Online Appendix to Hayek, Local Information, and Commanding Heights: Decentralizing State-Owned Enterprises in China

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Appendix A: Construction of the panel from the ASIF data

Construction of the panel from the ASIF data. In the dataset, every firm is given a unique firm code. A small number of firms may have changed their firm codes within the sample period but remained in the sample. To address this issue, we follow Brandt et al. (2012) and Yang (2015) to obtain unique firm codes based on the firm's name, zip code, telephone number, and founding year. We clean the data as follows. First, if the year t observation of a firm cannot be matched to any firm's observation in year $t+1$ based on the firm code, we try to find a firm with the same name in year $t+1$, and match them by giving the year $t+1$ observation the same firm code as the year t observation. Second, for those firms that cannot be matched by the code or name, we rely on the combinations of the zip code, telephone number and the founding year to match them. We delete firms with missing key information, i.e. assets, fixed assets, sales and employment. Table A-1 presents the frequency with which we can link the observations in different years for both SOEs and non-SOEs.

Table A-1. Evolution of the raw panel over time

Year	Total firms	Entrants	Incumbent, linked using		Exiting (in the next year)
			NBS ID	Other information	
1998	164,452				28,709
1999	161,439	25,696	130,863	4,880	27,672
2000	162,350	28,583	130,538	3,229	36,395
2001	170,780	44,825	117,526	8,429	24,356
2002	181,149	34,725	142,950	3,474	28,378
2003	196,204	43,433	146,605	6,166	51,295
2004	274,750	129,841	137,681	7,228	45,085
2005	271,819	42,154	226,675	2,990	25,819
2006	301,943	55,943	243,728	2,272	28,485
2007	336,742	63,284	271,629	1,829	

Note: Entrants are those that first appear in the sample in the specific year. Exiting means dropping out of the sample in the next year. The ASIF dataset includes all SOEs, and all non-state firms with sales exceeding five million yuan. Thus, a firm's entry year may be different from its establishment year. Similarly, a firm's exiting year may differ from its death year.

Table A-2. Sample composition by oversight level at the first year of observation

Initial Oversight level		SOEs with non-missing oversight information	After dropping SOEs without at least three continuous years of data	After dropping observations with abnormal oversight status
Central SOEs	Number of unique firms	5,874	2,843	2,765
	Observations	21,968	15,607	15,011
Provincial SOEs	Number of unique firms	10,378	5,175	5,077
	Observations	37,605	27,878	27,233
Municipal SOEs	Number of unique firms	19,288	9,840	9,704
	Observations	68,123	51,537	50,598
County SOEs	Number of unique firms	43,898	20,514	20,273
	Observations	143,804	104,737	102,855

Note: This table describes the composition of SOEs by their oversight status at the first year of observation.

Table A-3. Changes in sample characteristics with various sample restrictions

Variables	Step 1		Step 2		Step 3		Step 4		Step 5	
	SOEs with non-missing oversight information		After dropping SOEs initially oversighted by county governments		After dropping SOEs without at least three consecutive years of data		After dropping SOEs with abnormal oversight status		After dropping post-decentralization observations and first year observations	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Distance$_{(t-1)}$	1.365	2.182	2.797	2.397	2.754	2.399	2.735	2.391	2.795	2.403
Firm asset$_{(t-1)}$	10.027	1.922	10.729	1.947	10.823	1.887	10.813	1.866	10.837	1.856
ROS$_{(t-1)}$	-0.086	0.262	-0.108	0.289	-0.107	0.284	-0.105	0.253	-0.102	0.254
TFP OLS$_{(t-1)}$	0.578	1.414	0.630	1.480	0.565	1.406	0.558	1.408	0.538	1.351
TFP OP$_{(t-1)}$	1.437	1.518	1.471	1.566	1.421	1.526	1.414	1.523	1.394	1.475
Firm importance$_{(t-1)}$	0.087	0.191	0.029	0.102	0.031	0.104	0.027	0.086	0.022	0.073
Fully state-owned$_{(t-1)}$	0.778	0.415	0.761	0.426	0.779	0.415	0.781	0.395	0.784	0.395
Number of unique firms	79,438		35,540		17,858		17,546		17,546	
Observations	271,500		127,696		95,002		92,842		72,292	

Note: Step 1 restricts our sample to SOEs with non-missing oversight government status. Step 2 drops SOEs that are initially oversighted by county governments. Step 3 drops SOEs without at least three continuous years of data. Step 4 drops observations with abnormal oversight government statuses. Step 5 further drops i) all observations in the first year and ii) observations after decentralization for the ever-decentralized sample, to obtain our regression sample.
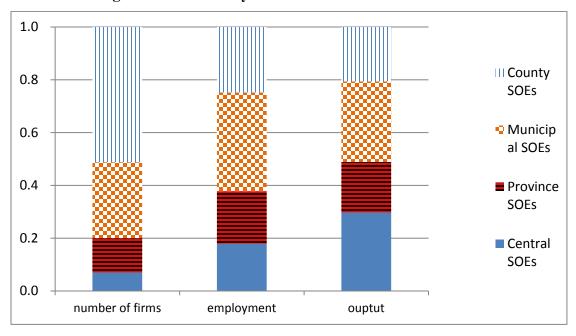
References:

Brandt, Loren, Johannes Van Biesebroeck, and Yifan Zhang, 2012. "Creative accounting or creative destruction? Firm-level productivity growth in Chinese manufacturing." *Journal of Development Economics 97*(2): 339-351.

Yang, Rudai, 2015. "Study on the Total Factor Productivity of Chinese Manufacturing Enterprises" (中国制造业企业全要素生产率研究). *经济研究 (Economic Research Journal, in Chinese) 2*: 61-74.

Appendix B: Summary Statistics

Figure B-1. Hierarchy of China's SOE affiliation in 1998

Note: This figure describes the distribution of SOE affiliations in terms of the number of firms, employment and output.
Source: Author's calculation from Annual Survey of Industrial Firms (ASIF) 1998.

Table B-2. Summary statistics of key variables

	Obs	Mean	Std. Dev.	Min	Max
Firm-level Variables					
Decentralized $_{lag}$	72292	0.021	0.143	0.000	1.000
Distance $_{lag}$	72292	2.795	2.403	0.000	8.127
Different city $_{lag}$	72292	0.320	0.466	0.000	1.000
Firm asset $_{lag}$	72292	10.837	1.856	1.333	19.859
ROS $_{lag}$	69785	-0.102	0.254	-1.699	0.462
TFP OLS $_{lag}$	67629	0.538	1.351	-10.646	7.105
TFP Olley-Pakes $_{lag}$	59624	1.394	1.475	-9.930	9.012
TFP Index Number $_{lag}$	67629	1.248	1.429	-9.766	7.717
Firm Importance $_{lag}$	72292	0.022	0.073	0.000	1.000
Fully state-owned $_{lag}$	72292	0.784	0.395	0.000	1.000
Firm average wage $_{lag}$	71490	2.193	0.703	-0.956	4.688
TFC	72292	0.059	0.236	0.000	1.000
Province-level Variables					
GDP per capita $_{lag}$	72292	8.479	0.516	7.234	10.113
State sector employment share $_{lag}$	72292	0.524	0.101	0.186	0.753
Unemployment rate $_{lag}$	72292	0.033	0.008	0.006	0.068
Road mileage $_{lag}$	72292	1.328	0.786	0.394	5.543
Entertainment and travel cost $_{lag}$	72292	0.013	0.004	0.008	0.028
Corruption cases $_{lag}$	68607	0.033	0.010	0.007	0.070
Industry-level Variables					
ROS dispersion $_{lag}$	72292	0.185	0.054	0.056	0.416
TFP OLS dispersion $_{lag}$	72291	1.426	0.247	0.674	3.450
TFP Olley-Pakes dispersion $_{lag}$	63862	1.551	0.258	0.798	2.954
TFP Index Number dispersion $_{lag}$	72291	1.365	0.238	0.570	3.430
Industry-level HHI $_{lag}$	72292	0.012	0.014	0.001	0.444

Table B-3. Comparison of basic characteristics for decentralized and non-decentralized SOEs

