Bottom-Up Institutional Change and Growth in China*

Heng Chen† Bingjing Li⋆ Xiaodong Zhu‡

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Abstract

This paper investigates the role of bottom-up reforms in driving China's economic growth. Leveraging granular documentation from county-level gazetteers, we identify local reform events from 1976 to 2005, capturing *de facto* policy innovations and their diffusion. Our findings show that bottom-up reforms primarily drive growth through productivity improvements, while centrally sponsored reforms operate mainly through capital accumulation. Evidence from firm entry and structural transformation further corroborates the productivity-enhancing effects of bottom-up reforms. Notably, these reforms were more likely to originate in politically peripheral regions and the diffusion of these reforms was more driven by local conditions than centrally sponsored reforms.

Keywords: Bottom-up institutional change, TFP growth, policy diffusion, machine learning.

JEL codes: C81, O31, O35, O38, O40, O43, R11

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1 Introduction

Since 1978, China has transformed from one of the world's poorest countries into the world's second-largest economy, now accounting for over 19% of global GDP. Growth accounting exercises identify total factor productivity (TFP) growth as the primary driver of this economic miracle (Zhu, 2012; Zilibotti, 2017). Prior studies examining TFP growth sources have focused on resource reallocation (Brandt et al., 2013), trade liberalization (Brandt et al., 2017), and domestic market integration through internal trade and migration (Tombe and Zhu, 2019; Hao et al., 2020). However, these identified channels explain only a fraction of the observed TFP growth, leaving a substantial portion unexplained. This paper investigates how institutional reforms during China's reform era contributed to TFP growth.

While a vast literature establishes how institutions shape economic development (e.g., North, 1990; Acemoglu et al., 2001; Rodrik et al., 2004), empirical evidence linking specific institutional changes to economic growth remains limited. One of the reasons is the lack of granular data that document institutional changes. In this paper, we use a large textual database to systematically examine the major institutional changes in reform-era China and link them to China's economic growth. We show that institutional changes from the bottom up are associated with faster TFP growth, while institutional changes from the top down are associated with higher speed of capital accumulation.

The conventional narrative of China's economic reform portrays it as a gradual, systematic experimental process orchestrated by a powerful central government (Blanchard and Shleifer, 2001; Heilmann, 2008a,b; Wu, 2009). However, this top-down, grand design narrative contradicts extensive historical evidence showing that many of China's economic reforms emerged through local experimentation and decentralized initiatives. Significant reforms often originated at the local level, with farmers, entrepreneurs, and local officials pursuing experiments either without central government endorsement or, in some cases, in direct defiance of Beijing's explicit prohibitions (Coase and Wang , 2012; Nee and Opper, 2012). The late 1970s land reform and 1990s privatization of small and medium-sized state-owned enterprises exemplify such bottom-up innovations (Xu, 2011).

Those reform initiatives that emerged from the ground were largely a response to the shifting political landscape after 1978. While party leadership unanimously recognized the need to bolster regime legitimacy through improved economic performance, they remained divided over strategies. Die-hard socialists defended the command economy on ideological grounds and viewed market mechanisms as threats to political control, while reform-minded leaders believed market forces could coexist with the authoritarian control of the Chinese Communist Party.

These strategic divisions created substantial uncertainty about China's reform direction.

Nevertheless, as reformists gained the upper hand, they fostered a political climate that tolerated economic practices contradicting orthodox socialism.[1] This shift substantially reduced the risks for local governments to introduce market-oriented mechanisms. This permissive stance was explicitly articulated by Hu Yaobang, then General Secretary of the Chinese Communist Party (CCP), in November 1980:

> After the Third Plenary Session of the Fifth National People's Congress, the central government put forward four principles for local governments. They are as follows: If the central government hasn't considered it, the local government can propose ideas; if the central government hasn't given instructions, but the local government sees fit, they can take action; if what the central government proposes doesn't suit the local situation, the local government can make flexible arrangements; and if the central government makes a wrong decision, the local government can debate it.

Despite political uncertainty and risks, local governments started initiating reforms, many of which eventually became national policies. During his 1992 southern tour, Deng Xiaoping remarked:

> [Reforms] were created at the grassroots level; we took these ideas, refined them, and used them as a guide for the entire country.

Against this historical backdrop, our study provides systematic empirical evidence that bottom-up institutional innovations drove gradual yet transformative changes during the reform era and contributed significantly to China's TFP growth and economic development.

We begin by compiling a novel dataset of over 1.8 million major events from 1976 to 2005 at the county level, drawn from more than 4,800 volumes of local gazetteers documenting important cultural, economic, and political developments at the year-month level. These gazetteers

[1]The Third Plenary Session of the 11th Central Committee of the Chinese Communist Party was held in December 1978, which produced a landmark Communiqué, which states: " A major deficiency in our country's current economic management system is the over-concentration of power. We should systematically decentralize authority, allowing local governments and industrial/agricultural enterprises more operational autonomy under the state's unified planning. ... Under the party's unified leadership, we should truly resolve the phenomenon of party-government-enterprise integration and substitute it with division of labor and responsibilities. We should strengthen the authority and responsibility of management institutions and personnel, reduce bureaucratic paperwork, improve work efficiency, and seriously implement systems of assessment, rewards/penalties, and promotions/demotions. Only by taking these measures can we fully unleash the initiative, enthusiasm, and creativity from four sectors: central departments, local governments, enterprises, and individual workers, enabling all components of the socialist economy to develop vigorously and harmoniously."

provide comprehensive chronicles of local developments through granular records of actual decisions and practices by local officials and entrepreneurs. The advantage of this dataset is that it allows us to identify *de facto* institutional innovations through observed economic activities rather than *de jure* policy documents. Crucially, we can track how new reform practices emerged and diffused across localities over time—often before receiving central government approval or being formalized into local and national laws and regulations—making this dataset particularly valuable for studying bottom-up reforms.

Next, we map county-level economic events to major national reforms implemented in the three decades after 1976. We identified 25 key reform sets spanning diverse policy domains and covering all major reform categories of this period. Using textual analysis tools, we classified events by their reform relevance and matched them to specific reforms. We then constructed a panel dataset tracking reform activities at the county-year level.

Using this dataset, we can trace how each reform emerged and diffused across counties. Through analyzing these diffusion patterns, we identify two key features that allow us to distinguish bottom-up from centrally sponsored reforms, without relying on prior knowledge. First, bottom-up reforms originated from local counties and emerged before central government approval, while centrally sponsored reforms followed central directives. Second, bottom-up reforms spread gradually between counties, whereas centrally sponsored reforms displayed sharp, discontinuous jumps in adoption rates following central mandates. Using these spatial and temporal patterns, we develop a continuous measure of bottom-up influence for all 25 key reforms. This measure captures a nuanced aspect of the reform process: most reforms were not simply bottom-up or top-down, but rather exhibited both influences at different stages of implementation.

Armed with these data and measures, we first link reform innovations activities with economic growth data at the province level. Using this province-level panel data, we systematically examine how reforms shaped regional economic performance. We show that both reform innovations and their diffusion contributed positively to economic growth, though their mechanisms varied by reform type. Bottom-up reforms generated growth primarily through productivity enhancements: specifically, a one standard deviation increase in bottom-up reform adoption in areas where 10% of the population was exposed led to a 1.1 percentage point increase in three-year GDP per worker growth and a 0.74 percentage point rise in TFP growth. In contrast, centrally sponsored reforms drove growth mainly through capital deepening, as evidenced by higher fixed investment rates. While reform diffusion across regions benefited followers, these growth effects diminished substantially for later adopters. Importantly, the stronger growth effects of bottom-up reforms compared to top-down directives underscore how local initiative

and experimentation served as crucial catalysts in China's reform-driven growth.

Next, we corroborate our findings on reform impacts through two additional aspects of economic growth: prefecture-level firm entry and county-level structural transformation. Using prefecture-level firm registration data, we find that while reform innovations generally encourage private firm entry, bottom-up reforms show notably stronger effects. This pattern is particularly important given that new firm creation contributed to productivity growth both directly through higher-productivity entrants and indirectly through improved resource allocation.

Our analysis of structural transformation–the movement of labor from agricultural to non-agricultural sectors–reinforces these findings. This transformation, which operates through both agricultural "push" factors and non-agricultural "pull" factors, serves as a well-established proxy for productivity growth. Consistent with our province-level results, bottom-up reforms prove more effective at accelerating this structural transformation, further supporting the crucial role of local initiative in China's economic development.

Finally, our dataset enables us to trace both the emergence and diffusion of reforms. We find that bottom-up reforms typically originated from politically peripheral counties, far from political spotlights. While remoteness is traditionally seen as a development constraint, it actually facilitated reform innovation by providing political space for local experimentation, particularly during periods of ambiguous central policy stance.

We also find that policy diffusion was strongly shaped by suitability–the similarity between potential adopters and early innovators in demographics, industry composition, and human capital. Without central mandates, local governments had greater discretion to adopt reforms based on local conditions, leading to stronger TFP gains. This suitability-driven diffusion process effectively matched reforms with localities where they could best reduce economic frictions and generate productivity gains, a key advantage over top-down directives that often overlooked local circumstances.

Our paper makes a methodological contribution by compiling a granular dataset of economic and political events to study de facto policy innovations and their diffusion through local events rather than policy documents. Our methodology builds on the growing literature that uses computational linguistics to extract rich textual features and uncover otherwise undetectable relationships in social sciences (Gentzkow et al., 2019a,b; Bertrand et al., 2021; Kelly et al., 2021). Through textual analysis, we identify region-specific events related to key reform policies, enabling us to map the spatial patterns of both bottom-up and centrally sponsored reforms across China and analyze their growth implications.

This approach also advances the policy diffusion literature (e.g., Mukand and Rodrik, 2005; Buera et al., 2011; Besley and Case, 1995; Mulligan and Shleifer, 2005; Bernecker et al., 2021;

DellaVigna and Kim, 2022). While Wang and Yang (2024) examine designated policy experiments and learning biases in post-2000 China using government documents, our analysis uses county-level gazetteers to study the crucial reform period up to 2005 and assess their impacts on economic and TFP growth.

Second, our work enriches the literature on the relationship between institutions and growth. While extensive research examines how institutions shape economic development and their persistence (e.g., Acemoglu et al., 2001; Rodrik et al., 2004), few macroeconomic studies analyze the impact of actual institutional changes on economic growth. Our paper provides the first systematic evidence linking bottom-up institutional changes to economic growth in reform-era China. Our findings echo Hayek's insights (e.g., Hayek, 1945; Hayek , 1960, 1973) that effective institutions are typically discovered through bottom-up processes rather than designed from top down.

Finally, we contribute to understanding TFP growth in China's reform era, one of the crucial issues in the current growth literature. While previous studies focus on various factors such as resource reallocation (Brandt et al., 2013), trade liberalization (Brandt et al., 2017), and domestic market integration through internal trade and migration (Tombe and Zhu, 2019; Hao et al., 2020), we advance a new perspective by examining the impact of market-oriented bottom-up reforms.

The rest of the paper is organized as follows. Section 2 details our data sources, introduces measurements to quantify the extent of bottom-up forces in driving different economic reforms, and describes the strategies used to identify local reform-related events. Section 3 examines the relationship between policy innovations, their adoption, and regional economic performance. Section 4 investigates the characteristics of reform policy innovators and explores how new policy ideas spread. Section 5 concludes.

2 Data and Measurement

We construct a novel county-level dataset of major events during China's reform era (1976-2005). We focus on counties as our unit of analysis since they represent the administrative level where many policies, including Hukou registration, are implemented. Section 2.1 describes our primary data sources, with additional details in Appendix A. Sections 2.2 and 2.3 explain our identification of key economic reform policies and reform-related events at the county level. Section 2.4 presents two illustrative cases–the Household Responsibility System and the Tax Sharing Reform–representing bottom-up and centrally sponsored reforms respectively. While recognizing that reforms often involve both bottom-up and top-down forces, we develop a mea-

sure to capture the extent of bottom-up influence in Section 2.5. In Section 2.6, we characterize counties to be reform innovators and followers, which will be useful for our subsequent analysis.

2.1 Data Sources

2.1.1 Chronicle of Events at the County Level

We obtain information from local gazetteers (地方志) at both the county and prefecture levels to compile a comprehensive dataset documenting local events during China's reform period. Often regarded as the "encyclopedia" of their respective localities, these gazetteers provide historical and contemporary information on nature, society, economy, culture, and politics. There are two runs of compilation and publishing of local gazetteers after the upheaval of the Cultural Revolution. Most of the first-run gazetteers were published in the 1990s and document events up to the mid-1980s; the second-run gazetteers, mainly published in the 2010s, cover events from the mid-1980s to the mid-2000s.

