$\text{SOE spillover}_i = \sum_{j=1}^{n} \text{SOE restructure}_j^{95} \times \frac{\text{migration}_{i,j}}{\text{migration}_i} \tag{3}$$

$$\text{COE spillover}_i = \sum_{j=1}^{n} \text{COE withdraw}_j^{95} \times \frac{\text{migration}_{i,j}}{\text{migration}_i} \tag{4}$$

In column 5 of Table 5, we find that the estimators of interest are similar to baseline results and the estimated coefficients of two spillover variables are insignificant, indicating the spillover effect of the reform on entrepreneurship has not been demonstrated.[27] Our baseline results are robust to account for the possible issues raised by population mobility.

[27]The reason might be that the migrant population are less likely to engage in entrepreneurial activities compared to locals. The 2005 population census data reveals that the probability of local residents being self-employed or establishing a private enterprise is about 4.7 times higher than that of the non-local population, at 7.66% and 1.64%, respectively. When considering only the urban population, this gap widens further to 7.3 times (8.68% and 1.19%).

4.2.5 Economic stimulus policy

In the late 1990s, due to the negative shock of the Asian financial crisis, to stimulate the economy, the central government raised a huge fund through issuing treasury bonds and launched policy to invest in infrastructure, including the policies of development of the western region and the revitalization of the northeast. The policy was expected to increase business creation in the relevant industries. To this end, we recalculate the dependent variables by deleting the subsample of the industries pertaining to construction, cement, and steel, which are relevant to the construction of infrastructure. New results are shown in Column 7 of Table 5, and all the results remain.

4.3 Alternative Explanations

4.3.1 Ownership relabeling as the sole mechanism

Previous studies have suggested that many COEs, particularly collective TVEs, were effectively private in nature prior to the reform, but were registered as collectively owned (referred to as *wearing a red hat*) to avoid ideological conflict or to secure government support(Huang, 2008; Xu and Zhang, 2009). These firms were likely to be readily relabeled as private entities after the reform, thus explaining our findings of collective-to-private transformation. The large number of COEs before the reform reinforces the plausibility of this hypothesis: According to official statistics, there were 1.77 million industrial COEs in 1997.[28]

We believe this mechanism is likely operative; however, multiple strands of evidence indicate that it is neither the sole nor the predominant channel. China's TVEs followed three distinct regional models: the Wenzhou model in southern Zhejiang, the Sunan model in southern Jiangsu, and the Pearl River Delta model in Guangdong. Among these, only the Wenzhou model is widely associated with the practice of relabeling, where private entrepreneurs operated under collective ownership labels(Xu and Zhang, 2009). According

[28]Data source: Table 2.1, China Statistical Yearbook 1999. Due to the difference in statistical methods, this figure is larger than the data shown in Figure 1a.

to Li (2003), southern Zhejiang began privatizing TVEs as early as 1994 and had largely completed the process by 1996, well before the nationwide public enterprise restructuring initiated in 1997. This suggests that in regions where collective ownership was nominal, ownership relabeling naturally occurred before the official reform timeline. In such cases, relabeling did not rely on the central government's formal permission to dismantle public ownership, since local governments did not hold substantial equity stakes to begin with.

In contrast, in regions where township governments genuinely held equity in TVEs, like in Jiangsu and Guangdong, relabeling was unlikely to occur prior to 1997. Before the central government formally authorized the divestment of public assets, local officials faced institutional and political constraints, including personal liability for state asset loss. This distinction explains why early privatization and relabeling were more prevalent in southern Zhejiang, while other regions initiated ownership changes only after 1998.

Importantly, this pattern aligns with observed data showing only a modest decline in collective employment before 1997, suggesting that most genuine transformations from collective to private ownership—involving substantive reallocation of capital, labor, and entrepreneurial capacity—did not occur until after the policy shift in 1997. Thus, pre-1997 changes likely reflect nominal registration adjustments rather than meaningful restructuring, and do not undermine the core interpretation that the post-reform expansion of the private sector was driven by real institutional transformation rather than mere administrative relabeling.

We also argue three typical characteristics of ownership relabeling: (1) it is more likely to occur among profitable COEs; (2) it typically does not involve the dissolution or formal re-registration of the enterprise; and (3) if re-registration does occur, one would expect a near one-to-one mapping between COE exits and private firm entries. We argue that these features are inconsistent with the evidence we observe and follow up with more direct tests.

First, profitable COEs are the ones most likely to undergo ownership relabeling, while unprofitable or insolvent ones would typically be shut down. Entrepreneurs from failing firms

would be more inclined to exit and establish new ventures, which is the process our empirical model captures. Specifically, our treatment variable, *COE withdraw*, reflects the pre-reform intensity of insolvent or loss-making COEs. In contrast, the potential confounding effect from profitable COEs undergoing relabeling is accounted for by including a control for COE employment, which proxies for the scale of potentially relabeled profitable COEs.

Second, typical relabeling does not necessarily involve legal re-registration. Many well-known firms such as *Haier* and *Lenovo* are now fully private, but their business registrations still date back to their original registrations. This suggests that administrative relabeling, when it occurs, does not result in new legal entities. In contrast, our outcome variable measures newly registered private enterprises, capturing genuine market entry rather than changes in formal ownership labels.

Third, if relabeling were widespread among failing COEs, one would expect a near one-to-one correspondence between exits and new entries. However, the magnitude, structure, and diversity of private sector growth post-reform do not support this view. Data from the 2004 CPES show that over 90% of private enterprises established after 1997 were located in urban areas, whereas collective TVEs were predominantly rural. [29] Business registry data further reveal that approximately 4.5 million private enterprises and self-employed businesses were established across all industries between 1998 and 2000. Self-employed businesses, known as *getihu*, are typically operated by individuals or households, employ only one to three people, and constitute a distinct segment of the private sector. They vastly outnumber formal private enterprises. These entrants are predominantly small-scale and concentrated in previously underdeveloped service sectors. Taken together, these features of private sector entry provide strong evidence against a simple relabeling narrative.

To provide more direct evidence, we examine the effect of COE withdrawal on two types of entry that are likely to be *de novo*: wholly foreign-owned enterprises and individual

[29] This urban–rural disparity suggests that a migration of entrepreneurial talent and capital from rural to urban areas likely accompanied the collective-to-private transition, consistent with prior findings by (Imbert, Seror, Zhang, and Zylberberg, 2022).

self-employed manufacturers. For the former, we aggregate newly registered wholly foreign-owned firms at the city-year level, normalize by the non-agricultural population, and use this as the dependent variable. Column 5 of Table 7 shows a positive effect of COE withdrawal on foreign firm entry, which is unlikely to reflect relabeling from old COEs. In addition, we use the number of newly registered self-employed manufacturers per 10,000 residents as an alternative outcome variable, labeled *Self-employed manufacturers*. Our analysis indicates that COE withdrawal is also positively associated with this form of entry.

Taken together, these findings indicate that ownership relabeling cannot account for the magnitude or heterogeneity of the private sector expansion we observe. [30] Rather, our results point to a broader institutional transformation: the dismantling of the collective sector served as a crucial foundation for genuine private sector development during China's market transition.

4.3.2 Privatized enterprise re-entry as the sole explanation

We assess the possibility that most of the entry was re-entry of privatized enterprises. We construct variables that measure the extent of SOE and COE privatization using data from ASIF and CPES, respectively. We use ASIF data to calculate the share of SOEs and COEs that were privatized, and CPES data to provide the share of private enterprises that originated from former SOEs or COEs. The correlation matrix in Table 6 shows that SOE restructuring and COE withdrawal are strongly associated with subsequent privatization in their respective sectors. These results suggest that the reform was accompanied by an increase in privatized enterprises, implying that privatization is likely a channel through which the reform contributed to private sector expansion. We next examine whether privatization serves as the primary mechanism driving our results, or whether other channels also play a significant role.

[30] In southern Zhejiang—particularly in areas like Wenzhou and Ningbo—the most representative places that majority of collective enterprises were effectively private in nature and often operated under "red hat" collective ownership. According to Li (2003), these regions began privatizing TVEs as early as 1994 and had largely completed the process by 1996.

First, since privatization should occur simultaneously in the SOE sector and in the COE sector, privatization does not appear to efficiently explain the difference in the effects of SOE restructuring and COE withdrawal and the heterogeneity of those effects between industries, as presented in Table 6. Furthermore, since exclusively foreign-owned enterprises are unlikely to be privatized SOEs and privatized COEs, privatization seems to fail to explain the empirical results in column 5 of Table 7.

Second, we use CPES data collected from 2002 to 2010, which reveal whether an enterprise was privatized from a SOE or a COE. Among the private enterprises surveyed in 2002, 28% were privatized from SOEs or COEs.[31] Subsequent surveys indicate a declining trend in this ratio. Specifically, within the subsample of start-ups established within two years when interviewed, which is less subject to the selection issue, the ratios were 43%, 40%, 24%, 15%, 17%, 12%, and 11% from 2000 to 2006. Based on matched enterprises data in ASIF from 1998 to 2008, we also observe a smaller proportion of disappeared SOEs and COEs (also the disappeared loss-making or insolvent SOEs and COEs) have gone privatized than have exited, as shown in Tables A10 and A11.

These analyses suggest that the majority of insolvent and loss-making SOEs and COEs go bankrupt rather than be privatized, and that most established private enterprises are new entrants, especially in the later time. Our dynamic results indicate that the effect of COE withdrawal has grown over time, peaked in 2001, and persisted for more than a decade. The temporal misalignment between these dynamic effects (Figure 6) suggests that privatization alone does not drive the observed trends in private sector entry. Entrants are increasingly likely to be *de novo* entities rather than privatized ones.

Third, by combining all waves of CPES samples with the privatization history of the firm, we calculate the ratio of SOE or COE privatized enterprises for each registration year at the provincial level.[32] The proportions are then added as control variables to the baseline

[31] Among the privatized enterprises, the proportion of privatize from SOEs was 25%, 58%, 54%, 40%, and 42% in the survey year from 2002 to 2010, respectively.

[32] We acknowledge that this metric is affected by a selection bias, as only surviving private enterprises were included in the interviews. Upon calculating the proportion of privatized enterprises and newly established

regression. Columns 1 and 2 of Table 7 show that the privatization coefficients are insignificant, suggesting that SOE privatization is independent of new entry of private enterprises, while the *COE withdraw* estimators remain significantly positive. We also use the proportion of *de novo* privatized enterprises at the provincial level as a weight to calculate a new dependent variable, which proxies for the entry of *de novo* private enterprises. In column 3, we find that the *COE withdraw* estimator remains significantly positive, with a coefficient of 0.0158, accounting for 74% of the total effect of COE withdrawal (i.e., 0.0213 in the baseline regression).

Fourth, we further test both channels employing two alternative cross-city intensity variables, namely the number of loss-making or insolvent SOEs and COEs per capita, respectively. If the new entrants are all privatized enterprises, for empirical strategy, the number of quasi-exit SOEs and COEs is better than the labor redundancies (i.e., *SOE restructure* and *COE withdraw*) to predict the number of private entrants. We incorporate the interaction of the two alternative treatment variables with the post-dummy into the baseline regression. The results in column 4 of Table 7 show that the new collective interactions are significantly positive and the state interactions are insignificant, indicating that the quasi-exit number COEs are highly correlated with the following private entries. Meanwhile, the *COE withdraw* estimator is robust to adding them.

These results confirm that while there are privatization channels, *de novo* private enterprises contribute a majority fraction of the entries, and the reallocation of resources by entrepreneurs plays a dominant role in driving the process of economic transformation.