	Pre-decentralization average for SOEs decentralized during 1999-2007	Average of SOEs never decentralized during 1999-2007	Mean difference test	
			Difference in mean	Standard error
	(1)	(2)	(3)	(4)
Firm-level Variables				
Distance $_{lag}$	4.22	2.698	1.522	(0.000)
Firm asset $_{lag}$	10.658	10.850	-0.192	(0.000)
ROS $_{lag}$	-0.131	-0.100	-0.031	(0.000)
TFP OLS $_{lag}$	0.465	0.543	-0.078	(0.000)
TFP Olley-Pakes $_{lag}$	1.314	1.400	-0.086	(0.000)
TFP Index Number $_{lag}$	1.191	1.252	-0.061	(0.007)
Firm importance $_{lag}$	0.009	0.023	-0.014	(0.000)
Fully state-owned $_{lag}$	0.797	0.783	0.014	(0.017)
Firm average wage $_{lag}$	2.046	2.203	-0.157	(0.000)
TFC	0.095	0.056	0.039	(0.000)
Province-level Variables				
GDP per capita $_{lag}$	8.389	8.485	-0.096	(0.000)
State sector employment share $_{lag}$	0.545	0.522	0.023	(0.000)
Unemployment rate $_{lag}$	0.033	0.033	-0.000	(0.901)
Road mileage $_{lag}$	1.435	1.321	0.114	(0.000)
Entertainment and travel cost	0.013	0.013	0.000	(0.013)
Corruption cases $_{lag}$	0.033	0.033	0.000	(0.029)
Industry-level Variables				
ROS dispersion $_{lag}$	0.191	0.185	0.006	(0.000)
TFP OLS dispersion $_{lag}$	1.428	1.426	0.002	(0.642)
TFP Olley-Pakes dispersion $_{lag}$	1.583	1.549	0.034	(0.000)
TFP Index Number dispersion $_{lag}$	1.368	1.365	0.003	(0.439)
Industry-level HHI $_{lag}$	0.012	0.012	0.000	(0.051)
Number of firms $_{lag}$	1,516	16,030		
Number of observations $_{lag}$	4,621	67,671		

Note: This table lists summary statistics of SOEs that were decentralized and those that were not decentralized during 1999-2007. The values in column (1) refer to the pre-decentralization means for all the years prior to decentralization for the eventually-decentralized SOEs. Column (3) shows the mean difference, and column (4) shows the associated standard deviation. An SOE is defined as *decentralized* if its affiliation level is changed to a lower-level government. The numbers of firms and observations are the same as those in the baseline regressions.

Table B-4: Number of firms that were decentralized over time

Year	Number of decentralized firms
1999	235
2000	200
2001	250
2002	149
2003	204
2004	280
2005	102
2006	59
2007	37
Total	1,516

Note: This table reports the annual number of SOEs that were decentralized during 1999-2007. An SOE is defined as *decentralized* if its affiliation-level is changed to a lower-level government.

Table B-5: Ratio of Decentralization in different provinces

Province	Ratio of Decentralization	Province	Ratio of Decentralization
Beijing	7.0%	Henan	4.2%
Tianjin	4.8%	Hubei	8.9%
Hebei	11.0%	Hunan	8.3%
Shanxi	7.0%	Guangdong	5.7%
Inner Mongolia	15.7%	Guangxi	7.0%
Liaoning	14.1%	Hainan	4.3%
Jilin	4.9%	Chongqing	10.8%
Heilongjiang	13.1%	Sichuan	12.1%
Shanghai	10.3%	Guizhou	5.2%
Jiangsu	5.0%	Yunnan	9.8%
Zhejiang	7.1%	Shaanxi	10.0%
Anhui	12.8%	Gansu	10.9%
Fujian	6.6%	Ningxia	7.2%
Jiangxi	13.9%	Qinghai	12.4%
Shandong	5.7%	Xinjiang	7.1%
		Total	8.6%

Note: This table reports the proportion of SOEs that were decentralized during 1999-2007 in each province. An SOE is defined as *decentralized* if its affiliation-level is changed to a lower-level government.

Appendix C. Government documents and official speeches on SOE decentralization

This appendix lists the government documents and official speeches about SOE decentralization cited in our paper. Only the relevant parts of each document are presented (in Chinese), with the key parts being highlighted by underlines. Explanations in English are given at the end of each document.

The list of documents are as follows.

1) Chinese Communist Party Central Committee and State Council, 2015. "Guidance on Deepening SOE Reforms." CCP Central Committee and State Council (中发) 2015-No. 22.

2) Chongqing Government, 1997. "On Implementation of SOE Decentralization for the SOEs that were Adjusted to be Provincial SOEs in 1982 (Temporary Method)." Chongqing CCP Decree (渝委发) 1997-No. 1.

3) Hubei Government, 2003. "On Decentralization of Some Provincial Industrial Enterprises。" Hubei Government Document (鄂文) 2003-No. 13.

4) Jiangxi Government, 2007. "On Further Deepening Reforms and Development." Jiangxi Government Document (赣发) 2007-No. 14.

5) Li, Rongrong, 2006. "Interview with the Xinhua News Agency Regarding SOE Reorganization."

6) Shaanxi Government, 2005. "On Decentralization of Provincial SOEs." Shaanxi Government General Office (陕政办发) 2005-No. 108.

7) Shandong Government, 2003. "Decree on Deepening provincial SOE reforms in Shandong." Shandong Government Decree (鲁政发) 2003-No. 62.

8) Shao, Ning, 2011. "Talk on the Tenth Annual Meeting of Chinese Enterprise Leaders."

9) State Asset Management Bureau, State Reform Commission, 1994. "Temporary Methods to Manage State Ownership in Joint Stock Companies." State Asset Management Bureau (国资企发) 1994-No. 81.

10) State Asset Management Bureau, State Reform Commission, 1997. "Regulatory Opinion on Implementing State Ownership Rights in Joint Stock Companies." State Asset Management Bureau (国资企发) 1997-No. 32

11) State Council, 1998. "On Implementing the Reforms of the Key SOEs in the Coal Industry." State Council Decree (国发) 1998-No. 22.

12) State Council, 2000. "On Adjusting the Management System of Central Nonferrous Metal Companies." State Council Decree (国发) 2000-No. 17.

13) State Council, 2006. "Notice on Pushing Forward the Adjustment of State Stocks and Reorganization of SOEs." State Council General Office (国办发)

2006-No. 97.

14) State Council, 2016. "Guidance on Pushing Forward Structural Adjustment and Reorganization of Central SOEs." State Council General Office (国办发) 2016-No. 56.

15) State Economic and Trade Commission, State Planning Commission, the Ministry of Finance, State Asset Management Bureau, 1994. "On Adjusting the Oversight Status." Guo Jing Mao Qi (国经贸企) 1994-No. 649.

16) State Reform Commission, 1996. "Speeding Up the Reforming of Small SOEs." (国家体改委) June 1996.

We now list key parts that we used in each government document or official speech.

1) Chinese Communist Party Central Committee and State Council, 2015. "Guidance on Deepening SOEs Reform." CCP Central Committee and State Council (中发)2015-No. 22.
Available at http://www.sh.xinhuanet.com/2015-09/14/c_134620921.htm

中共中央、国务院关于深化国有企业改革的指导意见
（2015 年 8 月 24 日）

…
二、分类推进国有企业改革

（四）划分国有企业不同类别。根据国有资本的战略定位和发展目标，结合不同国有企业在经济社会发展中的作用、现状和发展需要，将国有企业分为商业类和公益类。通过界定功能、划分类别，实行分类改革、分类发展、分类监管、分类定责、分类考核，提高改革的针对性、监管的有效性、考核评价的科学性，推动国有企业同市场经济深入融合，促进国有企业经济效益和社会效益有机统一。按照谁出资谁分类的原则，由履行出资人职责的机构负责制定所出资企业的功能界定和分类方案，报本级政府批准。各地区可结合实际，划分并动态调整本地区国有企业功能类别。

…
（六）推进公益类国有企业改革。公益类国有企业以保障民生、服务社会、提供公共产品和服务为主要目标，引入市场机制，提高公共服务效率和能力。这类企业可以采取国有独资形式，具备条件的也可以推行投资主体多元化，还可以通过购买服务、特许经营、委托代理等方式，鼓励非国有企业参与经营。对公益类国有企业，重点考核成本控制、产品服务质量、营运效

率和保障能力，根据企业不同特点有区别地考核经营业绩指标和国有资产保值增值情况，考核中要引入社会评价。

…

Note: The underlined sentences state that SOEs are classified into two groups, the "business type," and the "public-interest type." Evaluation of SOEs in the latter group would rely less on profits, and more on product quality, operation efficiency, and reliability.