Although the content of local gazetteers varies by region, their format is relatively uniform, which facilitates our textual analysis implementation. A key section common to local gazetteers is the "Chronicle of Major Events" (大事记), which provides concise records of significant occurrences within the locality during specific historical periods and on a monthly basis after 1949. Each event is documented in a separate entry, providing information on the event's time, precise location, key players involved, and a summary. This feature is useful for tracking local developments and events across various domains such as politics, economy, culture, and society.[2]

A key advantage of the major events section is its comprehensive documentation, including sensitive political events that are often omitted from other sections of the gazetteer. Following the April 1985 guidelines issued by the Steering Group for National Gazetteer Work (Xue, 2010), local gazetteers were instructed to record history truthfully while adopting a "rough, not detailed" principle for sensitive political events after 1949 (such as the Great Leap Forward and Cultural Revolution). This principle required documenting basic facts while omitting specific details like individual names and comprehensive statistics. Due to its summarizing nature, the "Chronicle of Major Events" section often remains the sole source of information on these

[2]In the political realm, it documents events such as key personnel changes, visits from upper-level government leaders, major political conventions and meetings, as well as political movements. Economic events include major reforms in the economic system, fluctuations in local economic conditions along with their causes and consequences, and development of infrastructure projects, and other significant economic activities. In the domain of culture, it covers events related to achievements in areas such as education, science, art, sports, and heritage preservation. Social events encompass responses to natural disasters, charity work, public health issues, public security management, and more.

Figure 1: Data Coverage Over Time

sensitive topics within the gazetteers.

With the support of a dedicated team of research assistants, we have compiled an extensive collection of county gazetteers from various online and offline sources.[3] We extract text from the "Chronicle of Major Events" section and employ Optical Character Recognition (OCR) to scanned images into machine-readable text. This text is then cleaned and organized into a structured dataset. To ensure accuracy, we engaged a team to manually verify and correct any errors introduced during the OCR process by cross-referencing the converted text with the original images. We assign each county a code according to the administration division codes used in the 1990 population census.

Our dataset of local events covers 2,568 county-level divisions in China, starting from 1976—the year of Mao's death—capturing a total of 1,836,590 events.[4] The average event description is approximately 48 Chinese characters long, and the average number of events per county-year observation is around 51. The first-run gazetteer compilation includes over 646,000 events from 2,515 counties across 30 provinces, covering more than 98% of the population and primarily spanning the period from 1976 to 1985. The second-run consists of more than 1,190,000 events from 2,288 counties in the same 30 provinces, accounting for more than 94% of the population and mainly spanning from 1986 to 2005. Figure 1 presents a summary of the data coverage over time. The left panel illustrates the number of local events over time, whereas the right panel depicts the number of counties covered in our sample over the same period. Due to a significant decline in geographic coverage after 2005, our analysis restricts the sample period

[3]We have accessed some scanned gazetters from the online database WangFangData (`https://fz.wanfangdata.com.cn`). Additionally, several provinces offer online portals that provide e-books, such as Sichuan (`https://www.scdfz.org.cn/szfz/sxz`) and Zhejiang (`https://dfz.zj.gov.cn/zlyz/fzbSite/home#header`). However, many of the second-run local gazetteers are not available online. To collect data from these books, our team of research assistants visited over ten libraries and archives nationwide and scanned the "Chronicle of Major Events" sections.

[4]We assign the content from the prefecture-level gazetteers to city-governed districts when district-level gazetteers are unavailable.

to 1976-2005, when the major economic reforms in China occurred (Zilibotti, 2017).[5] To the best of our knowledge, this is the first effort to compile text data on local events across China at a granular geographic level, providing a panoramic yet detailed view of the nation's recent history.[6]

This unique dataset of local events offers an opportunity to explore how China's transformative institutional reforms were formulated and disseminated across space and time—an inquiry that is challenging to address using existing databases of local laws and regulations—for the following reasons. First, in terms of spatial variations, local events provide comprehensive coverage across administrative levels. Local events capture concrete actions of local governments, entrepreneurs, and enterprises, revealing rich variations in institutional changes even within provinces. In contrast, local legislative authority was highly restricted before 2000, limited primarily to provincial capitals and designated prefecture cities, with legislative power extending to just 49 prefecture cities by the late 1990s.[7] Given this restriction, the variations of institutional changes within provinces during the reform period were unlikely to be fully reflected in local laws. Second, in terms of timing, local events track reform experiments and initiatives before their formalization into regulations. This temporal advantage allows us to trace how reforms emerged and evolved on the ground, providing information about institutional transformation during the experimental phases that preceded codification into law.

2.1.2 Other Data Sources

We introduce additional measures and control variables at the county level, drawing data gathered from the following data sources:

(i) The 1982, 1990, 2000 and 2010 County Population Census Data from the China Data Center at the University of Michigan (CDC). The 1982 census data are used to construct

[5]In Appendix A.1, we show that there is little correlation between the missing status of local events and county characteristics during our sample period.

[6]Recent studies have utilized information from county gazetteers to examine various political movements and policy shocks in contemporary China. These include the Cultural Revolution (Walder and Su, 2003), the diffusion of diagnostic ultrasound (Chen et al., 2013), land reforms across different periods (Almond et al., 2019; Alesina et al., 2021), the Send-Down Movement (Chen et al., 2020), as well as the Great Leap Forward and the Great Famine (Kasahara and Li, 2020). All of these papers rely solely on information from the first-run county gazetteers, whereas our study also utilizes information from the second-run county gazetteers to extend the analysis to the mid 2000s. In addition, rather than focusing on a specific policy during a given period, our study provides the first attempt to explore the formation and diffusion of a host of key reform policies throughout China's 30-year reform period.

[7]The 2000 Legislation Law extended this authority to 282 cities, though limited to specific domains like urban construction and environmental protection. As stipulated by the Law of Local Organizations and the 2000 Legislation Law. See `http://www.npc.gov.cn/zgrdw/npc/xinwen/rdlt/fzjs/2011-02/10/content_1619880.htm`.

measures of counties' baseline socioeconomic characteristics, while information from the subsequent census years is used to assess structural transformation over different periods.

(ii) A map of county-level administrative units from 1990, provided by the CDC, is used to geolocate the counties.

(iii) A map of China's railway network in 1980, obtained from Baum-Snow et al. (2017), is employed to calculate the distance from each county to the nearest railroad.

(iv) *Statistical Material for Prefectures, Cities, and Counties Nationwide* (Ministry of Finance, 1993) provides data on counties' fiscal revenue in 1993.

(v) *The Dictionary of the CCP Central Committee Members of Various Plenums, 1921-2003* (Organization Department of the CCP and Party History Research Center of the CCP Central Committee, 2004) is used to identify members of the Politburo Standing Committee of the Chinese Communist Party (CCP) for each year. Combined with the dataset on local events, we can infer the visits by Politburo Standing Committee members to each county over time.

(vi) The provincial-level data on GDP, investment, employment, and TFP from Brandt et al. (2013) and Hao et al. (2020).

(vii) The Business Registry Database, maintained by the State Administration of Industry and Commerce, provides a comprehensive record of all firms that have operated in China since 1949. This database includes information on firm characteristics such as the year of establishment, exit date (if available), location, ownership type, business scope, registered capital, and employment. For the purpose of our analysis, we aggregate the number of registrations by ownership type (e.g., private enterprises versus state-owned enterprises) at the prefecture-year level to infer firm entries across different regions and time periods.[8]

2.2 Identifying Key Economic Reforms

To compile a list of critical economic reforms in China over the period from 1978 to 2005, we collected the chronicle of major reform events from Reform Data (reformdata.org), a database maintained by the China Institute of Reform and Development (CIRD). There are 7,692 reform events documented over the period 1978-2018 at the national level, which are comprehensive and exhaustive of all national-level reforms.

[8]In the Business Registry Database, county codes are often missing for the earlier years. Therefore, we conduct the analysis at the prefecture level.

To identify key economic reforms, we conduct a systematic manual review of events documented in this comprehensive database. Our screening process follows a set of main criteria. First, given our focus on critical economic policies, we exclude reforms in non-economic domains such as population control, education, healthcare, environmental protection, and political institutions. Second, we omit policies that were implemented exclusively at the central government level - such as exchange rate regime changes and stock market regulations - since these reforms involved minimal local government participation.

Third, we include not only those "successful" policies and reforms that received central government's implicit or explicit approval but also those that were ultimately reversed or disapproved.[9] This approach allows us to capture the full spectrum of local reform experimentation, including those initiatives that were ultimately terminated through top-down decisions.

Finally and importantly, each critical reform identified should be considered as an umbrella encompassing multiple related policies. For instance, as detailed in Section A of the Online Supplementary Appendix, the price reform encompasses various policy initiatives, from the introduction of dual-track pricing systems across different sectors to the establishment of markets that facilitated price discovery through trading. Thus, policy adoption in our dataset may manifest as incremental implementation innovations.

Table 1 presents a comprehensive list of 25 reforms identified through our filtering criteria. These reforms span multiple dimensions: urban and rural sectors, state and private ownership, and diverse industries including agriculture, industry, real estate, and finance. The reforms also cover broad policy domains ranging from fiscal and labor policies to pension systems, land use regulations, housing reforms, migration policies, property rights, trade/FDI regulations, business entry/exit rules, and technology initiatives. Section A of the Online Supplementary Appendix provides detailed summaries of each reform's evolution, based on our systematic review of official documents and research papers, which are available on the authors' website.

Columns (1)-(2) of Table 1 present two critical timing measures for our empirical analysis: (i) the year when the central government granted partial consent for reform experimentation, and (ii) the year when the central government endorsed nationwide adoption. The average duration between initial partial consent and final endorsement is 7.2 years, with a standard deviation of 5.7 years. This substantial time gap underscores China's gradualist, experimental

[9]For example, the rural financial reforms of the 1980s, which delegated control rights of rural financial institutions to depositor-members and promoted bottom-up development of informal finance, were reversed by the central government in the 1990s (Huang, 2012). Similarly, the development of Urban Credit Cooperatives was halted in 1988 when the People's Bank of China centralized supervision and subsequently stopped issuing new licenses. The "blue-stamped household registration"—a bottom-up Hukou policy reform that created an intermediate status between formal household registration and temporary residence registration—was gradually phased out and eventually discontinued in the 2000s. The term "blue-stamped" derives from the blue stamp applied by public security authorities.

Table 1: Key Economic Reforms

Reforms	Year when Central Govt. Gave Partial Consent (1)	Year when Central Govt. Endorsed Nationwide Reform (2)	Bottom-Up Reform Index (3)
Household Responsibility System (家庭联产承包制)	1980	1982	3.033
Development of Individual Economy (发展个体经济)	1979	1982	-0.444
Substitution of Profit with Taxes (利改税)	1980	1983	-2.138
Importing Tech and Complete Sets of Equip (引进新技术和成套设备)	1978	1984	0.707
Developing Township and Village Enterprises (发展乡镇企业)	1979	1984	1.102
Rural Financial Reform (农村金融改革)	1980	1984	0.885
Wage System Reform (工资体制改革)	1978	1985	-1.119
Horizontal Economic Cooperation (横向经济联合)	1980	1986	0.285
Urban Credit Coorporative Development (城市信用社发展)	1986	1986	1.792
SOE Managerial Responsibility Contract (经营责任承包制)	1979	1987	-0.137
Urban Pension System Reform (城镇养老制度改革)	1983	1991	0.278
FDI and Special Economic Zones (外资，经济特区)	1980	1992	-0.783
Transformation of SOEs into Shareholding Companies (企业股份制)	1984	1992	0.127
Price Reform (价格改革)	1984	1992	-0.844
Land Use System Reform (土地使用制度改革)	1988	1992	-0.028
Tax Sharing Reform (分税制改革)	1992	1994	-2.874
Labor Contract System (劳动合同制)	1983	1994	0.605
Development of Private Economy (发展私营经济)	1988	1997	0.283
Privatization of SOEs (国企私有化)	1995	1997	1.888
Housing Reform (住房制度改革)	1979	1998	-1.001
Setting Up A Modern Enterprise System (建立现代企业制度)	1993	1999	1.036
Advancing Western Development (西部大开发)	1999	1999	-0.684
Hukou Reform (户籍制度改革)	1984	2001	0.671
Rural Tax and Fee Reform (农村税费改革)	1993	2004	-1.565
Bankruptcy Reform (破产制度改革)	1984	2006	-1.078

approach to reform implementation.