4.3.3 Export-driven activities and the WTO accession

Since the late 1970s, China has progressively expanded its openness to the outside world, its economy being driven by the surge in export demand. This surge has led a large number of

private enterprises in the database over the past years, we observe no significant increase in the proportion of either type as the years progress. This suggests that the observed proportions are likely highly correlated with the true proportions at the time of their establishment.

enterprises to engage in export activities, a factor that has undoubtedly facilitated the entry of private enterprises and may even explain the expansion of SOEs simultaneously. Therefore, it provides an alternative explanation for the simultaneous expansion of SOEs and the entry of private firms. In particular, China joined the WTO in November 2001, during a period when the reform was still shaping the private sector entry, and WTO accession was expected to foster business creation (Cui and Li, 2023). To address this, we have incorporated an interaction term between pre-reform city export intensity and annual dummy variables in the vector of control variables, which accounts for the export intensity of export-oriented cities and frees our results from the potential confounding influence of this explanation.

The alternative explanation for the accession to the WTO can be ruled out, as the dynamic results in Figure 5 show that the positive collective effect appears well before the WTO event, reaching its peak in 2001. To further control for the impact of WTO accession, we construct a variable measuring the intensity of exports of sample cities in 2001 using China's customs export dataset and calculate the distance from each sample city to the nearest coast, which serves as an exogenous measure of export propensity. Then, we interact them with a dummy variable that indicates years after 2001, and incorporate these interaction terms into the baseline model. The results, shown in column 2 of Table 5, indicate that the export interaction term is significantly positive, suggesting that WTO accession promoted the entry of private enterprises in export-oriented cities compared to others. Importantly, the estimators for our key variables remain robust.

4.4 Mechanisms

4.4.1 Continued SOEs presence and entry barriers

Here, we aim to discuss the mechanism underlying the baseline findings that the SOE restructuring does not facilitate entry of private enterprises, but the withdrawal of COEs does. The first step is to understand the different roles reforms in the state and collective sectors played in private economy development. In Section 2, we have shown that SOEs undergo significant

growth in total assets and output despite the decline in employment, and COEs completely retreated. Now, we examine the difference in the correlation of reform intensity and the post-reform output growth among the SOEs sector and the COEs sector. The empirical results are presented in Table 8 showing an insignificant correlation between the intensity of SOE reform and post-reform output growth, but a significantly negative association between the intensity of COE withdrawal and post-reform output growth.[33]

Furthermore, the average industrial output of industrial SOEs has continued to increase rapidly from 1994 to 2008 (shown in Figure A1). By 2008, SOEs were about 10 times the scale of private enterprises (above the designated size), compared to about twice that scale in 1998 and 1999 during the early stages of reform. For potential new private enterprises, the presence of SOEs creates high barriers to market entry, requiring them to compete with both SOEs and more mature privatized enterprises.

Industries with presence of state economy. We argue that SOE restructuring does not facilitate the entry of private enterprises due to the constant dominance of the state economy and impedes the entrepreneur from capturing the potential market opportunity. To further test this, we divided industries into two groups based on the mean share of SOEs in the economy in 1995, then recalculated two private enterprise variables for each city within these groups. In columns 1 and 2 of Table 9, it shows that the estimator for *SOE restructure* remains insignificant for both groups of industries. However, the estimators for *COE withdraw* are significantly positive and smaller in industries with a higher state economic share compared to those with a lower state economic share. The significant difference between the two *COE withdraw* estimators indicates that the presence of a strong state economy weakens the collective-private shift. The finding supports the argument that the entry barriers were significantly larger in the localities with a higher SOE presence.

Monopolistic or competitive industries. SOEs tend to dominate monopolistic industries,

[33]The huge-scale output maintained by the state economy was not contributed by new entrants to the SOE sector, as regions undergoing more drastic SOE restructuring experienced fewer entry of SOEs following the reform. The results are shown in Table A8.

which means that industries with different competitive structures may behave differently during the transition. We calculated the Herfindahl-Hirschman Index (HHI) for all industrial sectors using the 1995 CIC and divided the industries in the Business Registry Dataset into two groups based on the mean HHI value. We then calculated the number of private enterprise entries in these two types of industries and rerun the baseline regressions using these new dependent variables. The results in Column 3 and Column 4 of Table 9 show that the effect of reform in the collective sector is more pronounced in competitive industries with lower HHI values.

Upstream, midstream, or downstream industries. China's state capitalism is characterized by the concentration of SOEs in the upstream and some midstream industries (Li, Liu, and Wang, 2015). As time goes on, SOEs are more likely to dominate the upstream and midstream industries. Based on the classification by Li et al. (2015), we divide industries into three categories and calculate the number of private enterprise entries in each category. Examining the baseline model with three dependent variables, the results in columns 5 - 7 of Table 9 show that the effect of collective retreat is more pronounced in downstream industries compared to upstream and midstream industries.

4.4.2 Necessity- or opportunity-driven entry?

If market space is the key to understanding why SOE restructuring does not facilitate entry of private enterprises, then COE withdrawal does. Intuitively, we infer that the new private enterprises fill the market space released by this reform and capture the market opportunity. In brief, entrepreneurs of the private enterprises are likely to be largely opportunity-driven during the post-reform period. First, we try to understand the motivation of entrepreneurs who build a company during the reform period. CPES 1997 and 2002 asked why entrepreneurs start businesses, providing a metric for the entrepreneurial motivations. Among those established in 2001, approximately 5% (6.5% for those established after 1997) were started due to layoffs or unemployment, indicating that only a minority of entrepreneurs were driven by

being laid off. Given the substantial increase in entrepreneurial activities after the reform, it is reasonable to infer that a significant portion of these ventures were not driven by the tough situation of unemployment.

According to data from CPES 2002, among all answers, we define necessity-driven motivations as including poor interpersonal relationships at the previous job, poor economic performance of the previous firm, and being laid off or unemployed, and we define opportunity-driven motivations as including increasing income, being inspired by others' entrepreneurial experiences, and realizing personal values. Approximately 19% (20% after 1997) of the entrepreneurs pursued businesses primarily for survival, while a significant majority, 76% (73% after 1997), engaged in entrepreneurship to pursue opportunities. We regress the ratio in the cell of the province-registration year on *SOE restructure* and *COE withdraw*, and find insignificant estimators, suggesting that the reform does not predict larger or lower levels of necessary entrepreneurs. Combining this with the baseline result that COE withdrawal predicts mass private sector entry, it is natural to expect that most of them are opportunity-driven entrants.

We further identify the effect on opportunity entrepreneurship by analyzing the results on wholly foreign-owned enterprises, as shown in column 5 of Table 7. Entrepreneurs of these entrants were absolutely not laid-off workers and started their businesses in the local markets of China, most likely driven by opportunity. We aggregate the number of newly registered wholly foreign-owned enterprises at the city-year level, normalize it by the non-agricultural population, and use this ratio as the new dependent variable. The result supports the existence of opportunity-driven entrepreneurship. We also drop the subsamples of large cities and provincial capitals and find the results hold (unreported for brevity), indicating that our findings are not driven solely by the subsamples of large cities that are supposed to be major destinations for FDI. Hence, we consider that the market space vacated from the COEs sector attracts both local residents and foreigners to start a business.

4.4.3 Reallocation of entrepreneurail talents and labors

As most COEs have gone bankrupt, the mechanism facilitating the entry of private enterprises likely involves the release of labor resources, which are subsequently reallocated and combined by entrepreneurs under market forces (Meng, 2012). We posit that entrepreneurial talents and laborers laid off or voluntarily departed from the public sectors contribute to the entry of private enterprises.

First, according to the CPES 2002 sample, 63.6% of the entrepreneurs had been formerly employed in SOEs or COEs (the share of last work in a SOE or COE before venturing is 26.3%). This share is different between privatized and newly private enterprises and significantly higher for start-ups. On average, 72.2% of privatized enterprises have founders with work experience in SOEs or COEs, compared to 60.6% in *de novo* private enterprises. Among the start-ups established in 2001, 79.1% of the privatized enterprises had founders with public sector experience, while 61.4% of the *de novo* enterprises had founders with such background.

Former SOE workers becoming entrepreneurs post-reform does not necessarily indicate that SOE restructuring increased entrepreneurial activities, as these individuals may have voluntarily left SOEs, particularly in areas where COEs had significantly withdrawn. To this end, we examine whether *SOE restructure* and *COE withdraw* are associated with the share of entrepreneurs who formerly worked in SOEs or COEs, based on pooled CPES data. Specifically, we select data from CPES 2000, 2002, and retain the sample of private enterprises established within the last three years at the time of the survey, and pool the firms at province-survey year level. We identify entrepreneurs who worked in SOEs or COEs(the last job before starting a business) and aggregate the number of them at the province-year level as the dependent variable in the regressions. We further construct three more dependent variables corresponding to the job positions of the entrepreneurs in SOEs or COEs, i.e., main manager, technical staff, and other general staff. Then regress these variables on *SOE restructure* and *COE withdraw*.

The results in Panel A of Table 10 show that *COE withdraw* significantly predicts a higher number of private enterprises created by former SOE or COE workers, while *SOE restructure* predicts a lower number. This finding suggests that *COE withdraw* triggers potential entrepreneurs, previously employed in the public sector, to start their own businesses, whereas *SOE restructure* poses barriers to such transitions.

Second, regarding laid-off labor reemployed in private enterprises, according to the CPES 2002 sample, 91% of private enterprises employed laid-off workers, with the average share of laid-off workers in total employment being 26% and the median being 20%. This share is comparable between privatized and newly private enterprises and considerably higher for start-ups. On average, privatized enterprises hired laid-off workers for 27% of their total employment, and new private enterprises hired 26%. Among start-ups established in 2001, 43 of the privatized enterprises employed, on average, 35% of laid-off workers in their total employment, while 83 *de novo* enterprises employed 34%. These data indicate that both the incumbent private sector and newly established private enterprises after the reform have absorbed the massive layoffs. In other words, the availability of inexpensive laid-off workers contributes human capital to the development of private enterprises, especially new ones.

Using the pooled CPES data too, the results in Panel B of Table 10 indicate that the number and proportion of laid-off workers reemployed in private enterprises do not vary significantly across cities with differing levels of exposure to the reform. Given that *COE withdraw* is strongly associated with the increased entry of private enterprises and that a substantial proportion of laid-off workers are uniformly hired by these enterprises, we conclude that *COE withdraw* facilitates the growth of the private sector by providing labor resources.

Third, we strengthen the argument by comparing the entry patterns in labor- and capital-intensive industries. The industries in which COEs were concentrated were predominantly labor-intensive. Therefore, it would be expected that, from the perspective of market share and labor force characteristics, the effect of COE withdrawal on private sector entry is

probably greater in labor-intensive industries than capital-intensive industries. This also aligns with China's comparative advantage in the late 1990s, which was concentrated in labor-intensive activities. Following Kucera and Sarna (2006)'s classification of labor and capital-intensive industries, we categorize our sample of private manufacturing enterprises into three groups: labor-intensive, capital-intensive and intermediate. We then re-run the baseline regressions.[34] Table 11 presents the results using the subsamples of labor-intensive and capital-intensive manufacturing. We find that all *COE withdraw* interactions are significantly positive and larger for labor-intensive manufacturing enterprises, indicating that regardless of whether the industry relies on intensive labor or capital, the reform increased business creation, with a more pronounced impact on labor-intensive firms. The findings are consistent with the observed sectoral reallocation dynamics in China, where young high-productivity private firms have extensively entered labor-intensive sectors, while SOEs continue to dominate capital-intensive industries.

4.5 Further analyses

4.5.1 Effect on entry of self-employed individual business

To comprehensively examine the private economy, we also analyze the impact of reform on the establishment of self-employments. As mentioned before, in China individuals can legally register as self-employed businesses, known as "*Ge tihu*" in Chinese. These businesses, operated by individuals or households and typically employing 1-3 people, form an independent segment of the private economy. Some of these self-employed ventures may expand over time and eventually become private enterprises. We use the establishment of these private businesses per 10,000 residents as an alternative measure of private sector entry, named *Self-employment*. Our argument is based on models of occupational choice between entrepreneurship and paid employment, which consider the heterogeneous entrepreneurial

[34]We first examine the difference between services and manufacturing, and find that collective retreat greatly promotes the establishment of self-employment in the service sector, and private enterprises in manufacturing sectors.

abilities of individuals. As employment opportunities in the public sector decreased, laid-off workers and potential entrepreneurs were reluctant to seek new ventures. Unlike establishing formal private enterprises, which require capital and involve higher risks, self-employment became the easier option.