2) Chongqing Government, 1997. "On Implementation of SOE Decentralization for the SOEs that were Adjusted to be Provincial SOEs in 1982 (Temporary Method)." Chongqing CCP Decree (渝委发) 1997-No. 1.
   Available at http://www.chinalawedu.com/falvfagui/fg21829/70522.shtml

重庆市下放 1982 年工业调整时上收企业实施意见（试行）

为落实《中共重庆市委、重庆市人民政府关于进一步下放权力加快区市县经济和社会发展的意见（试行)》（渝委发〔1997〕1 号文）中"凡 1982 年全市进行工业调整时上收的企业原则上不放给区市县"的精神，现就下放 1982 年工业调整时上收企业的有关事宜提出如下实施意见。

…

二、下放企业的界定及范围

（一）凡 1982 年全市工业调整时上收的全部国有企业和集体企业中现仍具有独立法人资格的企业均属此次下放对象。市级各主管局和区无权擅自决定保留或拒收下放企业。

（二）下放企业由所在区接收。有两个以上生产经营场地的下放企业，由企业法人登记所在区接收。下放企业的党群关系随企业下放到区。

…

Note: The underlined sentences state that lower-level governments (which are district in this case) have no right to resist the implementation of decentralization.

3) Hubei Government, 2003. "On Decentralization of Provincial Industrial Enterprises." Hubei Government Document (鄂文) 2003-No. 13.
   Available at http://china.findlaw.cn/fagui/p_1/27726.html

中共湖北省委、湖北省人民政府关于部分省属工业企业下放属地管理的通知

鄂文(2003)13 号

各有关市、州党委和人民政府，省直各单位：

为加快我省省属工业企业改革步伐，提高工业企业的竞争力，促进全省工业企业健康发展，省委、省政府决定，<u>将湖北无线电厂等省属工业企业下放有关市、州实行属地管理</u>。现通知如下：

一、湖北省无线电厂、国营江北铸造厂(9603 厂)、湖北省轻工业机械厂、湖北粮食机械厂下放武汉市。二、湖北铝业集团有限责任公司、湖北安陆棉纺织集团有限公司、湖北省云梦棉纺织厂、湖北应城石膏矿和安陆粮食机械厂下放孝感市。三、湖北省松宜煤炭矿务局、湖北省松宜矿区铁路管理局下放宜昌市。四、湖北省嘉鱼棉纺织厂、湖北煤矿机械厂下放咸宁市。五、湖北省冶金矿山储运公司下放黄石市。六、湖北仪表厂、湖北鄂城水泥有限责任公司下放鄂州市。七、湖北省刘家场水泥厂下放荆州市。八、湖北第二机床厂、湖北省白莲发电设备制造厂下放黄冈市。九、湖北省铁合金厂下放随州市。十、已下放襄樊市管理的襄阳汽车轴承集团公司所属浠水轴承厂下放黄冈市；黄石轴承厂下放黄石市；湖北轴承厂、湖北钢球厂下放宜昌市；恩施轴承厂下放恩施州。十一、东风轮胎集团有限责任公司党组织关系下放十堰市。

各有关市、州党委和政府要高度重视省属工业企业下放工作。省直有关部门要主动加强与市、州的衔接，积极配合各地做好工作。从本通知下发之日起，由各市、州负责下放企业的管理工作。

Note: The underlined sentences state that when provincial SOEs are delegated to the city level, it should be under the oversight of the city government of its location (i.e., 属地管理).

4) Jiangxi Government, 2007. "On Further Deepening Reforms and Development." Jiangxi Government Document (赣发) 2007-No. 14.
Available at http://www.gzgzw.gov.cn/zcfg/sjfg/2010-09-21/1093.html

中共江西省委 江西省人民政府关于进一步深化国有企业改革和发展的若干实施意见
（2007 年 7 月 23 日）

为进一步增强国有及国有控股企业的内在动力、活力、竞争力和抗风险能力，最大限度实现国有资产保值增值，根据国家有关法律法规和相关政策，结合江西实际，提出如下意见。

…

三、大力推进国有经济战略性调整

…

9. 继续放开搞活国有中小企业。<u>采取整体划转、下放市县、兼并重组、合资合作、拍卖租赁、债务重组等多种方式放开搞活国有中小企业。</u>

…

Note: The underlined sentences state that in Jiangxi province, decentralization is listed as one of the reform methods (fully-transfer, decentralization to the city or county government, merger and acquisition, joint venture, auction, and debt restructuring).

5) Li, Rongrong, 2006. "Interview with the Xinhua News Agency Regarding Regarding SOE Reorganization."
Available at http://www.gov.cn/jrzg/2006-12/18/content_472256.htm

国务院国资委主任李荣融 18 日就《关于推进国有资本调整和国有企业重组的指导意见》的出台和国资委下一步工作部署接受新华社记者专访

新华社北京 12 月 18 日电（记者 任芳 刘兵）

国务院国资委主任李荣融 18 日表示，国资委已明确国有经济和中央企业必须控制的具体行业和领域，并明确到 2010 年，中央企业调整重组到 80 至 100 户，其中 30 至 50 户发展成为具有国际竞争力的大企业集团。

李荣融就《关于推进国有资本调整和国有企业重组的指导意见》的出台和国资委下一步工作部署接受新华社记者专访时作出上述表示。

李荣融说，根据国资委的最新部署，<u>国有经济应对关系国家安全和国民经济命脉的重要行业和关键领域保持绝对控制力，包括军工、电网电力、石油石化、电信、煤炭、民航、航运等七大行业。</u>这一领域国有资本总量增加、结构优化，一些重要骨干企业发展成为世界一流企业。

其中，对于军工、石油和天然气等重要资源开发及电网、电信等基础设施领域的中央企业，国有资本应保持独资或绝对控股；对以上领域的重要子企业和民航、航运等领域的中央企业，国有资本保持绝对控股；对于石化下游产品经营、电信增值服务等领域的中央企业，应加大改革重组力度，引入非公经济和外资，推进投资主体和产权多元化。

…

Note: In the underlined sentences, Mr. Li Rongrong, the director of the State Assets Supervision and Administration Commission of the State Council, mentioned the following key industries that should be under the central government's control for national security and the fate of national economy: oil and gas, coal, electricity,

telecoms, public transportation, and military industry.

6) Shaanxi Government, 2005. "On Decentralization of Provincial SOEs."
    Shaanxi Government General Office (陕政办发) 2005-No. 108.
    Available at http://china.findlaw.cn/fagui/p_1/28831.html

陕西省人民政府办公厅关于省属部分国有企业实行属地化管理有关问题的通知
陕政办发(2005)108 号

…
一、关于实行属地化管理的省属部分国有企业资产财务、税收关系的移交及管理问题
（一）实行属地化管理的省属国有企业的资产无偿划转到所在设区市财政部门（或国有资产监督管理部门），资产财务关系以社会中介机构审计确认的各企业 2004 年度财务决算报表数为准。
（二）省属国有企业实行属地化管理，企业的债权、债务随资产一并移交。各移交单位必须维护债权人的合法权益，确保国有资产不流失。
…

Note: The underlined sentences state that when provincial SOEs are delegated to the city level, it should be under the oversight of the city government of its location (i.e., 属地管理). The city government gets the full ownership and control rights over these firms.

7) Shandong Government, 2003. "Decree on deepening provincial SOE reforms in Shandong." Shandong Government Decree (鲁政发) 2003-No. 62.
    Available at http://law.esnai.com/view/17386

山东省人民政府关于深化省属国有企业改革的意见
鲁政发[2003]62 号

…
三、改革的主要途径和方式
    …
    （一）授权经营。 …
    （二）改制。 …
    （三）股权转让。…
    （四）下放。对适合下放到市、县管理，尤其是分布散、省里管理难度

大的国有中小企业，整体划归企业所在市进行改革重组，相应调整其财政、劳动、统计等关系。

（五）重组。…

（六）关闭破产。…

…

Note: This document shows that in Shandong Province, decentralization is listed as one of the six reform methods (franchising, privatization, transfer, decentralization, merger and acquisition, and bankruptcy). The underlined sentences state that, for SOEs suitable to be under oversight of municipal and county governments, especially those small and medium SOEs that are located far away with which the provincial government has difficulty directly managing, they should be restructured under the oversight of the municipality, and all issues related to taxes and subsidies, labor, and statistics should be adjusted accordingly.