2.3 Identifying Reform Events at the County Level

Having identified the key economic reforms, our next task is to establish linkages between local events and these major reforms. To accomplish this, we employ two complementary approaches: keyword matching and machine learning techniques.

The keyword matching is our baseline approach, which offers not only transparency in the

identification process but also holds particular advantages in our Chinese policy context. Chinese government reforms typically introduce distinctive terminology for propaganda purposes, making keyword identification especially effective. For instance, the Household Responsibility System was associated with specific phrases such as '联产到户、包产到户、包干到户、大包干' (Household-based joint production contract, household-based contract responsibility system, Household-based production contract system, large-scale household contracting system). To develop our keyword list, we carefully examined random samples of events from both the partial approval and final endorsement periods of each reform. The selection of keywords was optimized to balance false positive and false negative rates in identifying reform-related events. Appendix A.2 provides the complete list of keywords for each reform, while Section B of the Online Supplementary Appendix presents five illustrative examples of reform-related events identified through this keyword approach.

To validate our baseline approach, we develop a complementary methodology that combines supervised machine learning with manual annotation. This integrated approach leverages both the semantic pattern recognition capabilities of machine learning and the precision of human validation. The implementation follows three steps. First, we construct a training dataset by manually annotating events from a random sample of counties, classifying them as reform-related or unrelated and, for reform-related events, identifying their corresponding specific reforms. The quality of this training dataset is crucial for model performance. Second, we employ a pre-trained RoBERTa model (from the BERT family) for classification, training it on our annotated dataset to recognize patterns characterizing reform-related events. During training, we parameterize the model to minimize false negatives at the expense of increased false positives, ensuring comprehensive capture of reform activities. Finally, we classify events in our full sample using the trained model, followed by manual review of identified reform events to eliminate false positives. This combined approach ensures both comprehensive coverage and classification accuracy. Appendix A.3 documents the technical specifications of our machine learning approach.

In our empirical analysis, we use the keyword matching measures as our baseline due to their transparency, while employing the machine learning-based measures with manual annotation for robustness checks.

2.4 Bottom-Up v.s. Centrally-Sponsored Reforms: Examples

In this section, using our methodology of event collection and reform identification, we showcase two prominent reforms from our sample: the Household Responsibility System, which exemplifies a bottom-up reform process, and the 1994 tax-sharing reform, which represents a top-down

reform initiative.

Our methodology enables us to track both the emergence and geographical spread of reforms across counties over time, which we visualize through diffusion curves. These diffusion patterns serve two important analytical purposes. First, they validate our data collection and classification methodology by allowing us to compare our identified patterns against historical accounts and existing knowledge of these reforms. Second, they reveal distinct patterns between bottom-up and centrally sponsored reforms, helping us characterize the extent of local initiative in each reform process.

Household Responsibility System (HRS). The Household Responsibility System (HRS) reform in early 1980s China represented a fundamental shift in agricultural policy. Despite being officially banned at the Third Plenum of the 11th Central Committee in 1978, subnational governments began experimenting with contracting land and output quotas from communes to households.[10] Anhui and Sichuan—two populous inland provinces severely affected by the Great Leap Forward famine—pioneered the most notable HRS policies (Bai and Kung, 2014). Their provincial leaders, Wan Li and Zhao Ziyang, recognizing HRS's effectiveness in boosting agricultural productivity, permitted villages to adopt the system rather than punishing violations of central policy.[11]

As regional HRS experiments proved successful, the central government began endorsing the system in 1980.[12] The CCP Central Committee's 1982 'No.1 Document' formally established the HRS as China's agricultural foundation, allowing farmers to lease land, make independent production decisions, and retain surplus after meeting state quotas. During the reform's nationwide implementation (1978-1984), agricultural TFP grew by 5.62% annually. Studies by McMillan et al. (1989) and Lin (1992) attribute this growth primarily to HRS-generated incentive effects on farmer effort and production decisions.

In the official account of this reform, the Chinese government acknowledged its bottom-up nature, with 1978 marked as the starting point, coinciding with the Third Plenum of the 11th Central Committee. While the government's narrative highlights the reform in Xiaogang village, our dataset documents numerous earlier instances of household responsibility initiatives across different regions. For example, production teams in Guangchang County implemented

[10]In September 1979, the Fourth Plenum of the 11th Central Committee officially passed the 'Decision on Several Issues Concerning Accelerating Agricultural Development,' explicitly prohibiting land division for individual farming and discouraging the household responsibility system with output quotas.

[11]During his 1992 southern tour, Deng Xiaoping noted: "The household contract responsibility system in rural areas is an invention of the farmers. Many aspects of rural reform were created at the grassroots level; we took these ideas, refined them, and used them as a guide for the entire country."

[12]The Central Committee's "No. 75 Document" of September 1980 permitted HRS adoption in poor and remote regions, and in areas where it was already successfully implemented.

household contracting systems in early 1977, while Tunchang County's Nanlu Agricultural Science Station experimented with output-linked contracts to households in October 1977. Similar practices were also recorded in Wuhua and Lufeng counties in September 1976, demonstrating that household responsibility practices emerged in various locations before the officially acknowledged reform period. These documented cases demonstrate the comprehensive nature of our data collection in capturing reform activities.

Panel A of Figure 2 illustrates the diffusion process of the HRS reform across the country over time. In our analysis, a county is considered to have adopted the reform in a given year if any reform-related event occurred in that year or in previous years. The diffusion process is captured by two measures: the cumulative share of counties that have adopted the reform and the share of total population residing in these adopting counties.

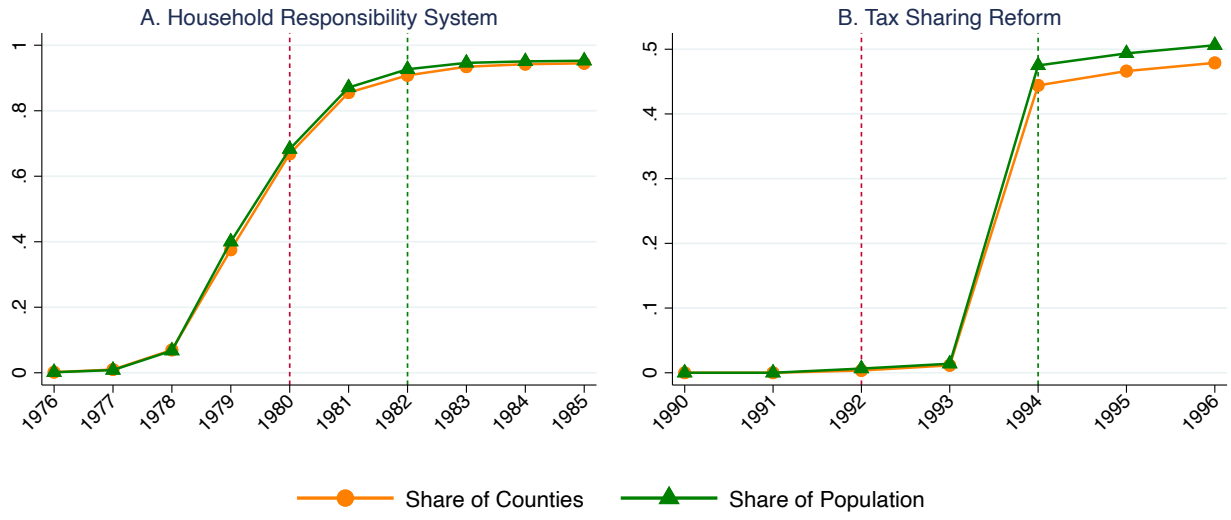
The diffusion curve reveals two striking patterns. First, HRS reform initiatives emerged before 1978, with approximately 10% of counties adopting the practice by 1978 despite central government prohibition. The reform then spread rapidly, reaching nearly 70% of counties by 1980 when the central government granted partial consent. Second, the central government's full endorsement in 1982 had minimal impact on adoption rates, as most counties had already implemented the reform by that time.

For further validation purposes, we examine the provincial patterns of HRS diffusion shown in Figure A.2. The data confirm that Anhui and Sichuan provinces pioneered the HRS experiments, while northeastern provinces like Heilongjiang and Jilin lagged in adoption. We also observe that more developed coastal regions did not necessarily lead in policy innovation. For example, Jiangsu, a relatively wealthy coastal province, displayed adoption patterns similar to those of Jilin, a northeastern province, prior to 1982. These provincial variations in adoption timing and speed align with documented historical accounts of the HRS's bottom-up development (Wu, 2009; Xu, 2011).

Tax Sharing Reform. Prior to the 1994 Tax Sharing Reform, China's "fiscal responsibility system" allowed local governments to retain revenues after remitting fixed amounts to the center, leaving central government with just 22% of fiscal revenues by 1993 (Xu, 2011). In 1992, central authorities piloted a new system that categorized taxes as central, local, or shared. Implemented nationwide in January 1994, this reform expanded central revenue share and enhanced funding for national initiatives. The reform exemplifies top-down policy implementation, with central authorities directing changes across China.

Panel B of Figure 2 visualizes the diffusion of the tax-sharing reform across the country over time. The patterns differ markedly from those of the HRS reform in two key aspects. First,

Figure 2: Diffusion of Reform Policies: HRS and Tax-Sharing Reform



Notes: Panel A presents the spread of the HRS over time, while Panel B depicts the diffusion process of the Tax-Sharing Reform. Both panels use measures based on the keyword matching approach. For each reform, there are two key time points: (i) the year the central government granted partial consent to experiment with the reform policy (indicated by a red dashed line), and (ii) the year the central government endorsed the reform for nationwide adoption (indicated by a green dashed line). We report, for each year, the share of counties that have adopted the reform (indicated by a connected orange line with circles) and the share of the population living in those counties (indicated by a connected green line with triangles).

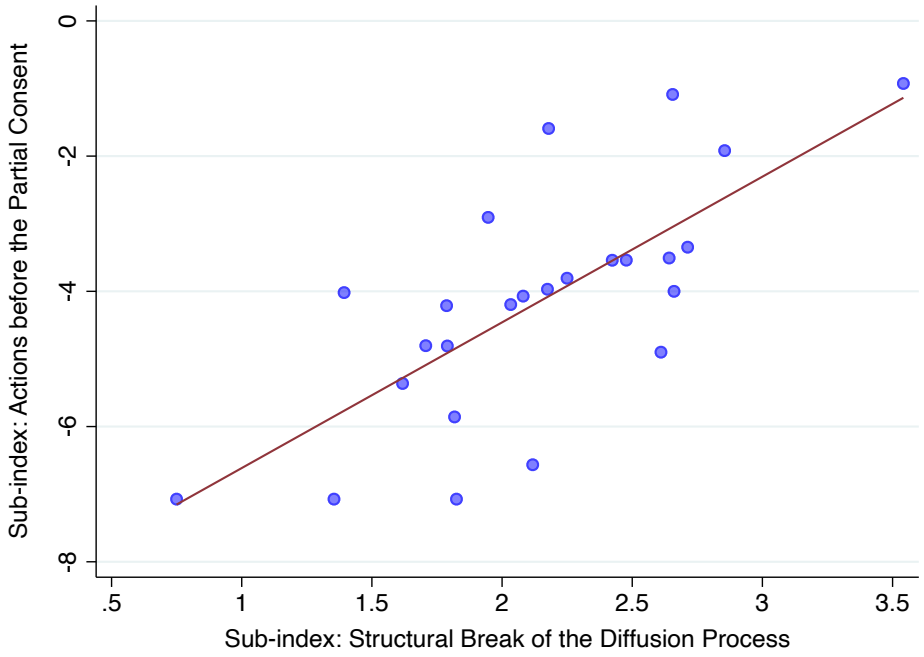
local event descriptions contained no mentions of the reform before the central government's policy experiment in 1992. The reform appeared in local event records only after the central government selected a small number of counties as experimental sites during 1992-1993. Second, reform coverage expanded dramatically after the central government's nationwide implementation decision, reaching nearly 50% by 1994. The population share residing in reform-adopting counties followed an identical sharp trajectory. This sudden surge in adoption following central directives reflects the reform's top-down nature, contrasting sharply with the bottom-up innovation and gradual diffusion of the HRS reform.

2.5 The Bottom-Up Reform Index

The contrast between the HRS and the Tax Sharing Reform indicates significant variation in the formation and dissemination processes of key economic reforms. Such variation is evident in (i) the degree to which local governments initiate the reform experiments, and (ii) the extent to which the top-down directive influences the reform diffusion. Figure A.4 presents the diffusion process for all the reforms listed in Table 1, most falling between these two extremes.[13] In other

[13]The figure tracks reform diffusion using both keyword matching and combined machine learning-manual annotation methods, which yield similar patterns.