The results in Table 11 show that the estimator is insignificant for *SOE restructure* and significant for *COE withdraw* in the last column, which is consistent with the findings of the baseline results. The *COE withdraw* estimator of 0.0865 implies an almost four-times larger effect on self-employment than on private enterprise (the estimator is 0.0213). The dynamic effects on self-employment are similar as well (shown in Figure A3).

The SOE restructuring has not released market space for private enterprises to operate, but since self-employment is less likely to compete directly with surviving large SOEs, it may not hinder laid-off workers from making a living through self-employed businesses. In addition, collective estimators are approximately three times higher than state estimators. This difference may reflect the fact that the more challenging circumstances faced by COEs' laid-off workers, and some of the self-employment induced by collective retreat, are driven by opportunity.

4.5.2 Impact on the size of private economy

We now turn to examine the effects of reforms on the quality of entry and the size expansion of the private economy. First, we construct a variable that measures high quality entry as the number of newly registered private enterprises that survive in the long run by 2022, when this study was started. Column 1 of Table 13 shows that the estimator is significant for *COE withdraw* but insignificant for *SOE restructure*, suggesting that in cities where more COEs retreated, newly established private enterprises are not of lower quality as measured by long-term survival status.

Second, *the China City Statistical Yearbooks* for 1993 began providing data on the number of self-employed workers in each city, providing us a measure for the employment size

of the private economy. The business registry data set provides the registered capital of newly entered enterprises. We aggregate the registered capital of newly established private enterprises at the city level and divide it by the total population of the city to measure the capital scale of private sector entry. There is a lack of other city-level official statistics for private enterprises; we rely on province-level industrial private enterprises data from *the China Industrial Statistical Yearbooks* to measure the size of the private sector, including total profit, output, value added, and fixed assets. We then construct city- or province-level panel data correspondingly to analyze the impact of reforms on the size of the private economy. Columns 1-4 of Table 13 Panel B show that the estimator for *SOE restructure* is consistently insignificant.[35] In contrast, the results for *COE withdraw* show significantly positive estimators for all the variables, indicating that the private sector grew faster in regions where the collective sector underwent deeper reform. In sum, the private economy expanded rapidly in cities where the collective sector experienced deeper retreats.

5 Theoretical and institutional implications

Our findings offer several theoretical insights into China's transition. First, SOE restructuring, while facilitating some privatization—particularly among small and medium-sized state-owned firms—did not generate broad-based private sector dynamism. This supports the view that dominant state-owned firms, even after reform, continued to pose substantial barriers to entry by occupying key markets, receiving preferential access to finance, land, and administrative approval, and maintaining *de facto* monopolistic positions (Brandt et al., 2025). As a result, the space available for *de novo* private entrepreneurs remained constrained, despite nominal liberalization.

This result offers a new perspective for understanding China's regional economic diver-

[35]Table 11 provides some evidence that SOE restructuring facilitated the entry of self-employed individual businesses. However, the results in column 3 of Table 12 show that SOE restructuring did not increase the employment scale of local self-employed individual businesses, possibly because it also had a suppressive effect on the survival rate of these businesses.

gence. The conventional narrative that SOE reform fostered private sector development does not easily fit the experience of the northeastern provinces, where the state sector was historically dominant. Despite extensive SOE restructuring, the private economy in the Northeast has remained underdeveloped, casting doubt on the notion that SOE reform alone spurred private sector growth. In contrast, cities like Shenzhen—where the state sector was relatively weak—provided ample market space for private enterprises to thrive, illustrating how the absence of SOE dominance may have been more conducive to private sector emergence.

Second, the transformation of COEs into private firms aligns with property rights theory, which predicts that vaguely defined or collectively held ownership tends to individualize as legal and market institutions evolve (Che and Qian, 1998; Tian, 2000; Weitzman and Xu, 1994). Our results emphasize that private sector expansion not only requires recognition of property rights, but also space for reallocation—enabled by the withdrawal of inefficient public entities.

The Chinese transition underscores the substantial dynamism that can be unleashed when a country mobilizes underutilized or inefficiently allocated resources, as emphasized by Song et al. (2011). Brandt et al. (2012) shows that productivity gains during this period were largely driven by the replacement of incumbent firms with more efficient new entrants, accounting for over two-thirds of total growth. Our findings are consistent with these insights, suggesting that entrepreneurial creative destruction—enabled by the large-scale withdrawal of collective enterprises—played a foundational role in China's transformation. In particular, our evidence echoes McMillan and Woodruff (2003), who emphasize the role of entrepreneurs in the economy transition. In our context, the exit of COEs not only freed up productive factors but also allowed entrepreneurs to reallocate them in ways that redefined the market structure itself.

Third, building on prior work emphasizing the role of the nonstate sector in China's transition (Naughton, 1994b; Zhu, 2012), we show that the transformation within the nonstate sector itself was critical for enabling private entry. This perspective moves beyond

the conventional dichotomy between state and nonstate sectors, and instead highlights the importance of structural dynamics within the nonstate segment of the public economy.

Our findings provide empirical validation for the long-held but largely qualitative view that China's planned economy embedded market-oriented elements within collective ownership arrangements (Xu, 2011). In particular, many COEs, established as early as the 1950s, played a transitional role by nurturing entrepreneurial behavior, managerial talent, and market responsiveness under decentralized and flexible governance structures. These institutional features enabled them to serve as incubators for private enterprise development once formal constraints on private ownership were relaxed. By documenting this historical continuity, we reinterpret the rise of China's private sector not as a sharp institutional discontinuity, but as a path-dependent evolution rooted in the internal diversity of the planned system itself.

6 Conclusion

This paper revisits China's economic transformation in the late 1990s, highlighting the surprising simultaneous growth of both the state and private sectors. We find that the reform process addressed labor redundancy in the state sector and restructured SOEs, which grew larger and more powerful, but did not facilitate the entry of private enterprises. In contrast, the withdrawal of COEs freed up market share and a significant labor force, creating opportunities for potential entrepreneurs and fueling the rise of private enterprises. Our study reveals that the COE withdrawal, rather than the SOE restructuring, was the key driver behind the surge in private enterprise formation and rapid development of the private economy. This structural transformation, marked by the dynamism of the nonstate sector alongside the steady expansion of the state sector, laid the groundwork for the coexistence of national economic privatization and sustained macroeconomic growth. We posit that legal recognition and protection of private property rights alone do not guarantee rapid development of

the private sector and the private sector also needs public economy to release market space, which makes market-driven resource allocation become possible.

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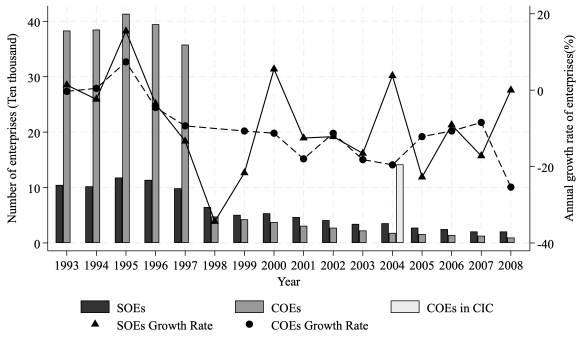
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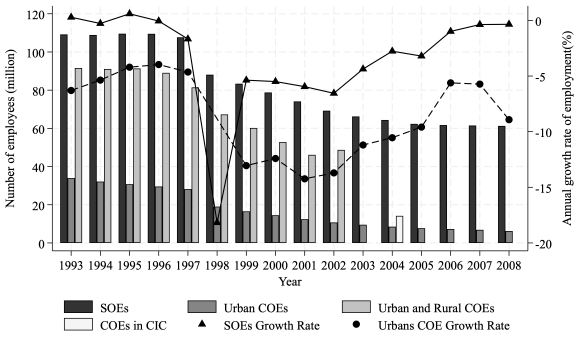
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Figures

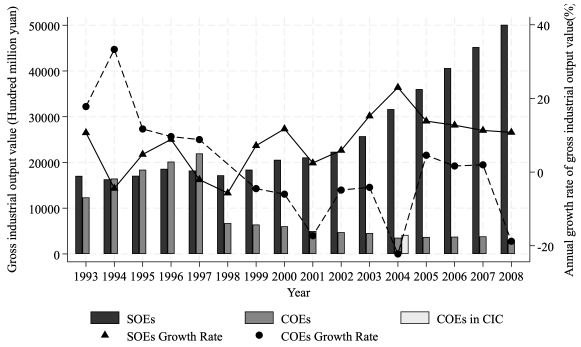
Figure 1 Contrasting trends in state and collective economy



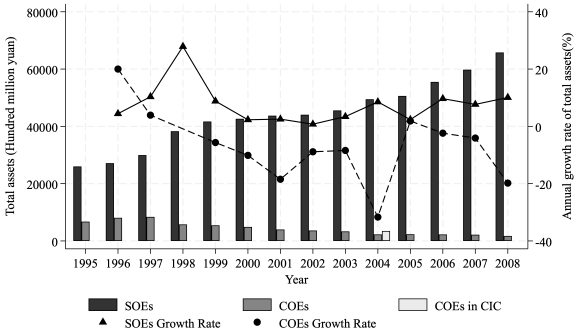
(a) Firm number



(b) Employments



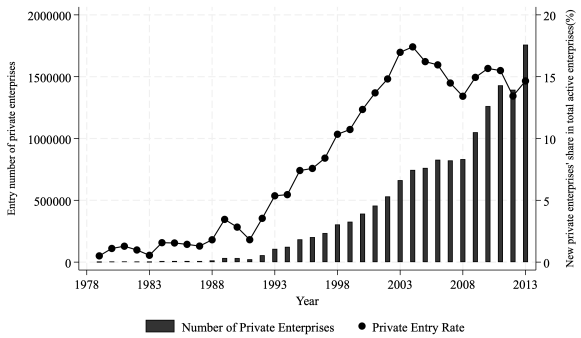
(c) Total outputs



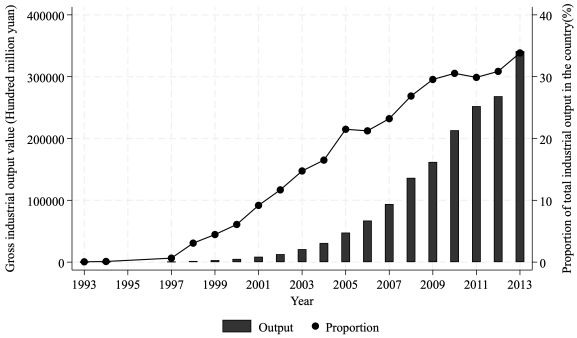
(d) Total assets

Notes: **Figure 1a** presents the number of SOEs and COEs from 1993 to 2008, with values expressed in tens of thousands. The data source is the *China Industrial Statistical Yearbook* (2009), Table 2-1. Notably, a statistical redefinition in 1998 excluded COEs with annual main business incomes below 5 million yuan, resulting in the unavailability of growth rate data for COEs in that year, a limitation that also impacts other subgraphs. **Figure 1b** illustrates employment trends in SOEs and COEs over the same period, with values expressed in millions. This data is derived from the *China Statistical Yearbook* (2009). **Figure 1c** depicts the total industrial output value of SOEs and COEs from 1993 to 2008, adjusted for inflation using deflators (base year: 1990). Values are represented in hundreds of millions of yuan. Data sources include the *China Industrial Statistical Yearbook* (2009), Table 2-3, and ASIF (1998, 1999). **Figure 1d** shows the total assets of SOEs and COEs from 1995 to 2008, with values also expressed in hundreds of millions. Data for 1996–2008 is obtained from the *China Statistical Yearbook* (1997–2009), while total asset values for SOEs and COEs in 1995, as well as for COEs in 2004, were calculated using data from the China Industrial Census.