8) Shao, Ning, 2011. "Talk on the Tenth Annual Meeting of Chinese Enterprise Leaders."
   Available at http://finance.sina.com.cn/hy/20111210/094610970547.shtml

新浪财经讯 2011 年 12 月 9 日-11 日，2011(第十届)中国企业领袖年会在北京举行，本次年会的主题是"2012：制度进化与市场尊严"。图为国务院国有资产监督管理委员会副主任邵宁发言。以下为演讲实录：

…

近几年来，随着改革的不断深化，国有经济布局结构调整路径日渐清晰，国有企业在向两个方向集中，并逐渐形成了两种类型不同的国有企业。这两种类型的国有企业在国家经济生活中发挥着不同的功能，在今后的改革方面也会具有一些不同的特点。

第一类是具有公益性质的国有企业。这类企业在中央企业层面，包括石油、石化、电网、通信服务等领域的企业，在地方包括供水、供气、污水处理、公共交通、地铁等方面的企业。具有公益性的国有企业，具有这样一些共同的特征。第一，产品或者服务关系国民经济发展和人们生活最基本的保障条件。第二，在经营中存在着不同程度的垄断因素，有些是寡头竞争，有些是独家经营。第三，产品或者服务价格由政府控制，企业自身并没有定价权。第四，企业社会效益高于经济效益，经常会承受政策性的亏损等等。

具有公益性质的国有企业在我国经济发展和人们生活中发挥着重要的保障作用,尤其是在外部经济环境发生剧烈波动,或者发生突发性事件的时候。在亚洲金融危机、国际金融危机期间我国国内经济相对比较稳定，人们生活

受影响比较小，与这些企业发挥了对市场波动的抑制作用直接相关。中国救灾重建的效率举世公认，与这些国有企业，包括其他企业的动员能力有很大关系。

　　…

Note: In the underlined sentences, Mr. Shao Ning, the vice director of the State Assets Supervision and Administration Commission of the State Council, listed four criteria for strategically important SOEs: their products being the foundation of national economic development; enjoying monopoly or oligopoly in their operations; pricing in the hands of the government; and their social benefits outweighing their economic profits (and with the characteristics of often being loss-making). Mr. Shao mentioned several industries as examples: oil and gas, electricity, telecoms, water and gas supply, and public transportation.

9) State Asset Management Bureau, State Reform Commission, 1994. "Temporary Method to Manage State Ownership in Joint Stock Companies." State Asset Management Bureau (国资企发) 1994-No. 81.
Available at
http://www.chinalaw.gov.cn/article/fgkd/xfg/gwybmgz/200403/20040300041967.shtml

股份有限公司国有股权管理暂行办法
国资企发[1994]81 号

　　…
二、新建设立股份公司的股权界定：
　　第十一条　国有企业进行股份制改组，要按《在股份制试点工作中贯彻国家产业政策若干问题的暂行规定》，保证国家股或国有法人股（该国有法人单位应为国有独资企业或国有独资公司）的控股地位。
　　国有股权控股分为绝对控股和相对控肌。绝对控股是指国有股权持股比例占 50%以上（不含 50%）；相对控股是指国有股权持股比例高于 30%低于 50%，但因股权分散，国家对股份公司具有控制性影响。
　　计算持股比例一般应以同一持股单位的股份为准，不得将两个或两个以上国有股权持股单位的股份加和计总。
　　…

Note: The underlined sentences state that there are two types of state controlling share, namely absolute control (state share >50%) and relative control (state

share between 30% and 50%, and the state has controlling influence on the firm because non-state shares are diversified).

10) State Asset Management Bureau, State Reform Commission, 1997. "Regulatory Opinion on Implementing State Ownership Rights in Joint Stock Companies." State Asset Management Bureau (国资企发) 1997-No. 32. Available at
http://www.chinalawedu.com/news/1200/22016/22019/22102/22116/2006/3/gu137520321119360022640-0.htm

<div align="center">

股份有限公司国有股股东行使股权行为规范意见
国资企发[1997]32 号
</div>

国务院有关部门，各省、自治区、直辖市、计划单列市国有资产管理局（办公室）、体改委（办公室），中国人民解放军国有资产管理局，新疆生产建设兵团国有资产管理局：

…
　第五条　公司的国有股比例分为绝对控股、相对控股和不控股。国家绝对控股的公司，国有股比例下限定为 50%（不含 50%）；国家相对控股的公司，国有股比例下限定为 30%（不含 30%），国有股股东须是第一大股东。
　国有股股东对公司是否需要控股和控股程度，按国家有关规定执行。
　…

Note: The underlined sentences state that there are two types of state controlling share, namely, absolute control (state share exceeding 50%) and relative control (state share between 30% and 50%, and being the largest shareholder).

11) State Council, 1998. "On Implementing the Reforms of the Key SOEs in the Coal Industry." State Council Decree (国发) 1998-No. 22.
Available at
http://www.chinalawedu.com/news/1200/22016/22027/22344/22361/2006/3/zh18769223516360026902-0.htm

<div align="center">

国务院关于改革国有重点煤矿管理体制有关问题的通知
国发[1998]22 号
</div>

…

三、有关省、自治区、直辖市人民政府从接到本通知之日起，要把下放单位的安全生产、扭亏增盈、职工下岗分流、实施再就业工程及社会保障等工作纳入地方统一安排。<u>下放的国有重点煤矿及企事业单位的财务、劳动工资、社会保险、人事关系的划转</u>，由国务院有关部门商地方人民政府办理；<u>国有资产、负债、所有者权益以及在职和离退休职工人数、工资和社会保险基金等划转，以财政部批准的 1997 年企业决算数为准；企业的亏损补贴指标，按原煤炭部和财政部确定的基数划转；事业单位的经费指标，按财政部下达的 1997 年基数划转；原煤炭部办理的统贷统还基建投资贷款和转产贴息贷款，随企业下放一并划转</u>，贷款划转的具体办法，由有关部门和银行另行制定；原煤炭部对企事业单位的补贴退库、事业经费及社会保险基金的缴拨，从 1998 年 7 月起由地方人民政府负责办理，未尽事宜由国家煤炭工业局协助清理。

四、继续执行中央财政对国有重点煤矿的亏损补贴、增值税定额返还政策；对 32 户国有重点煤矿超亏占用工商银行贷款，按照有关规定继续实行计息挂帐；继续执行对国有重点煤矿的转产贴息贷款政策。<u>企业下放后，所得税不再上缴中央财政，全额交给地方财政</u>，由有关省、自治区、直辖市统筹安排，用于困难煤炭企业的补贴；企业利润不再上缴和划转，全部留给企业。

…

Note: The underlined sentences state that after the decentralization, all rights regarding the SOE's finance, labor and wage, social welfare, and personnel are transferred to the local government; also transferred are state assets, liability, equity, and working and retired employees, their wages and social security fund; further transferred are their loss and subsidy quotas. After decentralization, all income taxes are no longer turned over to the central government, and are instead turned over to the local government.

12) State Council, 2000. "On Adjusting the Management System of Central Nonferrous Metal Companies." State Council Decree (国发) 2000-No. 17.
Available at http://www.51hrlaw.com/fagui/2013/93756.html

关于调整中央所属有色金属企事业单位管理体制有关问题的通知
国发[2000] 17 号

…

五、<u>中央所属有色金属企事业单位下放后，原有的中央财政各项经常性拨款和补贴（包括科研费、地勘事业费、离退休补助费、亏损补贴、矿山维简费等）继续保留，经核定后，一并下放地方；凡接收下放企业的地方，下</u>

放给地方和留在新的铝业集团内的盈利企业应缴所得税，全额留给地方财政（不调整地方财政上缴中央财政的基数），由有关省、自治区、直辖市统筹安排，用于解决下放的困难企业的问题；国务院有关部门对下放企业在改革、改组和改造等方面的其他政策继续执行，并适当加大支持力度；对下放的特别困难的企业和下放中存在的特殊问题，作为个案处理。

…

Note: The underlined sentences state that the subsidies (including R&D expenditure, geologic prospecting expenditure, retirement welfare, loss subsidy, and mine maintenance fees) will continue to be provided, and will be shifted to the local government after approval.

13) State Council, 2006. "Notice on Pushing Forward the Adjustment of State Stocks and Reorganization of SOEs." State Council General Office (国办发) 2006-No. 97.
Available at http://www.gov.cn/gongbao/content/2007/content_503385.htm.