Figure 3: Correlation Between Sub-Indices



words, rather than purely bottom-up or top-down, most reforms emerged through interaction between local and central governments. We therefore propose an index measuring bottom-up influence in each reform, constructed from two sub-indices:

Actions before Central Government's Partial Consent. For each reform q, let $\underline{\tau}_q$ and $\overline{\tau}_q$ denote the years of central government's partial consent and full endorsement, respectively. We measure local government initiative using the ratio of early to total adopters, where early adopters are counties implementing the reform by $\underline{\tau}_q - 1$ (one year before partial consent) and total adopters are those implementing by $\overline{\tau}_q + 5$ (five years after full endorsement).

Structural Break of the Diffusion Process. For each reform q, we identify a significant structural break year t_q in its diffusion process. We measure the rate of reform adoption as $\Delta Num\ of\ Adopters_{q,t} - \Delta Num\ of\ Adopters_{q,t-1}$, starting from when the central government partially approves the reform. We define t_q as the year with the largest increase in this adoption rate. While t_q typically coincides with the year of full central government endorsement $\overline{\tau}_q$, some reforms like Housing Reform show breaks before $\overline{\tau}_q$ due to interim central policy measures. The magnitude of the structural break is calculated as $\Delta Num\ of\ Adopters_{q,t_q} - \Delta Num\ of\ Adopters_{q,t_q-1}$. The Tax Sharing Reform exemplifies this pattern, with its largest diffusion jump ($> 40\%$) occurring in 1994.

The first subindex captures bottom-up reform momentum through temporal variations: a larger ratio of early-to-total adopters indicates stronger local initiative before central govern-

ment's partial consent. The second subindex measures top-down influence through spatial discontinuities, reflecting how central directives drive county-level reform adoption. Note that we normalize both ratios using zero-skewness log transforms to create the two sub-indices.

Figure 3 displays the scatter plot of the two sub-indices, revealing a positive correlation coefficient of 0.722. We construct an aggregate $Bottom\text{-}Up\ Index_q$ for each reform q using principal component analysis of these sub-indices. The resulting index is standardized with mean zero and standard deviation 1.312. This baseline index uses keyword matching measures, and correlates strongly (coefficient 0.961) with the alternative index constructed using combined machine learning and manual annotation.

Column (3) of Table 1 reports the index values across reform policies. The highest index values correspond to reforms known for strong local initiative: the Household Responsibility System (HRS), SOE privatization, urban credit cooperative development, and township and village enterprise development. Conversely, the lowest values appear in reforms directed from above: the tax-sharing system, profit-to-tax conversion, rural tax and fee reform, and wage system reform. The alignment between these index values and historical accounts of reform origins and implementation patterns validates our index construction.

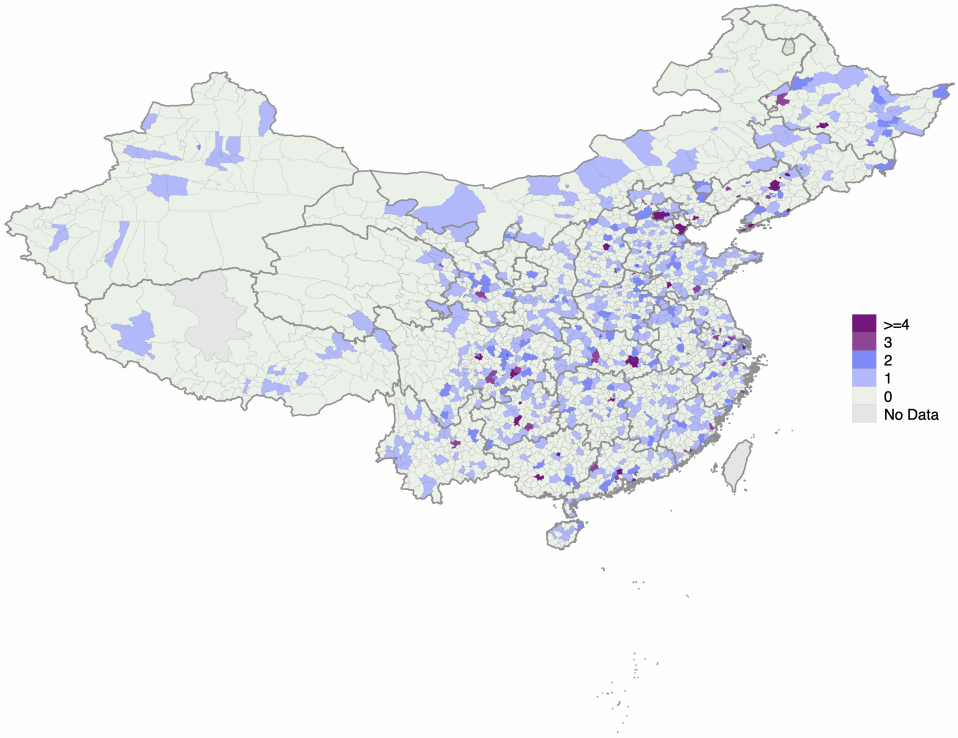
In the subsequent analysis, we classify reforms based on their $Bottom\text{-}Up\ Index_q$, identifying those in the top quartile as Bottom-Up Reforms and the remainder as Centrally-Sponsored Reforms.

2.6 Innovators and Followers

After quantifying the degree of bottom-up elements in each reform, we classify counties as innovators or followers based on their adoption timing. For each reform q, we define $Innovator_{i,q}$ as a binary indicator equal to 1 if county i is among the first 3 percent of adopters, and 0 otherwise. We then aggregate these innovation indicators at the county level. Figure 4 maps the geographic distribution of policy innovations across Chinese counties based on these aggregated counts.

Several patterns emerge from this spatial analysis. First, policy innovations show no clear geographic clustering. Second, while political and economic centers like Beijing and Tianjin exhibit high innovation intensity, many inland and rural counties also emerge as leading innovators. Figure 5 separately maps the geographic distributions of Bottom-Up Reforms and Centrally-Sponsored Reforms, revealing limited spatial overlap between these two types of innovations.

Figure 4: Spatial Distribution of Reform Policy Innovations



Notes: The figure illustrates the spatial distribution of reform policy innovations. For each county, we calculate the number of policy innovations implemented from 1976 to 2005, i.e., $\sum_q Innovator_{i,q}$. Counties with a higher number of policy innovations are depicted in a darker color.

3 Institutional Reforms and Economic Growth

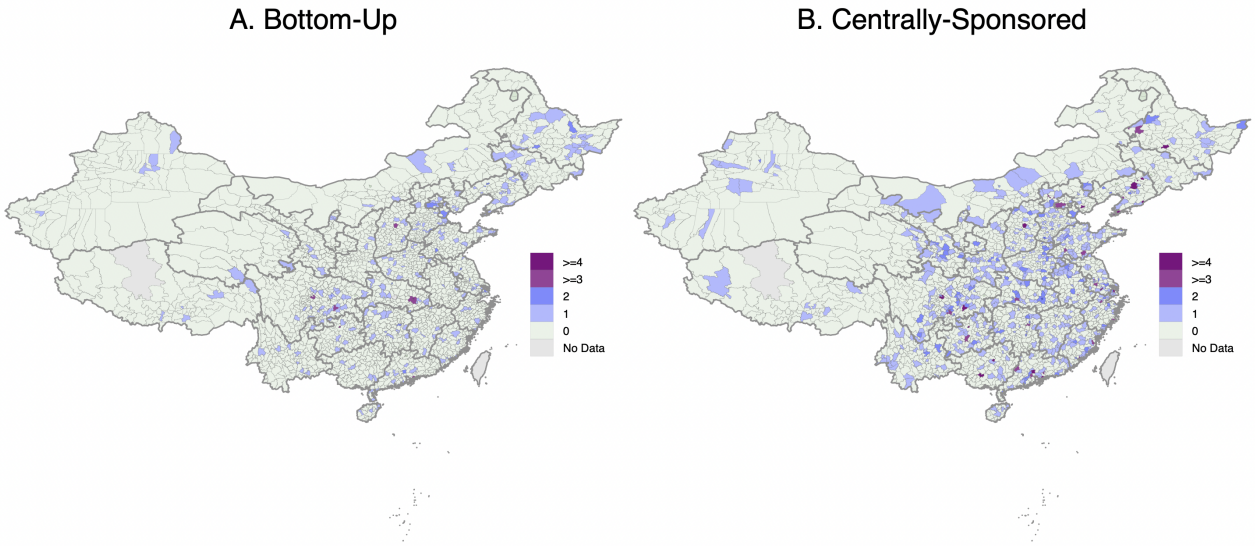
In this section, we examine the economic impacts of reform policies in China from the early 1980s to the early 2000s. We distinguish between two key aspects of the reform process: reform policy innovation—where regions initiate new reforms as innovators—and reform policy adoption—where regions implement existing reforms as followers. This distinction allows us to quantify how institutional innovation and its subsequent diffusion have contributed to China's economic growth and development.

3.1 GDP, Capital and Productivity: Province-Level Evidence

3.1.1 Effects of Reform Policy Innovation

We first examine how economic reforms contributed to GDP growth, capital investment, and the growth of total factor productivity (TFP). To this end, we combine provincial-level economic data with our local events dataset to create a provincial-level panel dataset. Each period in the dataset spans three years, covering intervals from 1981 to 2004, such as 1981-1983, 1984-1986,

Figure 5: Spatial Distribution of Reform Policy Innovations:
Bottom-Up versus Centrally-Sponsored Reforms



Notes: In this figure, we categorize the reforms into two groups: (i) Bottom-Up Reforms (BU), and (ii) Centrally-Sponsored Reforms (CS), depending on whether the index $Bottom\text{-}Up\ Index_q$ falls within the top quartile or not. Panels A and B illustrate the spatial distribution of policy innovations for bottom-up reforms and centrally-sponsored reforms, respectively. For each county, we calculate the number of bottom-up policy innovations and the number of centrally-sponsored policy innovations implemented from 1976 to 2005 (i.e., $\sum_{q\in BU} Innovator_{i,q}$ and $\sum_{q\in CP} Innovator_{i,q}$, where BU and CP denote the set of policies classified as Bottom-Up Reform and the set of policies classified as Centrally-Sponsored Reform, respectively.). Counties with a higher number of policy innovations are shown in darker colors.

subsequent periods in between, and 2002-2004. We label these periods as τ, encompassing the years $t-2$, $t-1$, and t.

In our analysis, we first define $Innovation_{i,\tau}$ as the total number of new reforms initiated by county i during the years $t-3$, $t-2$, and $t-1$, i.e., one-year lagged period of the designated three-year period τ. We use one-year lags to construct this variable to accommodate the fact that the effects of newly introduced reforms on economic growth often take time to materialize.

We aggregate this measure to the provincial level as follows:

$$Policy\ Innovator_{p\tau} = \sum_{i\in p} \frac{Pop_{i0}}{Pop_{p0}} Innovation_{i,\tau}$$

where Pop_{i0} and Pop_{p0} denote the baseline population of county i and province p, respectively. By construction, $Policy\ Innovator_{p\tau}$ measures the share of the population in province p that was exposed to policy innovations during the period τ. In a similar vein, we denote $Adoption_{i,t}$ as the total number of new policies implemented by county i as a follower during the years

$t-3$, $t-2$, and $t-1$. We aggregate this measure to the provincial level according to:

$$Policy\ Follower_{p\tau} = \sum_{i \in p} \frac{Pop_{i0}}{Pop_{p0}} Adoption_{i,\tau},$$

which quantifies the share of the population in province p embracing new reform policies as followers during the period τ. Both $Policy\ Innovator_{p\tau}$ and $Policy\ Follower_{p\tau}$ capture reform activity intensity in province p during the three-year window prior to year t (specifically $t-3$ to $t-1$), with the former measuring pioneering implementation and the latter measuring subsequent adoption.

Next, we estimate the following specification:

$$\Delta \ln y_{p\tau} = \alpha Policy\ Innovator_{p\tau} + \beta Policy\ Follower_{p\tau} + X'_{p0}\gamma_\tau + D_p + D_\tau + u_{p\tau}, \qquad (1)$$

where $\Delta \ln y_{p\tau}$ represents growth in province p over three-year period τ (from $t-2$ to t), measured as either log GDP per worker, log TFP, or investment rate. We incorporate a comprehensive set of province-level baseline controls (X_{p0}) that includes log employment, GDP per capita, and capital per capita (all measured in 1978), as well as indicator variables for coastal locations and municipality status. To account for their time-varying effects, we interact these controls with period dummies. Our specification includes both province fixed effects (D_p) and period fixed effects (D_τ), which absorb time-invariant provincial characteristics and common temporal shocks, respectively. We cluster standard errors at the province level to account for within-province correlation over time.