Figure 2 Growing trend of the private economy



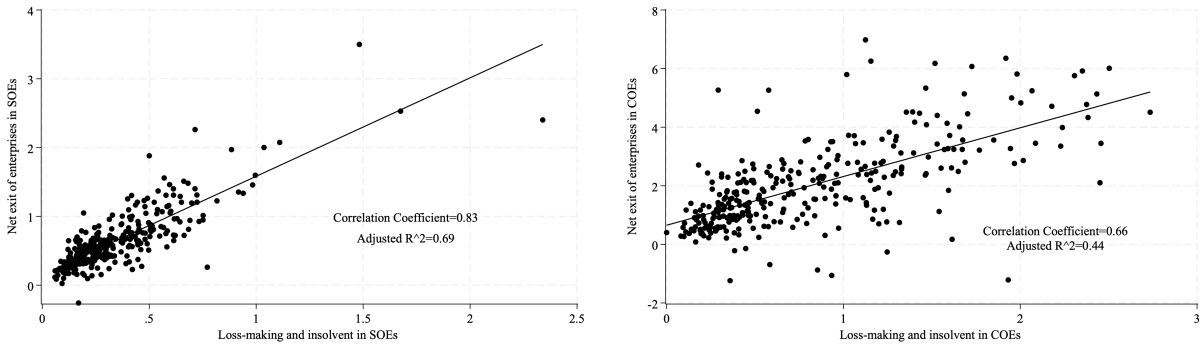
(a) Private sector entry during 1979-2013



(b) Industrial output of domestic private sector

Notes: **Figure 2a** illustrates the entry of private enterprises between 1978 and 2013. The data is sourced from the China Business Registry dataset. The left side reports the entry number and the right side reports the entry rate, calculated by dividing the number of new private enterprises established by the number of all surviving enterprises. **Figure 2b** shows the trend in the total industrial output value of domestic private enterprises from 1993 to 2013, with values presented in hundreds of millions of yuan. The Data and sourced from the *China Industrial Statistical Yearbook* and ASIF. However, data for the gross output value of private industrial enterprises in 1996 remains unavailable. From 1998 onward, only enterprises with annual main business incomes of 5 million yuan or more were included in the statistics.

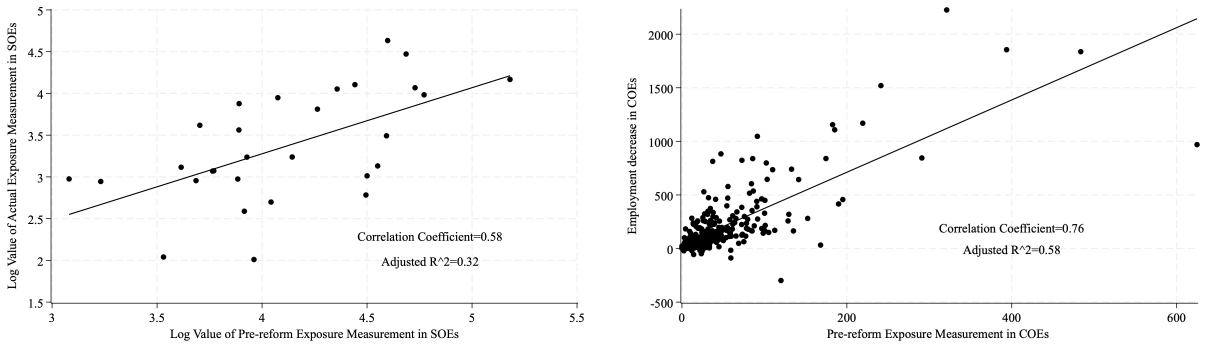
Figure 3 Net exit of enterprises and loss-making or insolvent enterprises



(a) SOEs (b) COEs

Notes: The two scatter plots illustrate the relationship between the number of loss-making or insolvent SOEs and COEs and the net exit of these entities. The net exit of SOEs and COEs from 1995 to 2004 is calculated using data from the *China Industrial Census* (CIC) for 1995 and 2004, with variables expressed in logarithmic form per 10,000 residents for each city.

Figure 4 Pre-reform redundancy and post-reform layoffs or employment reducation

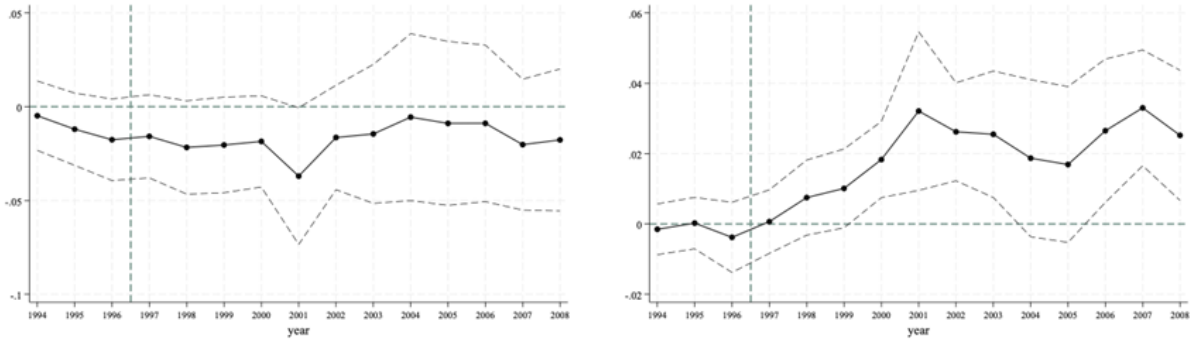


(a) SOEs: province-level

(b) COEs: city-level

Notes: **Figure 4a** illustrates the correlation between pre-reform labor redundancy and post-reform layoffs in SOEs at the provincial level. Labor redundancy is calculated using data from the CIC 1995 by summing the employment of loss-making or insolvent SOEs and normalizing it by the non-agricultural population. Layoff data are sourced from the *China Labor Statistical Yearbook*, which provides relevant information for SOEs only at the provincial level. All variables are expressed in logarithmic form per 10,000 residents. **Figure 4b** depicts the correlation between pre-reform labor redundancy and post-reform employment reductions in COEs at the city level. Calculation of labor redundancy in COEs is similar to that in SOEs. Employment reductions for COEs from 1995 to 2004 are calculated using data from the CIC 1995, 2004 for each city.

Figure 5 The dynamic effect of reform on the entry of private enterprises



(a) SOE restructuring and entry of private (b) COE withdrawal and entry of private

Notes: This figure presents the event study results illustrating dynamic effects and pre-trends. We estimate the following regression:

$$\text{Private entry}_{it} = \alpha_0 + \sum_{\text{year}=1994}^{2008} \beta_1 \times \text{SOE restructure}_i^{95} \times \text{year}_t + \sum_{\text{year}=1994}^{2008} \beta_2 \times \text{COE withdraw}_i^{95} \times \text{year}_t + \sum X_i^{95} \times \delta_t + \theta_i + \delta_t + \epsilon_{it} \quad (5)$$

$Private\ entry_{it}$ denotes the number of newly registered private businesses per 10,000 residents in city i and year t. $SOE\ restructure_i^{95}$ and $COE\ withdraw_i^{95}$ measure the number of employees in insolvent or loss-making SOEs and COEs per 10,000 residents in 1995.

X_i^{95} includes city-level covariates from 1995, such as economic and demographic characteristics and SOE/COE employment shares. The model controls for year fixed effects δ_t and city fixed effects θ_i. The omitted base year is 1993.

In panel (a), solid dots show yearly estimates of β_1; in panel (b), they show estimates of β_2. Dashed lines indicate 95% confidence intervals.

Tables

Table 1 Provinces and industries with declining SOE and COE sizes

Indicators	SOEs		COEs	
	1997-2000	1999-2002	1997-2004	1999-2002
Panel A. Province Level (31 provinces)				
Decline in total industrial output	0	0	30	27
Decline in industrial added value	0	0	30	25
Decline in total assets	-	8	-	28
Decline in number of enterprises	30	31	31	29
Decline in number of employees	30	31	31	30
Panel B. Industry Level (38 industries)				
Decline in total industrial output	4	12	29/35	32
Decline in industrial added value	3	0	29/35	0
Decline in total assets	3	25	30/35	-
Decline in number of enterprises	35	37	31/35	36
Decline in number of employees	35	36	32/35	36

*Notes:*This table reports the number of provinces and industries where the sizes of SOEs and COEs declined during the corresponding periods. Panel A presents the results at the provincial level, while Panel B provides the industry-level results. Data for 1997, 1999, 2000, and 2002 are sourced from the *China Industrial Statistical Yearbook*, and data for 2004 are calculated based on the *China Industrial Census (CIC)*. The total number of industries was 38, but in the CIC 2004, the total was 35. The value of output, value added and assets are deflated to 1990 values to account for inflation. "–" denotes unavailable data.

Table 2 Baseline generalized DID results

VARIABLES	*Entry of Private Enterprises*					
	(1)	(2)	(3)	(4)	(5)	(6)
SOE restructure$_i^{95}$× Post$_t$	0.0091		0.0021	-0.0043		-0.0085
	(0.0083)		(0.0086)	(0.0081)		(0.0085)
COE withdraw$_i^{95}$× Post$_t$		0.0336***	0.0329***		0.0187***	0.0213***
		(0.0060)	(0.0061)		(0.0051)	(0.0050)
Basic Controls	NO	NO	NO	YES	YES	YES
SOE and COE Size	NO	NO	NO	YES	YES	YES
Year and City FEs	YES	YES	YES	YES	YES	YES
Observations	5,088	5,088	5,088	4,832	4,832	4,832
Adjusted R^2	0.8194	0.8263	0.8263	0.8662	0.8678	0.8682

*Notes:*This table presents the results of examining the effect of the reform on private sector entry. This difference-in-differences model is adopted: $Private\ entry_{it} = \alpha_0 + \beta_1\ SOE\ restructure_i^{95} \times Post_t + \beta_2\ COE\ withdraw_i^{95} \times Post_t + \sum X_i^{95}\delta_t + \theta_i + \delta_t + \varepsilon_{it}$. $Private\ entry_{it}$ represents the number of newly registered private enterprises per 10,000 residents in city i during year t. $SOE\ restructure_i^{95}$ and $COE\ withdraw_i^{95}$ are city-level treatment variables, defined as the number of employees in insolvent and loss-making SOEs and COEs per 10,000 residents, respectively. $Post_t$ is a dummy variable that indicates years after 1996. The vector X_i^{95}includes economic and demographic characteristics of cities, and the employment proportions of SOEs and COEs among the total labor force in 1995. The model incorporates year $\delta_t$and city θ_i fixed effects. Robust standard errors clustered at the city level are in parentheses ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 3 Robustness checks: Alternative treatment metrics

	SOEs in strategy industries		Large SOEs			Central gov-owned SOEs
	Narrow Definition	Broad Definition	Top 0.5%	Top 1%	Top 5%	
	(1)	(2)	(3)	(4)	(5)	(6)
SOE restructure$_i^{95}$× Post$_t$	-0.0095	-0.0094	-0.0109	-0.0100	-0.0068	-0.0102
	(0.0094)	(0.0096)	(0.0141)	(0.0166)	(0.0391)	(0.0095)
COE withdraw$_i^{95}$× Post$_t$	0.0218***	0.0217***	0.0208***	0.0205***	0.0191***	0.0219***
	(0.0095)	(0.0094)	(0.0054)	(0.0052)	(0.0053)	(0.0052)
Basic Controls	YES	YES	YES	YES	YES	YES
SOE and COE Size	YES	YES	YES	YES	YES	YES
Year and City FEs	YES	YES	YES	YES	YES	YES
Observations	4832	4832	4832	4832	4832	4832
Adjusted R^2	0.8683	0.8683	0.8682	0.8680	0.8677	0.8684