国务院办公厅转发国资委关于推进国有资本调整和国有企业重组指导意见的通知
国办发[2006]97 号

各省、自治区、直辖市人民政府，国务院各部委、各直属机构：

国资委《关于推进国有资本调整和国有企业重组的指导意见》已经国务院同意，现转发给你们，请认真贯彻执行。

国务院办公厅
二〇〇六年十二月五日

…

二、主要政策措施

…

（三）推动国有资本向重要行业和关键领域集中，增强国有经济控制力，发挥主导作用。重要行业和关键领域主要包括：涉及国家安全的行业，重大基础设施和重要矿产资源，提供重要公共产品和服务的行业，以及支柱产业和高新技术产业中的重要骨干企业。有关部门要抓紧研究确定具体的行业和领域，出台相应的产业和企业目录。鼓励非公有制企业通过并购和控股、参股等多种形式，参与国有企业的改组改制改造。对需要由国有资本控股的企业，要区别不同情况实行绝对控股和相对控股；对不属于重要行业和关键领域的国有资本，按照有进有退、合理流动的原则，实行依法转让，防止国有资产流失。对国有资产转让收益，应严格按照国家有关政策规定进行使用和

管理。

　…

Note: The underlined sentences state that the state should maintain absolute control over important industries that are related to national security and national economic growth. Here, these SOEs are mainly those under the central government oversight in specific strategic industries.

14) State Council, 2016. "Guidance on Pushing Forward the Structural Adjustment and Reorganization of Central SOEs." State Council General Office (国办发) 2016-No. 56.
　　Available at:
　　http://www.gov.cn/zhengce/content/2016-07/26/content_5095050.htm

国务院办公厅关于推动中央企业结构调整与重组的指导意见
国办发[2016]56 号

　…
三、重点工作
　（一）巩固加强一批。
　巩固安全保障功能。<u>对主业处于关系国家安全、国民经济命脉的重要行业和关键领域、主要承担国家重大专项任务的中央企业，要保证国有资本投入，增强保障国家安全和国民经济运行能力，保持国有资本控股地位，支持非国有资本参股。</u>对重要通信基础设施、重要江河流域控制性水利水电航电枢纽等领域，粮食、棉花、石油、天然气等国家战略物资储备领域，实行国有独资或控股。对战略性矿产资源开发利用，石油天然气主干管网、电网等自然垄断环节的管网，核电、重要公共技术平台、地质等基础数据采集利用领域，国防军工等特殊产业中从事战略武器装备科研生产、关系国家战略安全和涉及国家核心机密的核心军工能力领域，实行国有独资或绝对控股。对其他服务国家战略目标、重要前瞻性战略性产业、生态环境保护、共用技术平台等重要行业和关键领域，加大国有资本投资力度，发挥国有资本引导和带动作用。

　…

Note: The underlined sentences emphasize the need to strengthen and control those central SOEs that are related to national security and that are the foundation of the national economy, or that carry out important national tasks.

15) State Economic and Trade Commission, State Planning Commission, the Ministry of Finance, State Asset Management Bureau, 1994. "On Adjusting the Oversight Status." Guo Jing Mao Qi (国经贸企) 1994-No. 649.
Available at http://www.law-lib.com/law/law_view.asp?id=10867

国家经济贸易委员会、国家计划委员会、财政部、国家国有资产管理局关于变更国有企业隶属关系审批办法的通知
（1994 年 11 月 18 日）

各省、自治区、直辖市及计划单列市人民政府，中央、国务院各部门：
根据国务院批准的国家经贸委"三定"方案，原由国家体改委承担的变更全民所有制企业隶属关系的审批职能改由国家经贸委承担。现将变更企业隶属关系的审批办法通知如下：

　…
二、审批原则
1．企业隶属关系的变更，须符合国家有关法规及国家的产业政策，有利于产业结构和产品结构的调整，适应发展规模经济的需要，并有切实可行的改造和发展规划。
2．企业隶属关系的变更，要符合政企职责分离、转换企业经营机制、建立现代企业制度的改革方向，有利于促进生产要素的合理流动、优化国有资产的配置，提高资金的运营效率。
　…

Note: The underlined sentences state that adjusting SOE oversight status should aim for separating the government from the enterprise, transforming the operating mechanisms, and establishing a modern enterprise system, with the aim of facilitating efficient flow of production factors, optimizing the allocation of state assets, and improving the operating efficiency of capital.

16) State Reform Commission, 1996. "On Speeding Up the Reforming of Small SOEs." (国家体改委) June 1996.
Available at http://www.law-lib.com/lawhtm/1996/16144.htm

国家体改委关于加快国有小企业改革的若干意见
（1996 年 6 月 20 日）

　　党的十四大特别是十四届三中全会以来，各地按照中央关于国有企业改革的基本方针，在深化国有小企业改革方面进行了积极有益的探索，取得了

一定的成效。为了适应本世纪末初步建立社会主义市场经济体制的需要，加快国有小企业改革步伐，根据《中共中央关于制定国民经济和社会发展"九五"计划和 2010 年远景目标的建议》以及《关于国民经济和社会发展"九五"计划和 2010 年远景目标纲要》的精神，现提出如下意见。

　　…

　　二、对于国有小企业，各地可以区别不同情况，加快改革和改组的步伐。特别是县属企业，可以更加放开一些，小企业改革要因地制宜，大胆探索，采取多种形式、多种途径，使企业具有自主经营、自负盈亏、自我发展、自我约束的能力，成为适应社会主义市场经济要求的法人实体和市场竞争主体。

　　…

Note: The underlined sentences state that the reform of small SOEs should respect local conditions of each region, and that local county governments are encouraged to explore and experiment with various means of restructuring.

Appendix D. Results of the hazard model

Table D-1. Determinants of decentralization: Cox proportional hazard model

	(1) Central SOE	(2) Provincial SOE	(3) Municipal SOE
Distance $_{lag}$	0.1644	0.2078	0.4281
	(0.0507)	(0.0554)	(0.0655)
Controls	YES	YES	YES
Observations	11,171	20,356	38,258
Pseudo R-squared	0.041	0.061	0.150

This table reports the Cox proportional hazard regression results on the determination of SOE decentralization. The control variables are the same as in Table 3. Standard errors clustered at the oversight-government level are reported in the parentheses.

Appendix E. More tests related to the issue of privatization

Table E-1. Determinants of decentralization:
Considering both explicit privatization and exit

	(1)	(2)	(3)
		Multinomial Logit	
		Whole Sample	
	$Decentralized_{(t)}$	$Explicit\ Priv_{(t)}$	$Exit_{(t)}$
Distance $_{lag}$	0.0051	0.0003	0.0007
	(0.0008)	(0.0009)	(0.0006)
Controls	YES	YES	YES
Observations	83,700	83,700	83,700

Note: This table repeats the multinomial analysis of Table 3 Columns (6)-(7), but differentiates the "restructuring" outcome into "explicit privatization" and "exit from the sample." For each firm in year *t*, there are four possible outcomes, with "*neither restructured nor decentralized*" being the base. The three columns report the marginal effect of each regressor on the probability of being *Decentralized*, being *Explicitly privatized, and Exiting the sample*, respectively. The control variables are the same as in Table 3. Standard errors clustered at the oversight-government level are reported in the parentheses.

Table E-2. Determinants of decentralization:
Dropping SOEs that are eventually restructured

	(1)	(2)	(3)	(4)	(5)
			Probit		Hazard
	Whole Sample	Central SOE	Provincial SOE	Municipal SOE	Whole Sample
			Dependent variable: *Decentralized*		
Distance $_{lag}$	0.0065	0.0083	0.0030	0.0044	0.3708
	(0.0009)	(0.0028)	(0.0013)	(0.0007)	(0.0593)
Controls	YES	YES	YES	YES	YES
Observations	20,859	3,930	6,995	9,934	20,859
Pseudo R^2	0.130	0.119	0.147	0.241	0.119

Note: This table reports *probit* and *Hazard* regression results on the determination of SOE decentralization. The control variables are the same as in Table 3. Standard errors clustered at the oversight-government level are reported in the parentheses.