Table 2 presents our estimation results. Column (1) reports the effects of reform innovation and adoption on GDP per capita growth. The coefficient for reform innovation is positive and statistically significant, suggesting that higher innovation intensity in province p predicts stronger economic growth in subsequent periods.

In Column (2), we include capital accumulation as a control variable. Under a Cobb-Douglas production function with constant returns to scale, the estimated effects of policy innovation and adoption, conditional on capital deepening, capture their impacts on TFP growth. The estimates indicate that institutional innovation drives economic growth primarily through improving productivity. Furthermore, adopting policies as a follower enhances productivity, though the estimated effect is smaller than that of pioneering economic reforms (0.0170 versus 0.0608).

To corroborate these findings, we employ an alternative approach by directly constructing TFP as a Solow residual following Brandt et al. (2008). We set the value of capital intensity to 0.5, consistent with China's average capital income share reported in the national accounts.

Table 2: Reform Policy Innovation, Adoption, and Economic Growth

Dependent Variable:	$\Delta \ln GDP$ *per worker*$_{p\tau}$ (1)	$\Delta \ln GDP$ *per worker*$_{p\tau}$ (2)	$\Delta \ln TFP_{p\tau}$ ($\alpha = 0.5$) (3)	$\Delta Investment$ *Rate*$_{p\tau}$ (4)
Policy Innovator$_{p\tau}$	0.0878***	0.0608**	0.0595**	0.0458*
	(0.0317)	(0.0287)	(0.0280)	(0.0229)
Policy Follower$_{p\tau}$	0.0077	0.0170**	0.0175**	-0.0384***
	(0.0105)	(0.0083)	(0.0080)	(0.0098)
$\Delta \ln$ *Capital per worker*$_{p\tau}$		0.4764***		
		(0.0592)		
Province Baseline Characteristics×Period	Y	Y	Y	Y
Province	Y	Y	Y	Y
Year	Y	Y	Y	Y
Observations	232	232	232	232
R-squared	0.7230	0.8007	0.7324	0.6354

Notes: Province baseline characteristics include: log employment in 1978, log GDP per capita in 1978, log capital per capita in 1978, a dummy indicating whether the province is in the coastal area, and a dummy variable indicating whether the province is a municipality. Robust standard errors are clustered at the province level. *** p<0.01, ** p<0.05, * p<0.1

Column (3) presents the results from re-estimating Equation (1) using this direct measure of TFP as the dependent variable. The estimated coefficients for both *Policy Innovator*$_{p\tau}$ and *Policy Follower*$_{p\tau}$ remain positive and significant, corroborating our findings from the specification in Column (2).

Column (4) examines the impact of reform policy innovation and adoption on the investment rate, defined as the ratio of investment in fixed capital to GDP. Our results reveal a contrasting pattern: while policy innovation increases the investment rate, followers who adopt these reforms exhibit lower investment rates. This finding suggests that the growth-stimulating effects of reforms may raise capital costs, thereby increasing the cost of capital for subsequent adopters.

3.1.2 Heterogeneous Effects: The Role of Bottom-Up Forces

To investigate how growth effects vary with the bottom-up intensity of economic reforms, we construct two weighted measures:

$$Bottom\text{-}Up\ Policy\ Innovator_{p\tau} = \sum_{i \in p} \sum_{q} Bottom\text{-}Up\ Index_q \times \frac{Pop_{i0}}{Pop_{p0}} \times Innovation_{i,q,\tau}, \quad (2)$$

$$Bottom\text{-}Up\ Policy\ Follower_{p\tau} = \sum_{i \in p} \sum_{q} Bottom\text{-}Up\ Index_q \times \frac{Pop_{i0}}{Pop_{p0}} \times Adoption_{i,q,\tau}. \quad (3)$$

These measures weight each reform by its bottom-up intensity. *Bottom-Up Policy Innova-*

$tor_{p\tau}$ takes larger values when provinces initiate more local policy innovations and when these innovations have stronger bottom-up components. Similarly, *Bottom-Up Policy Follower*$_{p\tau}$ increases with both the number and bottom-up intensity of adopted reforms.

We then estimate the extended model as follows:

$$\begin{aligned}\Delta \ln y_{p\tau} =& \alpha_1 \textit{Policy Innovator}_{p\tau} + \alpha_2 \textit{Bottom-Up Policy Innovator}_{p\tau} \\ &+ \beta_1 \textit{Policy Follower}_{p\tau} + \beta_2 \textit{Bottom-Up Policy Follower}_{p\tau} \\ &+ X'_{p0}\gamma_\tau + D_p + D_\tau + u_{p\tau}.\end{aligned} \tag{4}$$

The coefficients α_2 and β_2 capture how the growth effects of innovation and adoption vary with reforms' bottom-up intensity.

Table 3 presents the estimation results. Column (1) reveals that while reform policy innovation alone shows a positive but statistically insignificant effect on GDP per worker growth (α_1), its impact becomes substantial and significant when coupled with stronger bottom-up components (α_2). The economic magnitude is meaningful: when 10% of a province's population is exposed to reform policy innovation, a one-standard-deviation increase in the bottom-up reform index leads to 1.1% ($= 0.0838 \times 0.1 \times 1.312 \times 100$) higher GDP per worker growth. Bottom-up forces similarly amplify the benefits of reform adoption (β_2). When 10% of a province's population adopts a reform policy, a one-standard-deviation increase in the bottom-up reform index generates 0.4% ($= 0.0303 \times 0.1 \times 1.312 \times 100$) additional GDP per worker growth.

We examine reform's productivity effects through two approaches. Column (2) estimates the impacts on TFP by controlling for capital accumulation. The results indicate that reforms with stronger bottom-up components generate significantly larger productivity gains, whether implemented through innovation or adoption. However, the estimated effect is statistically smaller for reform followers compared to pioneers, suggesting that the benefits of bottom-up reforms attenuate as they diffuse.[14] This pattern aligns with the predictions of an innovation-diffusion process driven by bottom-up forces. Regions with higher potential returns are more likely to pioneer reforms, as they can better justify the substantial fixed costs and political risks. As reforms spread geographically, they reach regions where the underlying conditions are less suitable, resulting in diminishing policy returns.

Column (3) corroborates these findings using an alternative productivity measure–the Solow residua–as the dependent variable. The results consistently demonstrate the differential impacts of bottom-up reforms on TFP growth.

[14]When 10% of a province's population is exposed to a reform policy innovation with a *Bottom-Up Index*$_q$ = 1, the predicted productivity growth is 0.92% (calculated as $(0.0267 \times 0.1 + 0.0654 \times 0.1 \times 1) \times 100$). In contrast, when the same province acts as a policy adopter, the corresponding productivity growth is only 0.38% (calculated as $(0.0175 \times 0.1 + 0.0201 \times 0.1 \times 1) \times 100$).

Table 3: Reform Policy Innovation, Adoption, and Economic Growth: Heterogeneous Effects

Dependent Variable:	$\Delta \ln GDP$ *per worker*$_{p\tau}$ (1)	$\Delta \ln GDP$ *per worker*$_{p\tau}$ (2)	$\Delta \ln TFP_{p\tau}$ ($\alpha = 0.5$) (3)	Δ*Investment Rate*$_{p\tau}$ (4)
Policy Innovator$_{p\tau}$	0.0434	0.0267	0.0251	0.0749**
	(0.0348)	(0.0349)	(0.0349)	(0.0288)
Bottom-Up Policy Innovator$_{p\tau}$	0.0838***	0.0654**	0.0636**	-0.0497**
	(0.0297)	(0.0262)	(0.0260)	(0.0238)
Policy Follower$_{p\tau}$	0.0095	0.0175*	0.0182**	-0.0372***
	(0.0105)	(0.0085)	(0.0084)	(0.0083)
Bottom-Up Policy Follower$_{p\tau}$	0.0303**	0.0201**	0.0191*	-0.0021
	(0.0132)	(0.0095)	(0.0094)	(0.0102)
$\Delta \ln$ *Capital per worker*$_{p\tau}$		0.4561***		
		(0.0518)		
Province Baseline Characteristics×Period	Y	Y	Y	Y
Province	Y	Y	Y	Y
Year	Y	Y	Y	Y
Observations	232	232	232	232
R-squared	0.7691	0.8305	0.7691	0.6350

Notes: Province baseline characteristics include: log employment in 1978, log GDP per capita in 1978, log capital per capita in 1978, a dummy indicating whether the province is in the coastal area, and a dummy variable indicating whether the province is a municipality. Robust standard errors are clustered at the province level. *** p<0.01, ** p<0.05, * p<0.1

Column (4) examines the impact on investment rates. Reform policy innovation with limited bottom-up components stimulates investment, but this effect weakens significantly as bottom-up intensity increases. Reform adoption, consistent with the findings in Table 2, reduces the investment rate uniformly across reforms, regardless of their bottom-up components.

These results, when considered alongside those in Columns (1) through (3), reveal a distinct pattern: bottom-up reforms primarily drive GDP growth through TFP improvements, while centrally-sponsored policies operate mainly through investment rate increases. This contrast highlights the fundamentally different mechanisms through which bottom-up and centrally-sponsored reforms shaped China's growth experience during our study period.

While our analysis of growth, productivity, and capital accumulation effects has thus far relied on provincial-level data, we next validate our findings using two additional datasets at prefecture and county levels. This analysis not only corroborates the key insights from our growth regressions but also illuminates different aspects of the economic growth process during the reform era.

Table 4: Reform Policy Innovation, Adoption, and Firm Entry

Dependent Variable:	*Entries of Private Firms per Capita*$_{j\tau}$			*Entries of SOEs&COEs per Capita*$_{j\tau}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Policy Innovator$_{j\tau}$	0.3155***	0.3569***	0.0395*	0.0429	0.0389	-0.0418
	(0.1120)	(0.1002)	(0.0217)	(0.0413)	(0.0431)	(0.0517)
Bottom-Up Policy Innovator$_{j\tau}$		0.1452**	0.0337**		-0.0559**	-0.0484*
		(0.0680)	(0.0170)		(0.0223)	(0.0263)
Policy Follower$_{j\tau}$	0.0340**	0.0374**	0.0038	0.0095*	0.0115**	0.0025
	(0.0139)	(0.0147)	(0.0031)	(0.0051)	(0.0052)	(0.0025)
Bottom-Up Policy Follower$_{j\tau}$		0.0157*	0.0053*		0.0117**	0.0079**
		(0.0080)	(0.0029)		(0.0048)	(0.0038)
Prefecture Baseline Characteristics×Period	Y	Y	Y	Y	Y	Y
Province×Period	Y	Y	Y	Y	Y	Y
Prefecture	N	N	Y	N	N	Y
Observations	2,608	2,608	2,608	2,608	2,608	2,608

Notes: Poisson MLE models are used to estimate regressions across all columns. In Columns (1)-(3), the dependent variable is the number of domestic and foreign private firm entries per capita during period τ in prefecture j. In Columns (4)-(6), the dependent variable is the number of state-owned enterprise (SOE) and collectively-owned enterprise (COE) entries per capita during period τ in prefecture j. The control variables for baseline prefecture characteristics include the share of the population with college education or above, the share of the population with middle-school education, the share of employment in the agricultural sector, the share of employment in the industrial sector, log population, log agricultural and industrial output per capita, and log distance to the railway network. Robust standard errors are clustered at the province level. *** p<0.01, ** p<0.05, * p<0.1

3.2 Firm Entry: Prefecture-Level Evidence

A central channel through which reforms can drive economic growth is the stimulation of firm entry and entrepreneurship. Using prefecture-level firm registration data, we investigate how bottom-up reforms influence this extensive margin of economic activity. This investigation is especially pertinent given that China's economic transformation during the reform era was characterized by an unprecedented expansion of the private sector and extensive firm creation.

The wave of firm creation was propelled by multiple factors, particularly reforms that lowered entry barriers and enhanced potential returns. This surge in new firms contributed to total factor productivity growth through two distinct channels. First, new entrants exhibited above-average productivity levels and growth rates. Second, the exit of inefficient incumbent firms facilitated more productive resource reallocation. The magnitude of this effect was remarkable – Brandt et al. (2011) find that net entry accounted for over two-thirds of manufacturing TFP growth during 1998-2007. Building on these insights, we analyze how bottom-up reform innovations shaped firm entry patterns using prefecture-level firm registry data.