*Notes:*This tables presents the robustness of our results to the measurement of treatment variables. The table presents the results considering the government's strategy for dealing with certain special SOE, including those in strategic industries, large SOEs, and central government-owned SOEs. In Column (1)-(2) , the definition of strategy industry is defined based on Huang et al (2017). In Column (3)-(5), the size of SOEs is defined in terms of the number of employees. Control variables, Year and City fixed effects are included in all regressions. Robust standard errors clustered at the city level are in parentheses ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 4 Robustness checks: collecitve TVEs or urban COEs

VARIABLES	*Private Enterprise*	
	(1)	(2)
SOE restructure$_i^{95}$× Post$_t$	-0.0071	-0.0083
	(0.0082)	(0.0084)
Pre1978 COE withdraw$_i^{95}$× Post$_t$	0.0746***	
	(0.0176)	
Post1978 COE withdraw$_i^{95}$× Post$_t$		0.0249***
		(0.0071)
Basic Controls	YES	YES
SOE and COE Size	YES	YES
Year and City FEs	YES	YES
Observations	4832	4832
Adjusted R^2	0.8686	0.8678

*Notes:*This table considers the impact of collective TVEs and urban COEs separately on the collective-private transition. A difference-in-differences model similar to the baseline regression is adopted here, replacing only the independent variable of collective enterprises. As the COEs established before 1978 or belongs to government that higher than township and village are unlikely the rural collective TVEs, we adopt them to construct alternative measures of collective withdrawal and re-run the baseline regression. Control variables, year and city fixed effects are included in all regressions. Robust standard errors clustered at the city level are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 5 Robustness checks addressing contemporaneous events

	Dropping subsample of 111 pilot cities	Population mobility		Economic stimulus policy	WTO accession and export-driven activities
		Subsample	Add controls		
	(1)	(2)	(3)	(4)	(5)
SOE restructure$_i^{95}$× Post$_t$	-0.0088	-0.0033	-0.0068	-0.0077	-0.0106
	(0.0065)	(0.0030)	(0.0092)	(0.0078)	(0.0089)
COE withdraw$_i^{95}$× Post$_t$	0.0244***	0.0266***	0.0191***	0.0209***	0.0191***
	(0.0057)	(0.0043)	(0.0051)	(0.0047)	(0.0049)
Spillover SOE$_i$× Post$_t$			-0.0160		
			(0.0116)		
Spillover COE$_i$× Post$_t$			0.0239		
			(0.0211)		
Export^{2001}× After$_t$					0.9897**
					(0.3834)
Coast$_i$× After$_t$					0.3788
					(0.3390)
Basic Controls	YES	YES	YES	YES	YES
SOE and COE Size	YES	YES	YES	YES	YES
Year and City FEs	YES	YES	YES	YES	YES
Observations	3104	4224	4480	4832	4256
Adjusted R^2	0.7761	0.7584	0.8699	0.8721	0.8737

Notes: This table presents the results of alternative explanations. Column 1 presents the result excluding subsamples from the 111 pilot cities. Columns 2-3 consider the migration issue, including deleting samples from municipalities and special cities in column 2 and adding the control variable of spillover effect in column 3. Column 4 presents the results of other alternative explanations of large-scale economic stimulus policy aiming at investment on infrastructure. Column 5 considers the WTO accession in 2001 and export-driven activities, adding export intensity variable and the distance from each sample city to nearest coast. The data of export across cities in 2001 comes from China Customs export data. Control variables, Year and City fixed effects are included in all regressions. Robust standard errors clustered at the city level are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 6 Correlation between privatization ratio and treatment variables

Variables	SOE restructure	COE withdraw
Panel A. Province-level indicators based on CPES data		
SOE privatization	0.0327**	
COE privatization		0.0987***
Panel B. City-level indicators based on ASIF data		
SOE privatization	0.1068***	
COE privatization		0.3214***

*Notes:*This table presents the results of the correlation analysis between the privatization ratio and treatment variables. In Panel A, Privatization (Prov.) is a province-level ratio of privatized SOE or COE enterprises among all private enterprises, calculated based on the CPES data. Privatization of SOE (Prov.) and Privatization of COE (Prov.) are similar province-level ratios of privatized SOE and COE enterprises among all private enterprises, respectively. In Panel A, the *State restructure* and *COE withdraw* are calculated at province-level using the same method applied to city-level ones. In Panel B, following the sequential identification method proposed by Brandt et al. (2012), we match enterprise information across years, and assign a unified enterprise code to the observations belonging to the same enterprise to ensure that there was no estimation error due to changes in the enterprise code (see Table A9). We identify SOEs and COEs that transition to private ownership in the following year as privatized enterprises, aggregate the total number at the city-year level, and define the indicators as the share of privatized enterprises relative to the total number of SOEs and COEs, respectively. Correlation coefficients are presented in the table, which is Pearson correlation coefficient. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

Table 7 Privatization or new entry?

	Adding control variables		*Using the proportion of non-privatization*	*Adding control variables that measure the*	*Wholly foreign-owned*
	Privatization ratio	*Privatization ratio of SOE and COE*	*enterprises as weight*	*effect of privatization*	*enterprise*
	(1)	(2)	(3)	(4)	(5)
SOE restructure$_i^{95}$× Post$_t$	-0.0085	-0.0086	-0.0098	-0.0105	-0.0011
	(0.0085)	(0.0085)	(0.0071)	(0.0085)	(0.0011)
COE withdraw$_i^{95}$× Post$_t$	0.0212***	0.0213***	0.0158***	0.0190***	0.0012***
	(0.0050)	(0.0050)	(0.0038)	(0.0047)	(0.0004)
Privatization	0.6112				
	(0.9616)				
SOE privatization		1.3848			
		(1.0490)			
COE privatization		-0.5216			
		(0.9169)			
SOE potential close$_i^{95}$× Post$_t$				0.0183	
				(0.0212)	
COE potential close$_i^{95}$× Post$_t$				0.0801***	
				(0.0226)	
Basic Controls	YES	YES	YES	YES	YES
SOE and COE Size	YES	YES	YES	YES	YES
Year and City FEs	YES	YES	YES	YES	YES
Observations	4832	4832	4832	4832	4832
Adjusted R^2	0.8682	0.8682	0.8555	0.8698	0.6607

Notes: The table presents the regression results considering the possible impact of privatization on entry. In columns 1-2, Privatization is a province-level ratio of privatized SOEs or COEs among all private enterprises, calculated based on the CPES data. In column 3, we take the privatization variable as weight to calculate the proportion of non-privatized private enterprises in each province. In column 4, based on the China Business registry datasets, we construct variables to measure the privatization effect and use them as the control variables for regression. In column 5, we aggregate the number of newly registered exclusively foreign-owned enterprises at city-year level, and employ it as new dependent variable. Control variables, Year and City fixed effects are included in all regressions. Robust standard errors clustered at the city level are in parentheses. ***, **, and * indicate significant at the 1, 5, and 10 percent levels, respectively.

Table 8 To predict the changes of sector scale

	Total Industrial Output		*Total Asset*		*Employment*	
	SOE	*COE*	*SOE*	*COE*	*SOE*	*COE*
	(1)	(2)	(3)	(4)	(5)	(6)
SOE restructure$_i^{95}$	0.0239		0.0188		-1.8541***	
	(0.0322)		(0.0529)		(0.5466)	
COE withdraw$_i^{95}$		-0.0726***		-0.0864***		-2.9549***
		(0.0266)		(0.0217)		(0.6937)
Basic Controls in 1995	YES	YES	YES	YES	YES	YES
SOE and COE Controls in 1995	YES	YES	YES	YES	YES	YES
Year and City FEs	NO	NO	NO	NO	NO	NO
Observations	297	297	297	297	297	297
Adjusted R^2	0.1079	0.1730	0.2411	0.3360	0.3386	0.4052

Notes: This table examines the association between the intensity of a city's exposure to reform and the size of the state and collective economy, measured by industrial output, total assets, and employment. Columns 1-2 present results for industrial output, Columns 3-4 for total assets, and Columns 5-6 for employment. The dependent variables are calculated based on the change in SOEs and COEs industrial output, total assets, and employment for each city during 1995-2004, using data from the *1995-2004 China Industrial Census*. Control variables are from 1995, as the data are cross-sectional. Robust standard errors, clustered at the city level, are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

Table 9 Industry heterogeneities: continued SOE presence and entry barriers

	The proportion of SOEs in the industry		Industry concentration: the HHI index		Industrial chain position		
	≥Mean	<Mean	≥Mean	<Mean	Downstream	Midstream	Upstream
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SOE restructure$_i^{95}$× Post$_t$	-0.0020*	-0.0023	-0.0009*	-0.0033	-0.0047	-0.0009	-0.0017*
	(0.0012)	(0.0022)	(0.0006)	(0.0024)	(0.0045)	(0.0007)	(0.0009)
COE withdraw$_i^{95}$× Post$_t$	0.0021***	0.0111***	0.0016***	0.0115***	0.0077**	0.0032***	0.0044***
	(0.0006)	(0.0019)	(0.0005)	(0.0022)	(0.0035)	(0.0010)	(0.0007)
Basic Controls	YES	YES	YES	YES	YES	YES	YES
SOE and COE Size	YES	YES	YES	YES	YES	YES	YES
Year and City FEs	YES	YES	YES	YES	YES	YES	YES
Observations	4832	4832	4832	4832	4832	4832	4832
Adjusted R^2	0.7652	0.8562	0.7872	0.8592	0.8588	0.8280	0.8234
Diff.	(1)-(2)		(3)-(4)			(5)-(6)	(5)-(7)
Diff. of β(SOE)	0.000		0.002			-0.004	-0.002
p-value (SOE)	0.440		0.340			0.040	0.007
Diff. of β (COE)	-0.009		-0.011			0.003	0.004
p-value (COE)	0.000		0.000			0.000	0.010

*Notes:*This table presents the results of a difference-in-differences model similar to the baseline regression, but with different dependent variables. In Columns 1-2, industries are divided by the mean output share of SOEs in 1995, and private enterprise variables are recalculated accordingly for each city. Columns 3-4 analyze industry competition based on the 1995 Industrial Census HHI index, dividing industries at the mean value and recalculating private business entry numbers. Columns 5-7 assess the impact of upstream, midstream, and downstream industries using the classification by Li et al. (2015). Control variables, Year and City fixed effects are included in all regressions. Robust standard errors clustered at the city level are in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

Table 10: Entrepreneurs previously worked and re-employment in SOEs and COEs

Panel A. Entrepreneurs previously worked in SOEs and COEs

VARIABLES	The number of private enterprises created by SOE or COE former employees	The number of private enterprises created by different types of SOE or COE former employees		
		main manager	technical staffs	other general staffs
	(1)	(2)	(3)	(4)
SOE restructure$_i^{95}$	-0.0392*	-0.0137	-0.0066	-0.0089
	(0.0220)	(0.0118)	(0.0039)	(0.0061)
COE withdraw$_i^{95}$	0.1821***	0.0856***	0.0277***	0.0435***
	(0.0501)	(0.0269)	(0.0089)	(0.0138)
Basic Controls	YES	YES	YES	YES
SOE and COE Size	YES	YES	YES	YES
Survey Year FE	YES	YES	YES	YES
Observations	81	81	81	81
Adjusted R^2	0.3214	0.2602	0.2362	0.2579

Panel B. Re-employment of SOE and COE laid-off workers

VARIABLES	The number of laid-off workers employed	Proportion of laid-off workers employed in all workers
	(1)	(2)
SOE restructure$_i^{95}$	0.0044	-0.0009
	(0.1651)	(0.0008)
COE withdraw$_i^{95}$	0.0637	0.0016
	(0.3804)	(0.0018)
Basic Controls	YES	YES
SOE and COE Size	YES	YES
Survey Year FE	YES	NO
Observations	60	30
Adjusted R^2	-0.0881	0.2661

Notes: Panel A presents the results of regressing the entrepreneurs' status of SOE or COE former employees on the treatment variables. We select the CPES data in 1997, 2000, and 2002 with consistent statistical methods, and retained the sample of new enterprises established within the past three years at the time of the survey. We identify entrepreneurs who worked in SOEs or COEs(the last job before starting a business) and aggregate statistics at the province-year level as the dependent variable in the regressions. The regression model is used: $Entrepreneurs_{jt} = \alpha_0 + \beta_1\ SOE\ restructure_i^{95} + \beta_2\ COE\ withdraw_i^{95} + \sum X_i^{95}\delta_t + \theta_i + \delta_t + \varepsilon_{it}$. j represents province, t represents survey year. Panel B presents the results of re-employment of SOE and COE laid-off workers.Based on the CPES survey data in 2000 and 2002, we constructed statistics on the average number of laid-off workers in each province and their proportion in all workers. Since the information of all employees is not provided in 2002, the control variable of survey year is not included in Column 2. The regression model used is: $Layoff_{jt} = \alpha_0 + \beta_1\ SOE\ restructure_i^{95} + \beta_2\ COE\ withdraw_i^{95} + \sum X_i^{95}\delta_t + \theta_i + \delta_t + \varepsilon_{it}$. j represents province, t represents survey year. Standard errors are in parentheses. ***, **, and * indicate significant at the 1, 5, and 10 percent levels, respectively.