Appendix F. Alternative definitions of SOEs

Table F-1: Determinants of decentralization:
Alternative definitions of SOEs

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Probit				Hazard	Multinomial Logit	
	Whole Sample	Central SOE	Provincial SOE	Municipal SOE	Whole Sample	Whole Sample	
	Dependent variable: $Decentralized_{(t)}$					$Decentralized_{(t)}$	$Restructured_{(t)}$
Panel A. Using 50% state ownership share as the cutoff for defining SOEs							
$Distance_{lag}$	0.0057	0.0043	0.0035	0.0050	0.3057	0.0052	0.0008
	(0.0007)	(0.0017)	(0.0008)	(0.0006)	(0.0453)	(0.0008)	(0.0010)
Controls	YES	YES	YES	YES	YES	YES	YES
Observations	65,148	10,873	19,145	35,130	65,148	78,271	78,271
Pseudo R-squared	0.112	0.087	0.117	0.188	0.079		
Panel B. Using the Brandt et al. (2012) definition of SOEs							
$Distance_{lag}$	0.0052	0.0045	0.0031	0.0047	0.3073	0.0051	0.0002
	(0.0006)	(0.0012)	(0.0007)	(0.0005)	(0.0396)	(0.0007)	(0.0010)
Controls	YES	YES	YES	YES	YES	YES	YES
Observations	79,584	16,247	25,610	37,727	79,584	93,844	93,844
Pseudo R-squared	0.109	0.085	0.107	0.194	0.072		
Panel C. Using the Hsieh and Song (2015) definition of SOEs							
$Distance_{lag}$	0.0048	0.0054	0.0027	0.0042	0.2913	0.0048	0.0007
	(0.0006)	(0.0012)	(0.0007)	(0.0005)	(0.0361)	(0.0006)	(0.0011)
Controls	YES	YES	YES	YES	YES	YES	YES
Observations	94,913	18,674	32,544	43,695	94,913	110,942	110,942
Pseudo R-squared	0.103	0.081	0.094	0.193	0.067		

Note: This table reports the results on the determination of SOE decentralization using the probit model, the Cox proportional hazard model, and the Multinomial Logit model. Panel A uses 50% state ownership share as the cutoff of SOEs. Panel B follows Brandt et al. (2012) and defines state ownership using the registration type being state-owned or being limited liability corporations and shareholding corporations but having a state ownership exceeding 50 percent. Panel C follows Hsieh and Song (2015) and defines state ownership as state share exceeding 50% or the self-reported controlling shareholder being a state-owned company. The control variables are the same as in Table 3. Standard errors clustered at the oversight-government level are reported in the parentheses.

References:

Brandt, Loren, Johannes Van Biesebroeck, and Yifan Zhang, 2012. "Creative accounting or creative destruction? Firm-level productivity growth in Chinese manufacturing." *Journal of Development Economics* 97(2): 339-351.

Hsieh, Chang-Tai, Zheng Song, 2015. Grasp the Large, Let Go of the Small: The Transformation of the State Sector in China. NBER working paper No. 21006.

Appendix G. Slight alterations of samples

In Panel A of Table G-1, we present the results when we keep SOEs with abnormal decentralization cases. Abnormal decentralizations refer to the cases when SOEs were decentralized in year *t*, but then immediately re-centralized in year *t+1*. In total, 312 SOEs experienced such abnormal decentralizations. In our baseline regressions, we delete those SOEs with abnormal decentralizations because these cases likely reflect coding errors. Here, we include these cases and repeat our baseline regressions to check the robustness of our key results.

In Panel B, we allow multiple cases of decentralization for a single SOE. In our sample, 26 SOEs experienced two episodes of decentralization. In our baseline, we only keep the first episode of decentralization. In Panel B, we allow more than one episode of decentralizations for an SOE.

In Panel C, we present results when we add back firms with only 2 years of consecutive observations and control for once-lagged covariates.

Table G-1 Determinants of decentralization: Different sample compositions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Probit			Hazard	Multinomial Logit	
	Whole Sample	Central SOE	Provincial SOE	Municipal SOE	Whole Sample	Whole Sample	
	Dependent variable: *Decentralized*$_{(t)}$					*Decentralized*$_{(t)}$	*Restructured*$_{(t)}$
Panel A: Add back firms with abnormal decentralization							
Distance $_{lag}$	0.0056	0.0059	0.0038	0.0044	0.2774	0.0057	0.0009
	(0.0007)	(0.0018)	(0.0010)	(0.0005)	(0.0383)	(0.0008)	(0.0009)
Controls	YES	YES	YES	YES	YES	YES	YES
Observations	70,772	11,499	20,644	38,629	70,772	85,487	85,487
Pseudo R-squared	0.120	0.087	0.108	0.189	0.073		
Panel B: Allow for more than one episodes of decentralization							
Distance $_{lag}$	0.0052	0.0046	0.0036	0.0042	0.3001	0.0053	0.0011
	(0.0006)	(0.0017)	(0.0008)	(0.0005)	(0.0423)	(0.0008)	(0.0010)
Controls	YES	YES	YES	YES	YES	YES	YES
Observations	71,353	11,222	21,133	38,998	71,319	83,700	83,700
Pseudo R-squared	0.115	0.086	0.106	0.188	0.075		
Panel C: Keep firms with only two consecutive years of data							
Distance $_{lag}$	0.0043	0.0052	0.0023	0.0037	0.2561	0.0042	0.0005
	(0.0006)	(0.0011)	(0.0008)	(0.0004)	(0.0355)	(0.0006)	(0.0010)
Controls	YES	YES	YES	YES	YES	YES	YES
Observations	108,332	20,501	36,764	51,067	108,332	129,316	129,316
Pseudo R-squared	0.0970	0.0727	0.0838	0.177	0.0601		

Note: This table reports the baseline regression results on the determination of SOE decentralization. The control variables are the same as in Table 3. Standard errors clustered at the oversight-government level are reported in the parentheses.

Appendix H. Determinants of Centralization

Table H-1. The determinants of centralization

	(1)
	Provincial, municipal, and County SOE
	Dependent variable: *Centralized*$_t$
Distance to oversight government $_{lag}$	0.0004
	(0.0002)
Distance to **upper-level** government $_{lag}$	-0.0008
	(0.0002)
Firm asset $_{lag}$	0.0006
	(0.0002)
ROS $_{lag}$	0.0017
	(0.0010)
Firm importance $_{lag}$	0.0052
	(0.0012)
Fully state-owned $_{lag}$	0.0009
	(0.0005)
GDP per capita $_{lag}$	0.0003
	(0.0008)
State sector share $_{lag}$	-0.0156
	(0.0059)
Unemployment rate $_{lag}$	0.0223
	(0.0440)
Year & industry dummy	YES
Upper-level government dummy	YES
Observations	139,727
Pseudo R-squared	0.142

Note: This table reports the probit results on the determinants of SOE centralization. The sample includes all provincial, municipal, and county SOEs with three years of consecutive observations. The dependent variable is the centralization dummy. An SOE is defined as *Centralized* if its affiliation level is changed to a higher-level government. The control variables are the same as in Table 3. *Upper government dummy* is the upper-level government dummy. Standard errors clustered at the oversight-government level are reported in the parentheses.

Appendix I. China's third-front industries

China experienced massive relocation of firms from the coastal to her inland provinces during the 1960s and 1970s, relocation known as the Third Front Construction (TFC) program. The move was a response to perceived military threats from the USSR and the USA. In August 1964, North Vietnam and the U.S. navy had a series of confrontations in the waters of Tonkin Gulf. The U.S. Congress passed the Gulf of Tonkin Resolution, which gave President Lyndon B. Johnson the authorization to deploy forces and commence warfare against North Vietnam. Feeling that the war might escalate and China might eventually confront the U.S. military forces, Mao Zedong decided to move China's key heavy-industry and other strategically important firms (then largely fully state-owned) to China's inland provinces so that they would survive likely air assaults. The relocation was temporarily stopped in 1966 due to the outbreak of the Cultural Revolution, and was resumed after March 1969, when China was engaged in a military clash with the USSR over Zhenbao (also known as Damansky) Island. With Richard Nixon's visit to China in 1972, China managed to improve her relationship with the west. This led to a relief of security pressure; the TFC came to a halt afterwards. During these two periods, 1964-1966 and 1969-1971, China relocated more than 1100 factories and about 4 million workers to mountainous areas in West China (roughly south of Yanmengguan，north of Shaoguan city in Guangdong province, west of Beijing-Guangzhou railroad, east of Wuqiaoling in Gansu province, see Figure I-1 for a map). The result was a sudden increase in the number of SOEs in these areas during the two periods (see Figure I-2). We thus construct a dummy variable TFC, which is one if a firm was established during the TFC period (i.e. 1964-1966, or 1969-1971) and in the TFC Region (Chen, 2003; Li and Long, 2013).

References:
Chen, Donglin, 2003. "Third Front Construction: development of China's western area in anticipation of war." CCP Party School Press.
Li, Yunsen and Cheryl Long, 2013. "Historical Events and Regional Development: Evidence from China's Third Front Construction." Manuscript, Xiamen University.