For our analysis, we construct a prefecture-level panel dataset using the Business Registry Database (detailed in Section 2.1.2). Following our province-level analysis framework, we organize the data into three-year periods spanning 1981 to 2004. Specifically, we link firm entries

in each prefecture during periods 1981-1983, 1984-1986, ..., 2001-2004 to policy innovation and adoption in the same prefecture during the one-year lagged periods 1980-1982, 1983-1985, ..., 2000-2003. The measurement of prefecture-level policy innovation and adoption follows the same methodology as our county-level measures specified in equations (8).

We then estimate the Poisson MLE model as follows:

$$Entries\ per\ Capita_{j\tau} = \exp\left(\alpha Policy\ Innovator_{j\tau} + \beta Policy\ Follower_{j\tau} + X'_{j0}\delta + D_{p\tau}\right) u_{jt}. \tag{5}$$

where j indexes prefectures, τ denotes time periods, and p represents provinces. The dependent variable measures new firm entries normalized by prefecture population. Policy Innovator$_{j\tau}$ and Policy Follower$_{j\tau}$ capture a prefecture's reform stance, X_{j0} includes initial prefecture characteristics, $D_{p\tau}$ represents province-by-period fixed effects, and $u_{j\tau}$ is the error term.

Table 4 presents our estimation results. In Column (1), where the dependent variable is private firm entries per capita, we find that both policy innovation and adoption positively influence firm entry, with policy innovation showing a substantially larger effect (coefficient of 0.3155) compared to policy adoption (coefficient of 0.0340).

To investigate the differential impacts driven by bottom-up forces, we incorporate two additional explanatory variables into Equation (5):

$$\begin{aligned} Bottom\text{-}Up\ Policy\ Innovator_{j\tau} &= \sum_q Bottom\text{-}Up\ Index_q \times Innovation_{j,q,\tau}, \\ Bottom\text{-}Up\ Policy\ Follower_{j\tau} &= \sum_q Bottom\text{-}Up\ Index_q \times Adoption_{j,q,\tau}. \end{aligned} \tag{6}$$

Column (2) reveals that reforms with higher bottom-up intensity generate stronger effects on private firm entry, both through innovation (coefficient of 0.1452) and adoption (coefficient of 0.0157). In Column (3), which maintains private firm entries per capita as the dependent variable but adds prefecture fixed effects, the positive relationship between bottom-up reforms and private firm entry persists, albeit with smaller magnitudes.

Columns (4)-(6) shift focus to entries of state-owned enterprises (SOEs) and collectively-owned enterprises (COEs) per capita as the dependent variable. In contrast to private firms, bottom-up policy innovation shows a negative association with SOE and COE entry (coefficient of -0.0559 in column 5), though policy follower maintains a modest positive effect (coefficient of 0.0117). This pattern holds even when prefecture fixed effects are added in column (6), where the dependent variable remains SOE and COE entries per capita.

Our findings reveal that prefectures with stronger bottom-up reform characteristics experience both higher private firm entry and lower SOE/COE entry in the reform era. Through the

lens of prior research documenting how firm entry – especially the entry of productive firms and exit of inefficient ones – drove aggregate TFP growth, these entry patterns suggest that bottom-up reforms enhanced productivity by facilitating more efficient market selection. This interpretation aligns with our province-level evidence that bottom-up reform intensity predicts higher TFP gains (Table 3).

3.3 Structural Transformation: County-Level Evidence

Having documented how bottom-up reforms shaped firm entry patterns in urban areas, we now examine their impact on another crucial aspect of China's economic transformation: the structural transformation from agriculture to non-agricultural sectors. To corroborate our earlier findings on the growth-enhancing effects of reform policy innovation and adoption at the province and prefecture levels, we analyze structural transformation patterns across counties as an additional indicator of productivity and income growth.

The use of structural transformation as a proxy for productivity and income growth is well-founded. First, the literature has established that high agricultural employment shares are strongly associated with low aggregate productivity Restuccia, Yang, and Zhu (2008), with changes in agricultural employment shares correlating with changes in TFP. Second, productivity growth can drive structural transformation through two channels: agricultural productivity improvements act as "push factors" that release labor from farming, while non-agricultural productivity gains serve as "pull factors" that draw workers into non-agricultural sectors. Additionally, given non-homothetic preferences, rising incomes tend to increase the relative demand for non-agricultural goods, further accelerating the reallocation of labor toward non-agricultural activities.

To analyze structural transformation, we employ county-level data from population censuses to construct agricultural employment shares over three periods: 1982-1990, 1990-2000, and 2000-2005. For the 2005 agricultural employment share, we use an imputation approach by averaging the shares observed in the 2000 and 2010 census years. To ensure comparability across periods, we rescale all variables to a decadal scale.[15]

We estimate a stacked first-difference model that relates the change in log agricultural employment share across these three periods to reform policy innovations and adoptions over respective one-year lagged periods:

$$\Delta \ln Share\ Agri_{i\tau} = \alpha Policy\ Innovator_{i\tau} + \beta Policy\ Follower_{i\tau} + X'_{i0}\gamma_\tau + D_{p\tau} + u_{i\tau}, \quad (7)$$

[15]This rescaling has minimal impact on our estimates of interest given that we control for period fixed effects in our analysis.

where $Policy\ Innovator_{i\tau}$ and $Policy\ Follower_{i\tau}$ represent the number of reform policy innovations and adoptions by county i in the one-year lagged period of τ. These measures are constructed as:

$$Policy\ Innovator_{i\tau} = \sum_{q} Innovation_{i,q,\tau} \quad \text{and} \quad Policy\ Follower_{i\tau} = \sum_{q} Adoption_{i,q,\tau}. \quad (8)$$

The model includes controls for time-varying effects of county-specific baseline characteristics (X_{i0}), comprising: the share of population with college education or above, the share with middle-school education, the share of employment in agricultural and industrial sectors, log population, log agricultural and industrial output per capita, and log distance to the railway network. We also include province-period fixed effects ($D_{p\tau}$). Standard errors are clustered at the province level.

To examine the differential impacts driven by bottom-up forces, we extend the baseline model by incorporating additional explanatory variables, which are analogous to Equation (6), into Equation (7):

$$\begin{aligned} Bottom\text{-}Up\ Policy\ Innovator_{i\tau} &= \sum_{q} Bottom\text{-}Up\ Index_q \times Innovation_{i,q,\tau}, \\ Bottom\text{-}Up\ Policy\ Follower_{i\tau} &= \sum_{q} Bottom\text{-}Up\ Index_q \times Adoption_{i,q,\tau}. \end{aligned} \quad (9)$$

The estimation results are reported in Table 5. Column (1) shows that counties with more reform policy innovations experience faster declines in agricultural employment share, consistent with the findings presented in Table 2 that policy innovation positively correlates with GDP and TFP growth. Column (2) reveals that structural transformation accelerates even faster when innovations involve policies with stronger bottom-up components. As a robustness check, in Columns (3) and (4), we exclude the data from 2005, where the agricultural employment share is imputed and may be subject to inaccuracies. The estimation results remain consistent.

While adopting reform policies as followers appears to slow structural transformation, as shown in Columns (1) and (2), this effect is smaller in magnitude and not always statistically significant, as demonstrated in Columns (3) and (4).

Our findings suggest that policy innovations accelerate structural transformation by reducing agricultural employment share. Furthermore, the stronger effects we observe for bottom-up policy innovations at the county level mirror our earlier findings that bottom-up reform initiatives are more strongly associated with TFP growth. This consistency across different administrative hierarchies suggests that the growth-enhancing effects of policy innovation, particularly

Table 5: Reform Policy Innovation, Adoption, and Structural Change

Dependent Variable:	$\Delta \ln Share\ Agri_{i\tau}$			
Sample:	82-90,90-00,00-05		82-90,90-00	
	(1)	(2)	(3)	(4)
Policy Innovator$_{i\tau}$	-0.0551**	-0.0544**	-0.0550**	-0.0544**
	(0.0230)	(0.0219)	(0.0229)	(0.0217)
Bottom-Up Policy Innovator$_{i\tau}$		-0.0185*		-0.0193*
		(0.0095)		(0.0098)
Policy Follower$_{i\tau}$	0.0022**	0.0018*	0.0020	0.0016
	(0.0010)	(0.0011)	(0.0020)	(0.0021)
Bottom-Up Policy Follower$_{i\tau}$		-0.0031		-0.0051*
		(0.0021)		(0.0029)
County Baseline Characteristics×Period	Y	Y	Y	Y
Province×Period	Y	Y	Y	Y
Observations	6,806	6,806	4,539	4,539
R-squared	0.2872	0.2879	0.1798	0.1814

Notes: Columns (1)-(2) stack the first differences for three periods: 1982-1990, 1990-2000, and 2000-2005, while Columns (3)-(4) stack the first differences for two periods: 1982-1990 and 1990-2000. The control variables for baseline county characteristics include the share of the population with college education or above, the share of the population with middle-school education, the share of employment in the agricultural sector, the share of employment in the industrial sector, log population, log agricultural and industrial output per capita, and log distance to the railway network. Robust standard errors are clustered at the province level. *** p<0.01, ** p<0.05, * p<0.1

those with bottom-up characteristics, are robust. Both structural transformation and firm entry represent key aspects of China's growth during the reform era, making their examination crucial for understanding the mechanisms through which policy innovations drive productivity growth.

3.4 Mechanisms and Robustness

Our analysis in Sections 3.1-3.3 draws on diverse datasets across different administrative levels, revealing a consistent pattern: China's productivity growth during the reform period is associated with reform policy innovations, especially those with bottom-up characteristics. This section examines the mechanisms underlying these correlations and presents a series of tests to address potential reverse causality concerns.

Although our regression analyses incorporate a comprehensive set of fixed effects and time-varying effects of regional initial characteristics, concerns about reverse causality may persist. Specifically, regions experiencing faster growth might have both stronger demand for economic reforms and better capacity to initiate or participate in policy experimentation, as well as to adopt and implement new reform policies. In Appendix B.3, we conduct a series of Granger

tests relating our outcomes of interest to future reform policy innovation and adoption. As shown in Tables B.4, B.6 and B.8, our baseline findings regarding GDP and TFP growth, structural change, and firm entry are not driven by region-specific pre-determined trends.

While we do not claim causal interpretation of the estimates in Tables 2 to 4, we propose several mechanisms that may account for the observed stronger growth effects of bottom-up policy innovation and diffusion.

First, unlike centrally-sponsored experiments, local governments and entrepreneurs possess informational advantages that enable them to initiate reforms better suited to address region-specific distortions, thus enhancing local productivity growth. Similarly, our findings in Section 4.2 indicate that counties are more likely to adopt reform policies aligned with local conditions when the diffusion process is less centralized. This alignment may explain the stronger growth effects observed from bottom-up policy diffusion.

Second, since bottom-up reforms carry higher political risks compared to centrally sponsored policy experiments, bottom-up policy innovators and early adopters tend to be those who anticipate greater benefits from institutional changes. This selection process may explain why early adopters of bottom-up reforms achieve stronger productivity gains than later followers.

While we cannot separate these mechanisms in our study, we emphasize that bottom-up policy innovations generate an independent source of reform ideas, complementing those conceived and implemented by central policymakers. More importantly, these bottom-up innovations tend to be more effective in enhancing TFP and promoting economic growth.

In Appendix B.3, we perform additional robustness checks to demonstrate that the baseline findings in Sections 3.1-3.2 remain consistent across alternative measurements and specifications. In particular, we employ the alternative measures of policy innovation and adoption that are constructed based on the method combining machine learning and manual annotation. We also adopt an IV strategy that uses these alternative measures as instruments for the corresponding variables derived from the keyword matching approach. To the extent that measurement errors associated with different textual analysis methods are independent, this strategy helps to mitigate potential attenuation bias.

4 Innovators and Diffusion

Having examined the differential impacts of bottom-up and top-down reforms, two critical questions remain: (1) why bottom-up reforms emerged in specific locations, and (2) how they spread across different regions. In this section, we provide suggestive evidence on both the local conditions that enabled reform initiatives to take root and the key factors that facilitated their

diffusion across localities.