Table 11 Manufacturing Subsample: Industry-Level Labor and Capital Intensity

	Labor-Intensive Industry	Capital-Intensive Industry
	(1)	(2)
SOE restructure$_i^{95}$× Post$_t$	-0.0023***	-0.0009*
	(0.0009)	(0.0005)
COE withdraw$_i^{95}$× Post$_t$	0.0057***	0.0023***
	(0.0010)	(0.0005)
Basic Controls	YES	YES
SOE and COE Size	YES	YES
Year and City FEs	YES	YES
Observations	4832	4832
Adjusted R^2	0.7853	0.8007
Diff.	(1)-(2)	
Diff. of β (SOE)	-0.001	
p-value (SOE)	0.370	
Diff. of β (COE)	0.009	
p-value (COE)	0.000	

Notes: This table presents the empirical results for subsamples within manufacturing. A difference-in-differences model similar to the baseline regression is adopted, changing only the dependent variable. Columns 1-2 show the results for manufacturing subsamples. Based on the classification standard by Kucera et al. (2006), we recalculate entrepreneurship variables separately for labor-intensive and capital-intensive manufacturing and re-run the baseline regression using these new dependent variables. Control variables, Year and City fixed effects are included in all regressions. Robust standard errors clustered at the city level are in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

Table 12 Additional measure of private economy: self-employed businesses

VARIABLES	Entry of Self-Employed Businesses		
	(1)	(2)	(3)
SOE restructure$_i^{95}$× Post$_t$	0.0476**		0.0304
	(0.0238)		(0.0253)
COE withdraw$_i^{95}$× Post$_t$		0.0956***	0.0865***
		(0.0185)	(0.0199)
Basic Controls	YES	YES	YES
SOE and COE Size	YES	YES	YES
Year and City FEs	YES	YES	YES
Observations	4832	4832	4832
Adjusted R^2	0.6795	0.6833	0.6841

Notes: This table presents the effect of the reform on self-employment entry in a given city for a given year. A difference-in-differences model similar to the baseline regression is adopted, replacing only the dependent variable with self-employment. Year and City fixed effects are included in all regressions. Control variables are included in Columns (4)–(6). Robust standard errors clustered at the city level are in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

Table 13 Impact on entrepreneurial quality and the size of private economy

Panel A. Entrepreneurial quality and scale of entry (city-level)

VARIABLES	High-quality entry of private enterprises		Number of self-employed employees	Registered capital
	Survival in 2022	Creating job in 2022		
	(1)	(2)	(3)	(4)
$SOE\ restructure_i^{95} \times Post_t$	0.0044	-0.0162	-0.3724	-5.0317
	(0.0041)	(0.0471)	(0.4159)	(3.3426)
$COE\ withdraw_i^{95} \times Post_t$	0.0075**	0.1823***	2.0963***	5.3675*
	(0.0032)	(0.0614)	(0.3343)	(3.1539)
Basic Controls	YES	YES	YES	YES
SOE and COE Size	YES	YES	YES	YES
Year and City FEs	YES	YES	YES	YES
Observations	4832	4832	3542	4832
Adjusted R^2	0.8114	0.6187	0.7024	0.8942

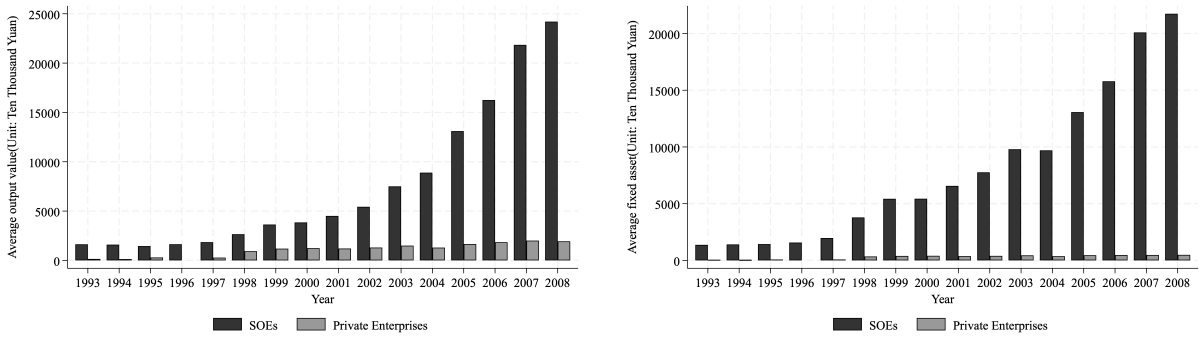
Panel B. Size of private industrial sector (province-level)

VARIABLES	Value added	Industrial output	Fixed assets
	(1)	(2)	(3)
$SOE\ restructure_i^{95} \times Post_t$	-0.0040	-0.0032	-0.0040
	(0.0034)	(0.0030)	(0.0030)
$COE\ withdraw_i^{95} \times Post_t$	0.0202**	0.0179**	0.0168**
	(0.0096)	(0.0082)	(0.0072)
Basic Controls	YES	YES	YES
SOE and COE Size	YES	YES	YES
Year and Province FEs	YES	YES	YES
Observations	253	282	281
Adjusted R^2	0.9668	0.9722	0.9679

Notes: This table presents the results of the entrepreneurial quality and the size of the private economy. Panel A used city-level panel data. Columns 1-2 of Panel A report the regression results for high-quality entry of private enterprises. In Columns 3-4, we adopt the number of self-employed employees per 10,000 residents and the registered capital of private enterprises per 10,000 residents as dependent variables. In Panel B, the data comes from the *China Industrial Statistical Yearbook*, including the data of 29 provinces except Xizang and Chongqing, covering 10 years (1993, 1994, 1997, 2001-2003, and 2004-2008). We adopt the logarithmic forms of total profit, output, add value, and fixed assets of the private industrial sector as the dependent variables, respectively. Variables are adjusted based on deflators (based on 1990) to remove the effects of inflation. In particular, considering that China's industrial statistical yearbook only counts collective enterprises above designated scale, time-varying control variables with the same statistical caliber are used. In Panel A, robust standard errors clustered at the city level are in parentheses, and at the province level in Panel B. ***, **, and * indicate significant at the 1, 5, and 10 percent levels, respectively.

Appendix A. Additional Figures and Tables

Figure A1 Average industrial output and fixed assets of SOEs and private enterprises

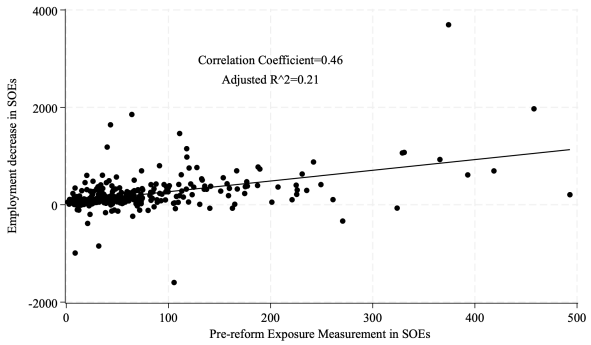


(a) Average industrial output

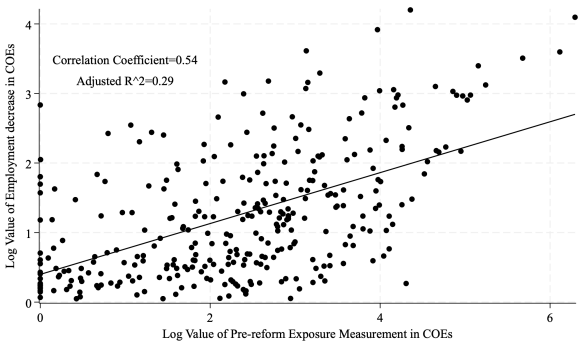
(b) Average fixed assets

Notes: This figure depicts the average industrial output and fixed assets of surviving SOEs and private enterprises. For private enterprises, we obtain the total industrial output value and fixed asset of most years (1993-1994, 1997, 2001-2003, 2005-2008) from the China Industrial Statistical Yearbook, and use the ASIF (1998-2000) and Industrial Census Data (1995,2004) to fill in some missing information. Data of private industrial enterprises for 1996 are missing. The numbers are in ten thousand. Variables are adjusted based on deflators (based on 1990) to remove the effects of inflation. Data source is China Industrial Statistical Yearbook.

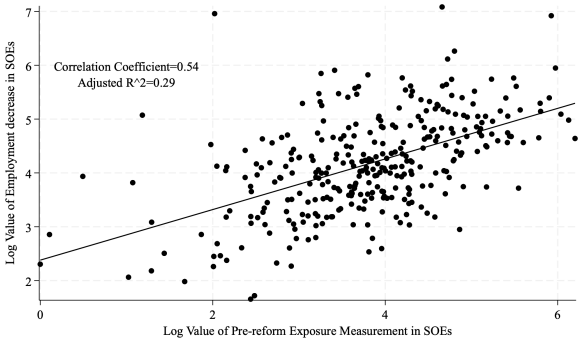
Figure A2 Pre-reform redundant labor and true employment reduction measurements



(a) SOEs: using CIC data



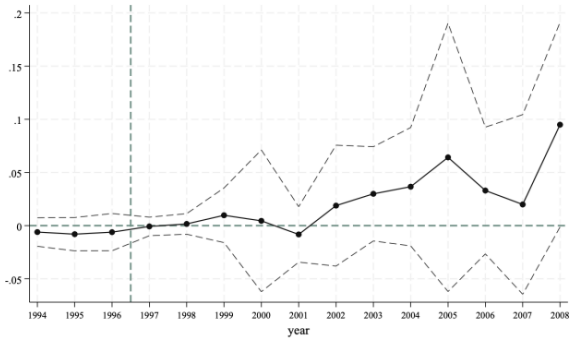
(b) COEs: using ASIF data



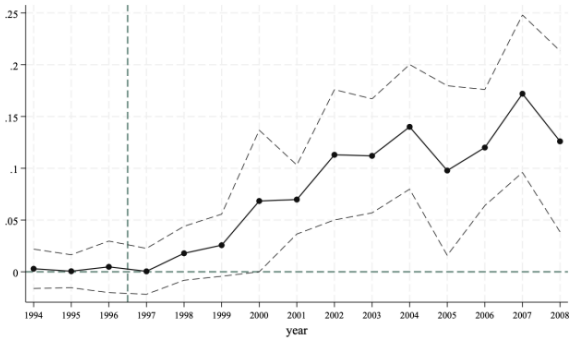
(c) SOEs: using ASIF data

*Notes:*This scatter plot directly presents the results of the correlation analysis between pre-reform variables and employment reductions. In Figure a, we adopt the 2004 Economic Census and 1995 Industrial Census to calculate the employment reductions of SOEs from 1995 to 2004 in each city, and aggregate the potential layoffs variable based on 1995 Industrial Census data. In Figures b and c, we adopt the Annual Survey of Industrial Firms (ASIF) database to calculate the employment reductions of SOEs and COEs from 1998 to 2005 in each city, and aggregate the potential layoffs variable based on 1995 Industrial Census data. Variables are in the form of log per 10,000 residents.