Figure I-1. Third Front Construction Area
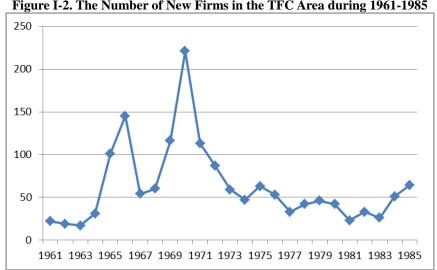

Note: The TFC area is shown in red.

Figure I-2. The Number of New Firms in the TFC Area during 1961-1985

Note: The data is from ASIF in 1998. We use the establishment year of an SOE to define new firms in the TFC area.

Appendix J. An auxiliary check on the excludability of TFC and a note on the proportion and characteristics of compliers

Table J-1. Determinants of TFC

	(1)
	Dependent variable: *TFC*
Firm asset $_{lag}$	0.0085
	(0.002)
ROS $_{lag}$	-0.0081
	(0.012)
Firm importance $_{lag}$	-0.0073
	(0.058)
Fully state-owned $_{lag}$	0.0627
	(0.010)
GDP per capita $_{lag}$	-0.2486
	(0.005)
State sector share $_{lag}$	0.0018
	(0.035)
Unemployment rate $_{lag}$	-0.0305
	(0.694)
gov't, year & industry dummy	YES
Observations	69,785
Pseudo R-squared	0.194

Note: This table reports the marginal effect from a probit specification. The dependent variable is the TFC dummy. Standard errors clustered at the oversight-government level are reported in the parentheses.

The proportion and characteristics of compliers.

The instrumental variable estimates represent the local average treatment effect (LATE) among a subpopulation of firms whose distance to the oversight government is affected by TFC. This type of firms are called "complier," as opposed to always takers and never-takes whose treatment status is not affected by TFC. To characterize the traits of compliers, we need to use the framework of dummy treatment variable (Angrist and Pischke, 2009). We thus replace the continuous distance measure with the dummy variable of the SOE being located in different cities as the oversight government ("D_i").

While it is impossible to identify the complier status of an individual firm in the sample, it is possible to calculate the proportion of compliers among the treated SOEs (i.e. SOEs that are far from the oversight government) (Angrist and Pischke,

2009). Given monotonicity, the proportion of compliers among all treated SOEs is given by:

$$P[D_{1i} > D_{0i}|D_i = 1] = \frac{P[D_i = 1|D_{1i} > D_{0i}]\,P[D_{1i} > D_{0i}]}{P[D_i = 1]}$$

$$= \frac{P[Z_i = 1]\,(E[D_i|Z_i = 1] - E[D_i|Z_i = 0])}{P[D_i = 1]} \quad (A1)$$

In our paper, the instrument status $Z_i = 1$ indicates that the SOE is affiliated with TFC. P and E are probability and expectation operators. D_{1i} and D_{0i} are the decentralization status when Z_i is one and zero, respectively. For compliers, since treatment status is completely determined by Z_i, $P[D_i = 1|D_{1i} > D_{0i}] = P[Z_i = 1|D_{1i} > D_{0i}]$. By independence, $P[Z_i = 1|D_{1i} > D_{0i}] = P[Z_i = 1]$. The second equality in equation (A1) uses the fact that by the Wald first-stage, $P[D_{1i} > D_{0i}] = E[D_i|Z_i = 1] - E[D_i|Z_i = 0]$. That is, the proportion of the treated who are compliers is given by the first stage times the probability that the instrument is switched on, divided by the proportion of the treated.

In our sample, $P[D_i = 1] = 0.3198$; $P[Z_i = 1] = 0.0589$; $E[D_i|Z_i = 1] - E[D_i|Z_i = 0] = 0.0875$, which is the first stage estimate of the coefficient of the instrumental variable. Moreover, the proportion of compliers among all treated SOEs is 1.6%.[1]

We cannot identify individual compliers since we do not observe both D_{1i} and D_{0i}. However, we can characterize the distributions of compliers' pre-treatment characteristics (Angrist and Pischke 2009). In particular, for a particular binary covariate (say X_k), the relative likelihood that a complier is 1, that is,

$$\frac{P[X_{ki} = 1|D_{1i} > D_{0i}]}{P[X_{ki} = 1]},$$

is given by the ratio of the first stage for the sub-sample of X_{ik} being 1 to the first stage for the overall sample. We focus on the key once-lagged covariates (to be transformed into dummy variables to be consistent with the feasible methodology in Angrist and Pischke, 2009) in our baseline model. The results are reported in Table J-2 below.

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[1] That is, $P[D_{1i} > D_{0i}|D_i = 1] = (0.0875 * 0.0589)/0.3198 = 1.6\%$.

Table J-2. Characterizing the distributions of the compliers sample

	Full sample	Above median lagged firm assets	Above median lagged ROS	Above median lagged firm importance	lagged fully state owned	Above median lagged GDP per capita	Above median lagged state sector share	Above median lagged unemp. rate
				Dependent variable: *Different City*				
TFC in 1st stage estimation	0.0875 (0.0344)	0.0988 (0.0449)	0.0904 (0.0434)	0.0950 (0.0258)	0.0834 (0.0359)	0.0727 (0.0315)	0.0873 (0.0367)	0.0895 (0.0314)
F-statistic p-value for test: coeff = 0.0875		0.802	0.947	0.772	0.910	0.638	0.996	0.949
Observations	69,785	34,892	34,892	34,892	51,708	34,852	34,889	34,439
$\dfrac{P[X_{ki} = 1 \mid D_{1i} > D_{0i}]}{P[X_{ki} = 1]}$		1.129	1.033	1.086	0.953	0.831	0.998	1.023

Note. The full sample is the same as that used in the baseline linear probability model. Note that we use the dummy of the oversight government and the SOE being in different cities as our distance measure. For each column, the sample consists of "Above median for the specific variable" (with each column corresponding to a different variable).

References:

Angrist, Joshua and Jörn-Steffen Pischke, 2009. *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press.

Appendix K. Estimating TFP

Here we describe how we estimate the firm-level TFP in three ways.

We use a standard log-linear Cobb-Douglas production function to estimate the firm-level TFP. Specifically, the TFP of firm i in year t is the estimated residual from the regression:

$$y_{it} = \beta_0 + \beta_k k_{it} + \beta_l l_{it} + u_{it} \qquad (K1)$$

where y_{it} is the logarithm of value-added, and k_{it} and l_{it} are the logarithms of capital and labor, respectively. To allow for different factor intensities across industries, we estimate equation (A1) separately for each two-digit industries. TFP can be interpreted as the relative productivity of a firm within its industry.

Real value added is constructed by subtracting the deflated input from the real output. We use the two-digit ex-factory price index from *China Urban Living and Price Statistics* to deflate the output. The input deflator is calculated based on the available output deflators at the two-digit industry level and information from the National Input-Output (IO) tables in 1997, 2002, and 2007. From the IO table, we know how much inputs are needed to produce one unit of output. Then the average input price index is the weighted average of the price indices of those inputs. Thus, to obtain the input deflator for each industry, we calculate a weighted average of the input deflators, using as weights the coefficients in the IO table.[2]

In the ASIF dataset, firms report the total annual employment, but they do not report the real capital stock. Instead, the firms report the value of their fixed capital stock at the original purchase prices. As these book values are the sum of the nominal values for different years, they are not equal to the real capital stock and are not comparable across time and across firms.

Since we do not have all past investments of a firm to construct the real capital stock, we roughly follow Brandt et al. (2012) and make several assumptions to convert the value of their capital stock at the original purchase prices into the real values using the following procedures.

First, we estimate the nominal value of the capital stock for each year between a firm's birth year and the first year in which the firm appears in our data set. For simplicity, we assume that it is 1998, the first year of our panel. We assume that the growth rate of the nominal capital stock of each firm equals to the growth rate of the nominal capital stock in the corresponding two-digit industry, which is reported

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[2] The 1997 IO table is used to construct the input deflators of 1998-2000, the 2002 IO table is used to construct the input deflators of 2001-2005, and the 2007 IO table is used to construct the input deflators in 2006-2007.

in the *China Statistical Yearbooks*.[3] We then calculate the nominal capital stock in 1998 with the following equation:

$$NK_{1998} = NK_s \prod_{\tau=s}^{1998}(1 + r_\tau) \qquad (A2)$$

Where NK_{1998} is the nominal captial stock in 1998 reported in the ASIF data, s indicate the firm's first year of operation, NK_s is the nominal captial stock of the firm in its birth year, and r_τ is the growth rate of the nominal capital stock in the two-digit industry in year t, which is reported by the *China Statistics Yearbook*. From equation (A2), we can calculate the nominal stock in each year between the firm's birth year and 1998.