4.1 Innovators of the Reform Policies

We begin by examining the characteristics of reform policy innovators–counties that pioneered specific reforms. Our analysis considers a set of county-level characteristics that could potentially determine policy innovation. These characteristics include education levels, measured by the shares of population with college education and with middle/high school education; economic structure, captured by employment shares in agricultural and industrial sectors; economic size, measured by log population; infrastructure access, indicated by log distance to railway; fiscal capacity, shown by log fiscal revenue; economic development, measured by log per capita agricultural and industrial output; and geographic location, indicated by a coastal province indicator.

Column (1) of Table 6 examines determinants of reform innovation by regressing $Innovator_{i,q}$ on key county characteristics. Our findings reveal that counties with a higher share of college-educated workers, larger populations, and greater agricultural and industrial output per capita are more likely to be innovators, highlighting the crucial role of human capital and economic scale in reform innovation. This pattern aligns with the fixed-cost theory of policy innovation (Mulligan and Shleifer, 2005; DellaVigna and Kim, 2022). Notably, local industry composition and fiscal capacity show no significant relationship with reform innovation.

We find no correlation between coastal location and policy innovation, consistent with the stylized facts and anecdotes presented in Sections 2.2 and 2.4. This geographic pattern likely reflects the diverse nature of China's economic reforms during 1976-2005, where different regions faced varying potential gains and comparative advantages across policy domains. Such diversity in reform opportunities explains why innovations emerged across varied geographic and industrial contexts, rather than concentrating in coastal areas.

In Column (2), we introduce province and reform fixed effects to base our estimation on within-province and within-reform variations, finding our results remain robust. Column (3) further explores potential heterogeneity by interacting county characteristics with the bottom-up reform index to test for systematic differences between innovators of bottom-up versus centrally-sponsored reforms. The significant negative interaction between the bottom-up index and fiscal revenue reveals that fiscally stronger counties were less likely to initiate bottom-up reforms, suggesting that higher fiscal capacity may actually discourage local experimentation when reforms require local initiatives.

A particularly striking finding emerges regarding geographic isolation: counties more distant from railway networks–a key proxy for remoteness in 1980s China–demonstrate a higher

Table 6: Characteristics of Reform Policy Innovators

Dependent Variable: $Innovator_{i,q}$	(1)	(2)	(3)
$Share\ College\ or\ above_i$	0.0158**	0.0109	0.0109
	(0.0061)	(0.0066)	(0.0066)
$Bottom\text{-}Up\ Index_q \times Share\ College\ or\ above_i$			0.0025
			(0.0020)
$Share\ Middle\ \&\ High\ School_i$	-0.0021	-0.0004	-0.0004
	(0.0038)	(0.0044)	(0.0044)
$Bottom\text{-}Up\ Index_q \times Share\ Middle\ \&\ High\ School_i$			0.0024
			(0.0016)
$Share\ Agri_i$	-0.0295	-0.0396	-0.0396
	(0.0249)	(0.0280)	(0.0280)
$Bottom\text{-}Up\ Index_q \times Share\ Agri_i$			0.0053
			(0.0064)
$Share\ Ind_i$	-0.0257	-0.0328	-0.0328
	(0.0225)	(0.0244)	(0.0244)
$Bottom\text{-}Up\ Index_q \times Share\ Ind_i$			0.0040
			(0.0046)
$Log\ Pop_i$	0.0263***	0.0262***	0.0262***
	(0.0078)	(0.0068)	(0.0068)
$Bottom\text{-}Up\ Index_q \times Log\ Pop_i$			0.0024
			(0.0019)
$Log\ Dist.\ to\ Railway_i$	0.0029**	0.0029***	0.0029***
	(0.0012)	(0.0010)	(0.0010)
$Bottom\text{-}Up\ Index_q \times Log\ Dist.\ to\ Railway_i$			0.0014***
			(0.0005)
$Log\ Fiscal\ Revenue_i$	-0.0031	-0.0014	-0.0014
	(0.0070)	(0.0045)	(0.0045)
$Bottom\text{-}Up\ Index_q \times Log\ Fiscal\ Revenue_i$			-0.0025**
			(0.0012)
$Log\ Agri\ \&\ Ind\ Output\ per\ capita_i$	0.0113*	0.0106**	0.0106**
	(0.0057)	(0.0049)	(0.0049)
$Bottom\text{-}Up\ Index_q \times Log\ Agri\ \&\ Ind\ Output\ per\ capita_i$			0.0019
			(0.0018)
coast	0.0007		
	(0.0077)		
Province FEs	N	Y	Y
Reform FEs	N	Y	Y
Observations	56,750	56,750	56,750
R-squared	0.0648	0.0833	0.0842

Notes: All regressions are weighted by county population in 1982. Robust standard errors are clustered at the province level. *** p<0.01, ** p<0.05, * p<0.1

propensity for policy innovation. This relationship is especially pronounced for bottom-up reforms, as shown by the significant interaction between the bottom-up index and railway distance ($Bottom\text{-}Up\ Index_q \times Log\ Dist.\ to\ Railway_i$) in Column (3). The results suggest that remoteness provided local governments with a strategic advantage in reform experimentation

by reducing visibility and political risk, particularly valuable when initiating bottom-up reforms without central sponsorship and thus facing higher political costs.

To confirm the robustness of our findings, we use the alternative bottom-up index constructed from machine learning and manual annotation. We also employ this alternative measure as an instrument for our baseline keyword-matching index to address potential attenuation bias from measurement error. The results are collected in Table B.1 of the Appendix, with details provided in Appendix B.1, confirming our main findings.

While our analysis above suggests that geographic remoteness shields counties from scrutiny and reduces political risks of policy innovations, we now examine a more direct measure of political oversight: the level of attention counties received from the central government. This investigation is motivated by the observation that political visibility and oversight from central authorities significantly influence the risks associated with policy innovation.

To examine this channel, we analyze inspection visits by Politburo Standing Committee (PSC) members–China's highest political leadership.[16] These visits typically carried substantial policy implications.[17] Data on these high-level visits come from our county-level major events dataset described in Section 2.1.[18]

Using a Poisson event study framework that tracks PSC visits three years before and after reform innovations, we uncover distinct patterns across reform types that reveal the strategic interactions between central and local governments. For centrally-sponsored reforms, we find increased visits both before and during innovation–consistent with top-down experimental site selection–followed by evaluation visits two years later. In contrast, bottom-up reforms show significantly reduced PSC visits before and during innovation, suggesting that reduced central attention may provide local governments with greater latitude for policy experimentation. This pattern reverses two years post-innovation with increased visits, likely reflecting both inspection and implicit approval of successful reforms. These findings highlight how political visibility shapes reform incentives: while central scrutiny facilitates top-down experiments, the ability to initiate reforms under lower oversight may be crucial for bottom-up innovation. All details of the analysis and results are presented in Appendix B.4.

[16]The PSC includes the CCP General Secretary, State Council Premier, and other top leaders. Our sample covers the 11th to 16th Central Committees, when membership ranged from five to nine individuals.

[17]The visits of national political leaders carried significant policy implications in China's political system, as exemplified by the SOE privatization reforms in Zhucheng, Shandong province. In 1992, facing mounting fiscal pressures from underperforming state enterprises, this county-level city took the bold step of selling numerous SOEs to their employees, despite privatization being unconstitutional at the time. The reform initiative faced widespread criticism and uncertainty until Premier Zhu Rongji's 1996 inspection visit, during which he explicitly approved Zhucheng's approach. This high-level endorsement proved pivotal, as the central government formally sanctioned SOE privatization nationwide in 1997, marking Zhucheng's experiment as a pioneering reform model.

[18]See Appendix A.5 for details on the extraction of PSC visit records.

Remoteness and Bottom-Up Reforms Our results paint a consistent picture: innovators of bottom-up reforms were typically politically peripheral counties, where limited central oversight created space for risky reform initiatives. Remote counties, despite their distance from economic centers, became important sources of reform innovation precisely because their political costs were lower. This advantage emerged in an environment where the political climate shifted toward market reform but uncertainty remained about the central leadership's tolerance limits. These findings suggest that remoteness, while often viewed as a constraint, actually fostered reform innovation by providing political space for local experimentation?especially during periods of ambiguous central policy stance.

4.2 Spatial Diffusion of the Reform Policies

This section examines the factors driving reform diffusion. Drawing on studies of policy innovations and their spread (e.g., Mukand and Rodrik, 2005; Buera et al., 2011; Besley and Case, 1995; Mulligan and Shleifer, 2005; Bernecker et al., 2021; DellaVigna and Kim, 2022), we focus on two key channels: exposure and suitability.

First, to operationalize the exposure channel in Equation (12), we measure county i's exposure to reform q in year t as:

$$\Lambda_{iqt} = \sum_{j} \frac{(Dist_{ij})^{-1} \cdot Pop_{j0}}{\sum_{j'} (Dist_{ij'})^{-1} \cdot Pop_{j'0}} \mathbf{1}(j \in \Omega_{q,t-1}), \tag{10}$$

where $\Omega_{q,t-1}$ denotes counties that adopted reform q by year $t-1$. Each early adopter is weighted by its inverse distance ($Dist_{ij}^{-1}$) and baseline population (Pop_{j0}). Higher Λ_{iqt} indicates greater reform exposure through spatially proximate and populous early adopters, enabling potential adopters to better assess reform returns and political costs.

Second, to measure the suitability channel, we compute county i's similarity to the average early adopter of reform q as:

$$Sim^{Avg}_{i,\Omega_{q,t-1}} = -\frac{1}{K} \sum_{k} \left[\frac{1}{N_{q,t-1}} \sum_{j \in \Omega_{q,t-1}} \left| x^k_{i0} - x^k_{j0} \right| \right], \tag{11}$$

where x^k_{i0} denotes county i's standardized baseline characteristic k. The K characteristics include education (college and secondary shares), employment (agricultural and industrial shares), population size (log), and per capita output (log of agricultural and industrial). $N_{q,t-1}$ denotes the number of early adopters in set $\Omega_{q,t-1}$. Higher $Sim^{Avg}_{i,\Omega_{q,t-1}}$ indicates greater similarity between county i and previous adopters, suggesting higher reform suitability.

To study the spatial diffusion of the key reforms, we follow DellaVigna and Kim (2022) and estimate a harzard model of diffusion. For each reform, the estimation sample starts in the first year when at least 5 counties have adopted the reform, and concludes five years post the final endorsement of the reform by the central government. Specifically, for all counties labeled as i that have yet to adopt reform q by year t, we employ a logit specification to model the discrete-choice decision pertaining to reform adoption:

$$\ln\left(\frac{P(Y_{iqt}=1)}{1-P(Y_{iqt}=1)}\right) = \alpha\Lambda_{iqt} + \beta Sim_{i,\Omega_{q,t-1}} + X'_{i0}\gamma + D_{rq} + D_{qt} + D_{rt} + \varepsilon_{iqt}, \tag{12}$$

where Y_{iqt} indicates whether county i adopted reform q in year t. Λ_{iqt} and $Sim_{i,\Omega_{q,t-1}}$ measure exposure and suitability channels, respectively. X_{i0} contains county i's baseline characteristics. The fixed effects include region-reform (D_{rq}), reform-year (D_{qt}), and region-year (D_{rt}) dummies, with regions comprising East Coast, Central, Northeast, and Western areas. D_{rq} controls for region-specific reform propensities, D_{qt} absorbs nationwide reform shocks, and D_{rt} captures region-specific implementation capacity over time. Standard errors are clustered at the province level to account for spatial and policy correlations.

Table 7 presents the estimation results. Column (1) shows that both exposure and suitability channels significantly predict reform adoption. A one-standard-deviation increase in reform exposure (λ_{iqt}) raises the hazard rate by 47.8 log points ($0.1851 \times 2.5846 \times 100$), while a one-standard-deviation increase in reform suitability ($Sim^{Avg}_{i,\Omega_{q,t-1}}$) increases the hazard rate by 26.2 log points ($0.422 \times 0.6198 \times 100$).

Column (2) examines how exposure and suitability effects vary with reforms' bottom-up indices. For the exposure channel, theoretical predictions are ambiguous. In reforms with high bottom-up indices, learning from peers may be more important as local governments actively seek information from early adopters. However, in centrally-sponsored experiments, higher exposure often signals stronger central directives, potentially amplifying peer effects in reforms with low bottom-up indices. Empirically, the interaction term $Bottom\text{-}Up\ Index_q \times \Lambda_{iqt}$ is positive but insignificant, suggesting these opposing forces may offset each other.

For the suitability channel, the interaction term ($Bottom\text{-}Up\ Index_q \times Sim^{Avg}_{i,\Omega_{q,t-1}}$) is positive and significant at the 1% level. This indicates that local conditions more strongly influence adoption decisions when reforms originate from local initiative rather than central mandate. This feature of bottom-up reforms may enhance their effectiveness: when counties select reforms based on local suitability, they are more likely to implement them successfully and realize intended economic benefits, compared to adoption driven primarily by central directives regardless of local conditions.