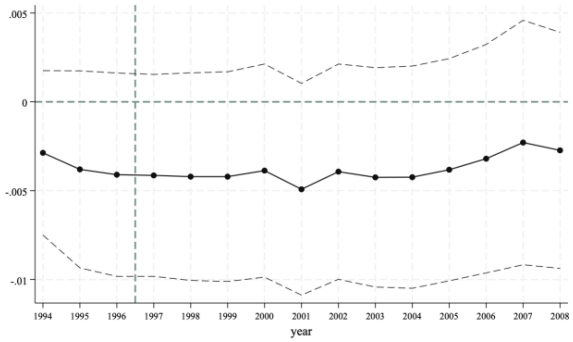
Figure A3 The dynamic effect on self-employment and foreign-owned enterprises



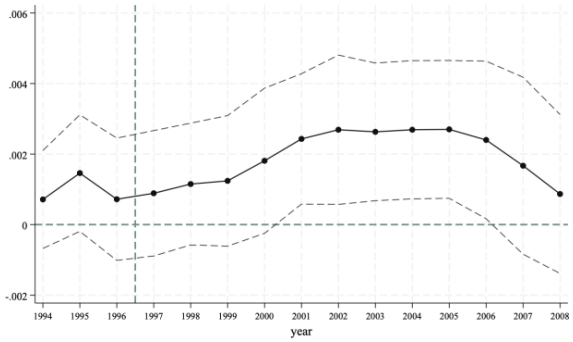
(a) SOE restructuring and self-employments



(b) COE withdrawal and self-employments



(c) SOE restructuring and foreign entry



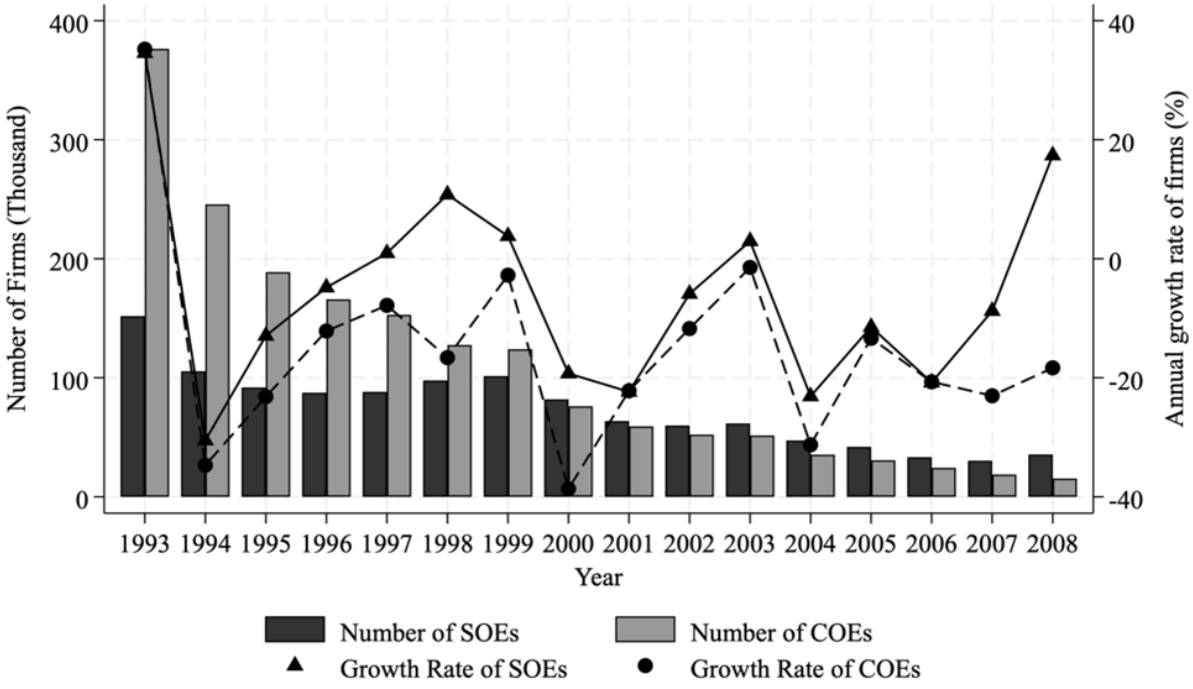
(d) COE withdrawal and foreign entry

Notes: This figure presents the dynamic effect of the reform on self-employment and exclusively foreign-owned enterprises. We use an event study approach to estimate the dynamic effects of the reform and the following regression model is used:

$$\text{Self-employment}_{it} \text{ or Exclusively FOE}_{it} = \alpha_0 + \sum_{\text{year}=1994}^{2008} \beta_1 \times \text{SOE restructure}_i^{95} \times \text{year}_t + \sum_{\text{year}=1994}^{2008} \beta_2 \times \text{COE withdraw}_i^{95} \times \text{year}_t + \sum X_i^{95} \times \delta_t + \theta_i + \delta_t + \epsilon_{it} \quad (6)$$

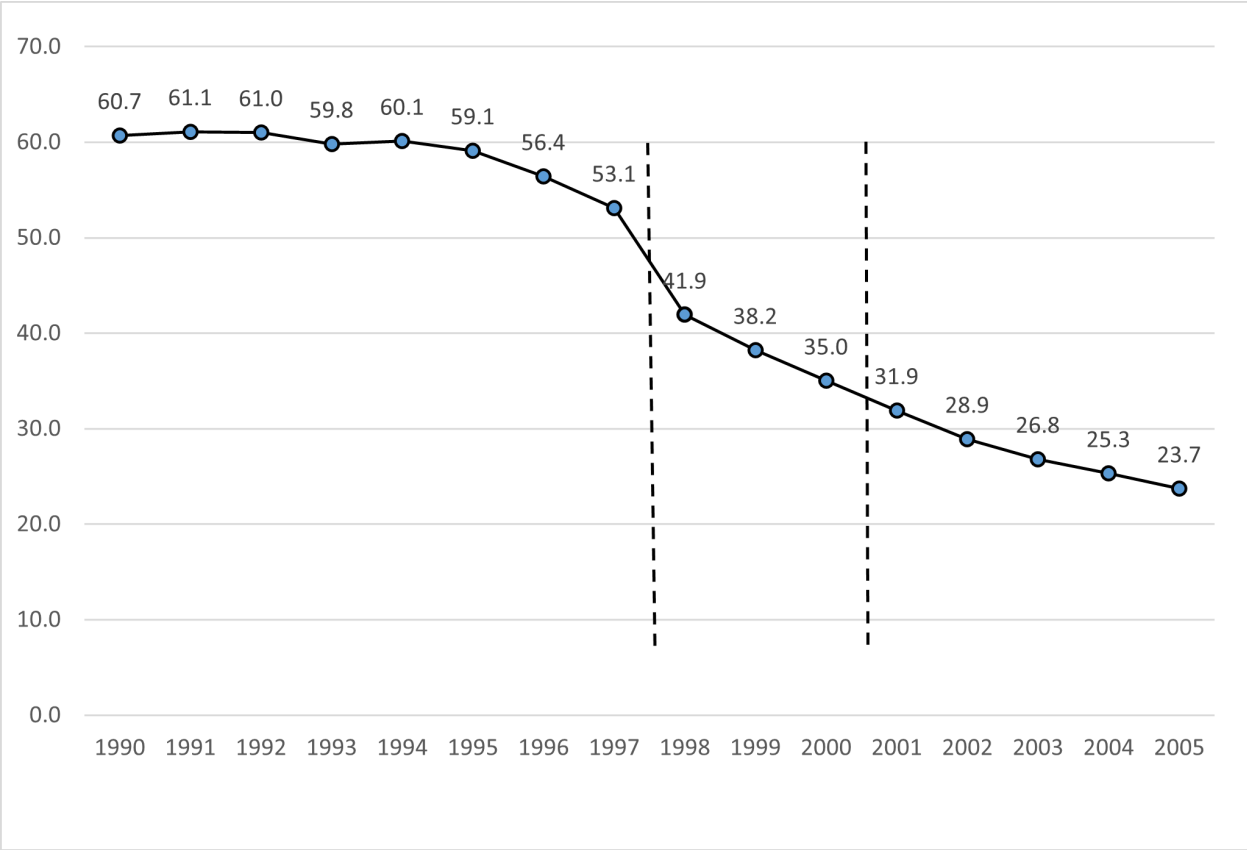
Dependent variables are the number of newly registered self-employment or exclusively foreign-owned enterprises per 10,000 residents of city i in year t. and are the city-level number of potential layoffs of SOE or COE per 10,000 residents. include basic control variables and the proportion of SOEs and COEs employment size among total labor forces in a city, respectively. Year and city fixed effects are included in all regressions.

Figure A4 The number and growth of SOE and COE established



Notes: This figure depicts the creation of state-owned enterprises and collectively owned enterprises between 1993 and 2008. The numbers are in ten thousand; Data source is China Business registry dataset.

Figure A5 The trend of SOE share in urban employments



Notes: This figure depicts the trend of SOE share in urban employments between 1990 and 2005. The numbers are in ten thousand; Data sources include Cai, Park and Zhao (2008); Yearbook (various years).

Table A1 Main variables and description

Panel A. The treatment variables	
SOE restructure$_i^{95}$	City-level number of employees in insolvent or loss-making industrial SOEs in 1995 per 10,000 non-agricultural residents.
COE withdraw$_i^{95}$	City-level number of employees in insolvent or loss-making industrial COEs in 1995 per 10,000 non-agricultural residents.
Panel B. Private sector entry and the size of private economy	
Private Enterprise	City-level number of creations of private-owned enterprises per 10,000 residents.
Self-employment	City-level number of creations of self-employment per 10,000 residents.
Panel C. Basic Controls	
GDP (log value)	Logarithm of GDP in 1995.
Non-agricultural population (log value)	Logarithm of non-agricultural population in 1995.
Fiscal expenditure (log value)	Logarithm of fiscal expenditure in 1995.
Expenditures on education (log value)	Logarithm of fiscal education expenditure in 1995, per capita.
Export Intensity	The intensity of export of each city in 1995.
Share of GDP of the secondary industry	The proportion of the secondary industry GDP of each city in the total GDP in 1995.
Share of GDP of the tertiary industry	The proportion of the tertiary industry GDP of each city in the total GDP in 1995.
Panel D. Size of state and collective sector	
Share of employment in SOE	The proportion of the employment in SOE in the total employment of each city in 1995.
Share of employment in COE	The proportion of the employment in COE in the total employment of each city in 1995.
Panel E. Entrepreneurial quality	
Survival in 2022	The proportion of private firms in each city that will still be alive by 2022.
Creating job in 2022	City-level number of private enterprises insured per 10,000 people.
Number of self-employed employees	City-level number of self-employed employees per 10,000 residents.
Registered Capital	City-level number of registered capitals of private enterprises per 10,000 residents.
Profit	Logarithm of total profit of the private industrial sector.
Add Value	Logarithm of added value of the private industrial sector.
Industrial Output	Logarithm of industrial output of the private industrial sector.
Fixed Asset	Logarithm of fixed asset of the private industrial sector.

Notes: This table presents the main variables and their description. In *Panel A*, the variables are derived from the 1995 Industrial Census Data. In *Panel B*, the variables come from the Business Registry dataset, which is originally from the National Enterprise Credit Information Publicity System. In *Panels C and D*, the control variables of cities are from the China City Statistical Yearbook. *Panel E* provides measures of entrepreneurial quality.