Second, the annual nominal investment NI_t is the change in the nominal capital stock between two consecutive years, that is, $NI_t = NK_t - NK_{t-1}$.

Third, we derive the real capital stock for each year between the firm's birth year and 1998. We deflate the annual nominal investment in each year NI_t into the real value RI_t using the investment deflator, which is in *China Statistics Yearbook* from 1990. For years 1986-1989, we use the investment deflator constructed by Perkins and Rawski (2008).

Fourth, we obtain the real capital stock in 1998 from the perpetual inventory method. Specifically,

$$RK_t = (1 - \delta)RK_{t-1} + RI_t$$

Where RK_t is the real capital stock in year t, and δ is the depreciation rate, which is estimated by

$$\frac{\text{accumulated depreciation reported in 1998}}{1998 - s}/NK_{1998}.$$

Finally, we obtain the annual real investment and the real capital stock after 1998. For years after 1998, we use the observed change in the firm's nominal capital stock at the original purchase prices as our estimate of the nominal annual investment, that is, the nominal annual investment NI_t is still obtained from $NK_t - NK_{t-1}$. The real fixed investment RI_t is obtained by deflating NI_t with the investment deflator in *China Statistics Yearbook*. The Real capital stock is constructed using the perpetual inventory method, that is,

$$RK_t = RK_{t-1} - Depreciation_t + RI_t$$

$Depreciation_t$ is annual depreciation that is reported in ASIF, again deflated by the investment deflators in *China Statistics Yearbook*.

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[3] Since China Statistical Yearbooks report the growth rate of nominal capital stock in the two-digit industry from 1986, we assume firms established before 1986 are established in 1986.

We estimate equation (A1) by ordinary least squares (OLS). We call this TFP-OLS.

While this approach is commonly used in the literature, the existing research has argued that the OLS estimates suffer from two endogeneity issues: simultaneity of input choices and selection biases. These two issues will generate biased estimates of β_k and β_l, and therefore biased estimates of the TFP. A variety of techniques have been suggested to address these issues. We use the widely-used method proposed by Olley and Pakes (1996). We call this TFP-OP.

As a robustness check, we use a straightforward index number approach, which does not require estimating any parameters. To implement, the industry-specific wage share in the output is used to measure β_l. One minus this share is used to measure β_k. Here the assumption is that a cost-minimizing firm will make sure that the relative factor price ratio equals the local elasticity of substitution between the inputs of the production technology. Since we do not have good comparable data to compute factor shares based on our survey data, we rely on the estimates of the factor shares at the two-digit industry level from Saint-Paul and Bentolila (2003), as in Bloom et al. (2012). We call this TFP-IN.

Overall, these three approaches yield similar results. The correlations of these productivity measures are quite high: that between TFP-OLS and TFP-IN is 0.92; that between TFP-OLS and TFP-OP, 0.96. Thus, it is not surprising that our results do not hinge on how we measure productivity.

References:

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Perkins, Dwight, and Thomas Rawski, 2008. "Forecasting China's Economic Growth to 2025," In *China's Great Economic Transformation*, edited by Brandt, Loren, and Thomas Rawski, pp. 829-886, Cambridge University Press.

Appendix L. Classification of strategic industries

To identify industries with strategic importance, we started with government documents. Indeed, "national interests" has often been mentioned in government documents regarding SOE reforms. For example, in 2006, the State Council issued a document on the reorganization of SOEs (State Council, 2006), and stated, "the state should maintain an absolute control over important industries that are related to national security and national economic growth." Immediately after the issuance of this document, Mr. Li Rongrong, director of the State Assets Supervision and Administration Commission of the State Council, enumerated the industries of strategic importance, which included oil and gas, coal, electricity, telecoms, public transportation, and the military industry (Li, 2006). In 2011, Mr. Shao Ning, the vice director of the State Assets Supervision and Administration Commission, stated in a speech that certain SOEs served national interests (Shao, 2011). He listed four criteria for such SOEs: their products being the foundation of national economic development; enjoying monopoly or oligopoly in their operations; government control of pricing; and their social benefits outweighing their economic profits in importance (and often being loss-making). Mr. Shao further enumerated several such industries that serve "national interests": oil and gas, electricity, telecoms, water and gas supply, and public transportation.

More recently, the Chinese Communist Party Central Committee and State Council (2015) issued the "Guidance on Deepening SOE Reforms," and the State Council (2016) issued the "Guidance on Pushing forward the Structural Adjustment and Reorganization of Central SOEs." These are the latest government documents on SOE reforms. The Central Committee of the Chinese Communist Party and the State Council (2015) classify SOEs into two types, the "business type," and the "public interest type." It is said that the evaluation of SOEs in the latter group would rely less on profits, but more on product quality, operation efficiency, and reliability. The State Council (2016) emphasizes controlling and strengthening the central SOEs that are related to national security and that serve as the foundation of the national economy, or that contribute to important national objectives. Based on these official speeches and government documents, it is clear that the Chinese government has always designated certain industries as having "strategic importance" or serving "national interests," and has taken a different approach to manage the SOEs in such industries.

We also look for guidance from research. In a recent study on China, Haley and Haley (2013) show that government subsidies have contributed significantly to China's success as the largest manufacturer and exporter in the world. They identified industries such as oil and gas, steel, aviation and aerospace, and

automobiles as China's "national champions." Relatedly, in a study on Russia's privatization of SOEs and subsequent re-nationalization, Chernykh (2011) identifies the following strategically important sectors: Oil and gas; nuclear, aerospace, or defense engineering; telecom (except internet) or media; airports, seaports, rail, or pipelines; and special metals.

Based on these government documents and the academic literature, we identify the following manufacturing industries as China's strategic industries:[4] (1) Oil and gas, petroleum (07-oil and gas extraction; 25-petroleum, coking, and nuclear fuel processing); (2) nuclear fuel, aviation and aerospace, arms and ammunition (3663-arms and ammunition manufacturing; 3669-aviation and aerospace equipment manufacturing; 4413-nuclear power generation); (3) electricity, heat, gas, and water supply (44-electricity and heat production and supply; 45-gas production and supply; 46-water production and supply). We call these industries "strategic industries I." All these industries are regulated, and SOEs in these industries usually do not have pricing rights. While most of these categories mainly contain large SOEs that serve national interests, category (3) provides public utilities, which directly affects urban residents' approval of the government and exhibits stronger control benefits for the government.

For robustness checks, we consider an alternative, a slightly broader, definition of the strategic industries. We add a fourth category into the list to form "strategic industries II": (4) Automobile, locomotive, and ship (371-railway locomotive manufacturing; 372-automobile manufacturing; 375-ships manufacturing). The manufacturing of automobile, locomotive, and ship is often mentioned as China's national champions in official news reports. The automobile industry receives large subsidies from both the central and local governments (Haley and Haley, 2013). The locomotive industry includes China's high-speed railway system, and is often regarded as the pride of the country.

References:

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Chinese Communist Party Central Committee and State Council, 2015. "Guidance on Deepening SOE Reforms." CCP Central Committee and State

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[4] Telecoms and public transportation (including airlines) belong to the service sector and do not appear in our sample. The numbers in front of the industry name are the 2/3/4-digit industry code (according to the GB/T 4754-2002 classification).

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Table L-1. The share of central SOEs in the strategic industries

	1998		2007	
	Share of firms in strategic industries I	Share of firms in strategic industries II	Share of firms in strategic industries I	Share of firms in strategic industries II
By the number of firms				
In all industrial firms	0.3%	0.6%	0.1%	0.2%
In all SOEs	0.9%	1.7%	3.0%	4.0%
By employees				
In all industrial firms	2.5%	3.8%	1.3%	1.7%
In all SOEs	4.7%	7.0%	8.9%	11.3%
By value-added				
In all industrial firms	6.2%	7.5%	4.4%	5.1%
In all SOEs	14.1%	16.9%	23.5%	27.3%
Number of firms	490	964	407	541

Note: This table summarizes the share of central SOEs in the strategic industries in terms of the number of firms, the number of employees, and the value added, respectively.