Table A2 Summary statistics

Variables	Obs.	Mean	SD	Min	Max
Panel A. The treatment variables					
SOE restructure$_i^{95}$	302	74.68	78.62	1.64	493.03
COE withdraw$_i^{95}$	302	46.99	64.78	0	624.74
Panel B. Private sector entry and the size of private economy					
Private Enterprise	4832	5.35	11.16	0	205.49
Self-employment	4832	18.93	30.39	0	602.74
Panel C. Basic controls					
GDP in 1995 (log value)	302	13.92	1.05	10.16	17.02
Non-agricultural population in 1995 (log value)	302	4.15	0.85	0.74	6.83
Fiscal expenditure in 1995 (log value)	302	11.16	0.88	8.25	14.80
Expenditures on education in 1995 (log value)	302	8.61	0.94	5.86	12.64
Export intensity in 1995	302	0.01	0.01	0.00	0.08
Share of GDP of the secondary industry in 1995 (%)	302	40.97	12.89	12.10	86.20
Share of GDP of the tertiary industry in 1995 (%)	302	30.61	7.75	8.70	68.40
Panel D. Size of state and collective sector					
Share of employment in SOE in 1995 (%)	302	47.73	20.02	2.24	95.65
Share of employment in COE in 1995 (%)	302	33.01	15.23	3.37	74.15
Panel E. Entrepreneurial quality					
Survival in 2022	4832	1.57	3.57	0	79.93
Creating job in 2022	4832	42.07	111.00	0	2708.13
Number of self-employed employees	3542	488.28	509.93	28.97	3311.35
Registered Capital	4832	1885.96	4191.31	0	75551.91
Profit	265	7.95	2.81	1.62	12.93
Add Value	253	9.32	2.88	2.02	14.03
Industrial Output	282	10.82	2.97	2.02	15.58
Fixed Asset	281	9.77	2.82	2.02	14.20

Notes: This table reports the summary statistics for key variables across all panels. The unit of observation is the city-level data for each variable. Panel A contains treatment variables related to the restructuring and withdrawal of state-owned and collective enterprises in 1995. Panel B reports on business entry, including private enterprises and self-employment. Panel C presents the basic controls in the sample, based on 1995 city-level data. Panel D summarizes the employment share in state-owned and collective enterprises. Panel E presents entrepreneurial quality variables, with data for 2022. The unit for per capita variables is per 10,000 residents.

Table A3 Selection procedure of sample cities

Description	Number of Cities	Observations
Panel A. Original sample size by data sources		
1995 Industrial Census Data	340	510,381
Business registry dataset	340	47,301,152
Panel B. Construction of a prefecture-level city panel data (1993-2008)		
Construct per capita variable: the year-end population variable is missing	318	5088
New cities established after 1993	-13	-208
Administrative divisions abolished from 1993 to 2008	-9	-144
Control variable: the GDP ratio of the secondary/tertiary industries	302	4832
Some autonomous prefectures lack relevant information	-16	-256

Notes: This table presents the selection process of sample cities. Due to the adjustment of administrative divisions, there are certain differences in the administrative division codes of the same enterprise in different years. To reduce errors, we unified the administrative division codes of all observations to 2020 through address resolution, resulting in a total of 340 cities. Panel B details the sample elimination process.

Table A4: Employment changes in SOEs and COEs between 1995-2002 by industries

Industry Category	Population (Ten thousand)	1995	2002	Absolute Change	Relative Change	Contribution raio	
						Value	Total
Agriculture	Farming, Forestry, Animal Husbandry, and Fishery	660	430	-230	-34.85%	5.29%	5.29%
Industrial	Mining and Quarrying	914	537	-377	-41.25%	8.67%	73.06%
	Manufacturing	5439	2907	-2532	-46.55%	58.21%	
	Production and Supply of Electricity, Gas, and Water	257	285	28	10.89%	-0.64%	
	Construction	1053	756	-297	-28.21%	6.83%	
Service	Geological Prospecting and Water Conservancy	134	96	-38	-28.36%	0.87%	21.66%
	Transport, Storage, Post, and Telecommunications	824	613	-211	-25.61%	4.85%	
	Wholesale and Retail Trade & Catering Services	1828	733	-1095	-59.90%	25.17%	
	Finance and Insurance	273	287	14	5.13%	-0.32%	
	Real Estate Trade	77	107	30	38.96%	-0.69%	
	Social Services	449	483	34	7.57%	-0.78%	
	Health Care, Sporting, and Social Welfare	438	480	42	9.59%	-0.97%	
	Education, Culture, Arts, and Polytechnical Services	1291	1517	226	17.51%	-5.20%	
	Scientific Research and Polytechnical Services	178	151	-27	-15.17%	0.62%	
	Government Agencies, Party Agencies, and Social Organizations	1027	1056	29	2.82%	-0.67%	
	Others	66	120	54	81.82%	-1.24%	
Total		14908	10558	-4350	-29.18%	100.00%	100%

Notes: The data source is Chinese Labor Statistic Yearbook (2003). The contribution ratio represents the proportion of the absolute change in employment within a specific industry to the total employment reduction during the period from 1995 to 2002.

Table A5 Representativeness of industrial data

	Divided by the proportion of the output value in the secondary industry (1)	Divided by the proportion of the employment in the secondary industry (2)
SOE restructure$_i^{95}$× Post$_t$	-0.0042	-0.0050
	(0.0039)	(0.0048)
COE withdraw$_i^{95}$× Post$_t$	0.0100***	0.0109***
	(0.0024)	(0.0024)
Basic Controls	YES	YES
SOE and COE Size	YES	YES
Year and City FEs	YES	YES
Observations	4832	4528
Adjusted R^2	0.8680	0.8714

Notes: The regression aims to address the issue of the representativeness of industrial census data, adopting the alternative treatment variables by dividing the original *SOE restructure* and *COE withdraw* variable by the share of industrial firm employment (or output) in the total urban employment (or output) in each city in 1995. In Column (2), because some autonomous prefectures lack the number of employees by industry, the sample size is smaller than others.

Table A6 Alternative treatment variables weighted by industrial output

VARIABLES	Entry of Private Enterprises					
	(1)	(2)	(3)	(4)	(5)	(6)
SOE output$_i^{95}$× Post$_t$	0.4346*		0.1609	-0.6897*		-0.7930**
	(0.2620)		(0.2654)	(0.3685)		(0.3749)
COE output$_i^{95}$× Post$_t$		0.9141***	0.8598***		0.5480***	0.6338***
		(0.1250)	(0.1527)		(0.1523)	(0.1591)
Basic Controls	NO	NO	NO	YES	YES	YES
SOE and COE Size	NO	NO	NO	YES	YES	YES
Year and City FEs	YES	YES	YES	YES	YES	YES
Observations	5088	5088	5088	4832	4832	4832
Adjusted R^2	0.8213	0.8299	0.8302	0.8731	0.8731	0.8753

Notes: This table adopts alternative variables as weighte by industrial output as compared to employment of SOEs and COEs. A difference-in-differences model similar to the baseline regression is adopted here, replacing only the dependent variable with the industrial output of loss-making or insolvent enterprises. Year and city fixed effects are included in all regressions. Control variables are included in columns (4) – (6). Robust standard errors clustered at the city level are in parentheses. ***, **, and * indicate significant at the 1, 5, and 10 percent levels, respectively.

Table A7: Considering redundancies in profit-making and non-insolvent enterprises

VARIABLES	Entry of Private Enterprises (1)
SOE restructure$_i^{95} \times$ Post$_t$	-0.0135**
	(0.0059)
COE withdraw$_i^{95} \times$ Post$_t$	0.0142**
	(0.0057)
Basic Controls	YES
SOE and COE Size	YES
Year and City FEs	YES
Observations	4832
Adjusted R^2	0.8682

Notes: Using the CIC 1995 data, we regress employment on industry dummies, firm asset size, and ownership type. The residual term from this regression serves as a proxy for labor redundancy in profit-making and non-insolvent SOEs and COEs. These residuals are then summed up at the city level and incorporated into the original values of *SOE restructure* and *COE withdraw*. The revised treatment variables are subsequently used to replace the original variables in the baseline DID models. Robust standard errors, clustered at the city level, are reported in parentheses. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

Table A8 The impact on the entry of SOEs and COEs

VARIABLES	Entry of SOEs or COEs	
	SOEs entry	COEs entry
	(1)	(2)
SOE restructure$_i^{95}$× Post$_t$	-0.0081**	-0.0105**
	(0.0032)	(0.0042)
COE withdraw$_i^{95}$× Post$_t$	-0.0000	-0.0146***
	(0.0014)	(0.0026)
Basic Controls	YES	YES
SOE and COE Size	YES	YES
Year and City FEs	YES	YES
Observations	4832	4832
Adjusted R^2	0.3899	0.5153

Notes: This table presents the effect of the reform on SOE and COE entry in a given city for a given year. A difference-in-differences model similar to the baseline regression is adopted here, replacing only the dependent variables with SOE and COE. Year and city fixed effects are included in all regressions. Robust standard errors clustered at the city level are in parentheses. ***, **, and * indicate significant at the 1, 5, and 10 percent levels, respectively.

Table A9: Matching of firms over years in ASIF dataset

Year	Active Firms	Entrants	Linked Using		Exiting (Next Year)	Fraction of Active Firms (%)			
			NBS ID	Other Info		Entrants	NBS ID	Other Links	Exiting
1998	165,106	–	–	–	24,827	–	–	–	–
1999	162,017	21,738	133,480	6,799	24,035	13.4	82.4	4.2	14.8
2000	162,874	24,892	133,619	4,363	31,929	15.3	82.0	2.7	19.6
2001	171,243	40,298	121,844	9,101	21,315	23.5	71.2	5.3	12.4
2002	181,546	31,618	145,286	4,652	24,089	17.4	80.0	2.6	13.3
2003	196,208	39,751	150,008	7,449	36,134	20.3	76.5	3.8	18.4
2004	279,077	119,003	144,457	15,617	45,086	42.6	51.8	5.6	16.2
2005	270,027	36,036	229,167	4,824	22,039	13.3	84.9	1.8	8.2
2006	301,942	53,954	243,971	4,017	25,436	17.9	80.8	1.3	–

Notes: In the Annual Survey of Industrial Firms (ASIF) 1998–2013, the legal entity code of the same enterprise may change due to various reasons such as reorganization, acquisition, merger, and restructuring during the sample period. Following the sequential identification method proposed by Brandt et al. (2012), we match enterprise information across years and assign a unified enterprise code to observations belonging to the same enterprise, ensuring no estimation errors arise from changes in the enterprise code. To reduce errors caused by administrative division adjustments, we unify the administrative division codes of all observations to 2020 through address resolution.

Table A10 Ratio of privatization and exit in ASIF dataset

Survey Year	Obs.	Disappeared SOEs			Disappeared COEs		
		Obs.	Exit	Privatization	Obs.	Exit	Privatization
1998	165106	57793	8019	1801	48779	9185	3869
1999	162017	52503	7992	2301	43527	7431	4001
2000	162874	44395	9237	2246	38681	8939	5054
2001	171243	36579	5693	1564	31763	4814	2845
2002	181546	31393	6122	2080	28117	4826	4304
2003	196208	25040	5255	2255	23056	6705	5842
2004	279077	27412	9879	1024	18631	3146	1937
2005	270027	17607	2036	1036	16252	2002	2260
2006	301942	16214	5002	564	14647	1724	1396
2007	336751	11712	3373	757	13429	3917	2258
2008	412191	10750	2036	136	11458	2509	224
Total			64644 (80.39%)	15764 (19.61%)		55398 (61.97%)	33990 (38.03%)

Notes: This table presents the privatization and bankruptcy of SOEs and COEs during the sample period. Based on the Annual Survey of Industrial Firms (ASIF) 1998–2009, we follow the sequential identification method proposed by Brandt et al. (2012) to match enterprise information across years and make statistics on bankrupt and privatized SOEs and COEs. To avoid errors caused by administrative division adjustment, we unify the administrative division codes of all observations to 2020 through address resolution. However, the ASIF database changed its statistical caliber in 2007, counting only SOEs with annual main business income of 5 million yuan or more from 2007 onward. Similarly, only COEs with annual main business income of 5 million yuan or more have been counted since 1998.