Columns (3)-(4) strengthen our findings by including region-reform-year fixed effects. These

Table 7: Spatial Diffusion of Reforms

Dependent Variable: $Y_{iqt} = 1$	(1)	(2)	(3)	(4)
Λ_{iqt}	2.5846***	2.6206***	3.5886***	3.6125***
	(0.6981)	(0.6923)	(0.6009)	(0.5972)
$Bottom\text{-}Up\ Index_q \times \Lambda_{iqt}$		0.5799		0.4930
		(0.3901)		(0.4367)
$Sim^{Avg}_{i,\Omega_{q,t-1}}$	0.6198***	0.6049***	0.9883***	0.4467***
	(0.0833)	(0.0833)	(0.0923)	(0.0911)
$Bottom\text{-}Up\ Index_q \times Sim^{Avg}_{i,\Omega_{q,t-1}}$		0.0697***		0.0663***
		(0.0148)		(0.0147)
County Baseline Characteristics	Y	Y	Y	Y
Region×Reform FEs	Y	Y	N	N
Reform×Year FEs	Y	Y	N	N
Region×Year FEs	Y	Y	N	N
Region×Reform×Year FEs	N	N	Y	Y
Observations	587,004	587,004	557,255	557,255

Notes: County baseline characteristics include: share of population with college degree or above, share of population with middle- or high-school education, share of employment in the agricultural sector, share of employment in the industrial sector, log population, and log agricultural and industrial output per capita. All these measures are constructed using data from the 1982 Population Census. For each year t, the sample is restricted to counties that have not yet adopted reform q. For each reform, the estimation sample starts in the first year when at least 5 counties have adopted the policy, and concludes five years post the final endorsement of the reform by the central government. Robust standard errors are clustered at the province level. *** p<0.01, ** p<0.05, * p<0.1

controls absorb region-reform-specific baseline hazard rates by year, accounting for unobserved region-specific shocks that might affect reform adoption. The estimates remain stable under this more demanding specification, reinforcing their robustness.

We have conducted additional heterogeneity analyses and performed a series of checks to establish the robustness of our findings. While the full details are reported in Appendix B.2, we summarize the key highlights below.

In the baseline analysis, we construct the measures of reform exposure and similarity based on the set of early adopters across the country. In Column (1) of Table B.2, we replace Λ^{iqt} and $Sim^{Avg}_{i,\Omega_{q,t-1}}$ with their within-province and outside-province counterparts, and re-estimate the hazard model. Specifically, the within-province version of Λ_{iqt} quantifies the exposure to early adopters inside the province where i is situated, while the outside-province version captures exposure to adopters in other provinces. Similarly, the within-province counterpart of $Sim^{Avg}_{i,\Omega_{q,t-1}}$ measures the similarity to early adopters within the province where i is located, while the outside-province version reflects similarity to adopters elsewhere. Our findings indicate that the estimated coefficient for similarity with early adopters outside the province is significantly

larger compared to that with early adopters within the province.

In Columns (2)-(4), we separately estimate the specification for each of the three decades in our sample: 1976-1985, 1986-1995, and 1996-2005. The effect of the suitability channel declines monotonically over time, yet remains significantly positive throughout the entire period. This finding echoes the pattern observed in Figure A.3, which shows that the bottom-up index has declined over time.

We have conducted a battery of additional checks, including: (i) contrasting the differences in the diffusion process for bottom-up versus centrally-sponsored reforms using a less parametric approach, which classifies the reforms into three groups based on whether the bottom-up index falls in the top quartile, the middle two quartiles, or the bottom quartile (Figure B.3); (ii) adopting an alternative measure of similarity that emphasizes the influence of early adopters that bear the most resemblance (Panel A of Table B.3); (iii) estimating a linear probability model instead of a logit model (Panel C of Table B.3); and (iv) using measures of Y_{iqt}, Λ_{iqt} and $Sim_{i,\Omega_{q,t-1}}$ constructed through an alternative textual analysis approach, which combines machine learning techniques with manual annotation as described in Section 2.3. It is reassuring that our baseline results remain stable across these alternative specifications and measurements.

Suitability, Bottom-Up Reforms, and TFP Our results paint a coherent picture: bottom-up reforms, whose diffusion relies heavily on local suitability, generate stronger TFP gains than top-down directives. When local governments evaluate reforms based on suitability to local conditions, they have stronger incentives for implementation and achieve better economic outcomes. Local governments that find productivity-enhancing reforms suitable for their localities–such as measures to reduce economic frictions and wedges–are more likely to adopt them, aligning with the observed TFP improvements. This suitability-driven diffusion process serves as an effective selection mechanism, matching reforms with localities where they can generate the larger productivity gains–a key feature that distinguishes bottom-up from top-down reforms.

5 Conclusion

China's reform-era policymaking is often portrayed as a centrally directed process, following a "proceeding from point to surface" experimental approach (Heilmann, 2008a,b; Xu, 2011; Wang and Yang, 2024). In this narrative, central leadership controlled reform blueprints while delegating implementation to local governments. Our findings reveal a contrasting view in which bottom-up initiatives emerged as the driving force. As political tolerance grew and ideological constraints weakened, decentralized policy innovations emerged organically. Local governments,

particularly those insulated from political risks, became independent sources of policy experimentation. Bottom-up reforms that introduced market mechanisms and reduced distortions spread, as localities learned their suitability for local conditions. These bottom-up reforms drove GDP growth primarily through enhanced aggregate productivity. Our study thus provides an alternative narrative of China's reform success, highlighting how decentralized experimentation and spontaneous policy diffusion shaped the country's economic transformation.

These findings raise two important questions: (i) If the central government had dismissed bottom-up policy innovations, how much economic growth would have occurred during the reform period? (ii) With the recentralization of power to upper-level governments (Martinez-Bravo et al., 2022), the rise of top-down industrial policies (Zhu, 2024), and declining incentives for local governments to initiate policy experiments (Xu, 2022), the supply of bottom-up reforms has diminished over the past decade. What implications might these institutional changes have for China's recent economic slowdown? We leave these quantitative analyses to future research.

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Appendix

A Data Appendix

A.1 Missing Status of Local Gazetteers and County Characteristics

A potential concern is that some counties are not covered by our dataset, and hence the sample is not nationally representative, especially in the later years when geographic coverage is lower (Figure 1). To investigate this issue, in Figure A.1, we relate the missing status of a county in a given year to different county characteristics. Specifically, the dependent variable is an indicator that equals 1 if no event is recorded for the county in a given year, and 0 otherwise. To facilitate the interpretation, we standardize the estimates using the standard deviation of the independent variable. Most of the standardized coefficients are statistically indifferent from zero. For the significant estimates, their economic magnitude is small. For example, we find that a one standard deviation increase in the share of the population with a high school education or above is associated with at most a 2% higher likelihood that the county is missing in our data. These findings suggest that the incomplete geographic coverage is unlikely to significantly undermine the national representativeness of our data.

A.2 Keywords

In this appendix, we list the keywords selected for each policy in Table 1. The keywords are provided in Chinese, along with their English translations (sourced from ChatGPT 4.0).

– Household Responsibility System

- Events are flagged as 1 when the following keywords are present:
  '联产承包、包产到户、包干到户、生产责任制、定额计酬、分田到户、包群到户、大包干、联产到劳、包产到劳、小段包工、联产计酬、包产到组、联产到组、包干到组、承包&地、承包&耕、承包&田、承包&林、承包&水面、承包&塘、承包&果、承包&山、承包&牧、承包&渔、承包&畜、承包&禽、承包&树、承包&家庭、承包&农村、承包&农业、承包&农户、承包&农民、包养到户、三包一奖' (Joint production contract, household responsibility system, household contract responsibility system, production responsibility system, quota-based remuneration, allocation of land to households, group contract to households, large-scale contract system, joint production tied to labor, production contracts tied to labor, small-section contract work, joint production remuneration, production contracts to groups, joint production

to groups, contract responsibility to groups, land contracting, cultivation contracting, field contracting, forest contracting, water surface contracting, pond contracting, orchard contracting, mountain contracting, pasture contracting, fishery contracting, livestock contracting, poultry contracting, tree contracting, household contracting, rural contracting, agricultural contracting, farmer household contracting, farmer contracting, rearing to households, three contracts and one reward)

- The above events are re-flagged as 0 in the following cases:
  - Containing the '承包责任制 or 经济责任制 or 联产计酬 (contract responsibility system, or economic responsibility system, or quota-based remuneration), excluding '农牧业 & 农业 & 农村 & 农户' ('farming and animal husbandry & agriculture & rural areas & and farmer households'), but including '企业 or 厂 or 商业' ('enterprises, or factories, or commerce')
  - Containing '纠正 or 打击' ('correction or crackdown') ;
  - Containing '安全生产" ("safety production')

– **Development of Individual Economy**

- Events are flagged as 1 when the following keywords are present:
  '个体' (Individual)

– **Substitution of Profit with Taxes**

- Events are flagged as 1 when the following keywords are present:
  '以税代利、利改税、利税改革、利（润）改税（收）、"利"改"税"、税&交利润&without偷税、税&缴利润&without偷税、利润制&税收制、交利&交税' (Replacing profit with tax, converting profit to tax, profit and tax reform, converting profit (earnings) to tax (revenue), replacing 'profit' with 'tax', tax & pay profit & without tax evasion, tax & remit profit & without tax evasion, profit system & tax system, paying profit & paying tax)

– **Importing Tech and Complete Sets of Euip**

- Events are flagged as 1 when the following keywords are present:
  '引进&国外，引进&外国，引进&技术&外资，采用&技术&国外，采用&技术&外国，采用&技术&外资，利用&技术&国外，利用&技术&外国，利用&技术&外资，引进&设备&外资，采用&设备&国外，采用&设备&外国，购买&设备&国外，购买&设备&外国，进口&设备，进口&技术，引进&（美国、日本、德国、法国、英国、瑞士、瑞典、澳大利亚、加拿大、荷兰、丹麦、意大利、比利时、奥地利、西班牙、西德），技术&洽谈&（美国、日本、

德国、法国、英国、瑞士、瑞典、澳大利亚、加拿大、荷兰、丹麦、意大利、比利时、奥地利、西班牙、西德），技术&合同&（美国、日本、德国、法国、英国、瑞士、瑞典、澳大利亚、加拿大、荷兰、丹麦、意大利、比利时、奥地利、西班牙、西德），设备&洽谈&（美国、日本、德国、法国、英国、瑞士、瑞典、澳大利亚、加拿大、荷兰、丹麦、意大利、比利时、奥地利、西班牙、西德），设备&合同&（美国、日本、德国、法国、英国、瑞士、瑞典、澳大利亚、加拿大、荷兰、丹麦、意大利、比利时、奥地利、西班牙、西德）' (Introduction & foreign, introduction & foreign country, introduction & technology & foreign capital, adoption & technology & foreign, adoption & technology & foreign country, adoption & technology & foreign capital, utilization & technology & foreign, utilization & technology & foreign country, utilization & technology & foreign capital, introduction & equipment & foreign capital, adoption & equipment & foreign, adoption & equipment & foreign country, purchase & equipment & foreign, purchase & equipment & foreign country, import & equipment, import & technology, introduction & (USA, Japan, Germany, France, UK, Switzerland, Sweden, Australia, Canada, Netherlands, Denmark, Italy, Belgium, Austria, Spain, West Germany), technology & negotiation & (USA, Japan, Germany, France, UK, Switzerland, Sweden, Australia, Canada, Netherlands, Denmark, Italy, Belgium, Austria, Spain, West Germany), technology & contract & (USA, Japan, Germany, France, UK, Switzerland, Sweden, Australia, Canada, Netherlands, Denmark, Italy, Belgium, Austria, Spain, West Germany), equipment & negotiation & (USA, Japan, Germany, France, UK, Switzerland, Sweden, Australia, Canada, Netherlands, Denmark, Italy, Belgium, Austria, Spain, West Germany), equipment & contract & (USA, Japan, Germany, France, UK, Switzerland, Sweden, Australia, Canada, Netherlands, Denmark, Italy, Belgium, Austria, Spain, West Germany))

- The above events are re-flagged as 0 in the following cases:
  - Containing '牛、猪、羊、兔、鸡、鸭、品种、鱼、种植、树、菜、种子、胚、种子、饲养、良种、培育、试种、优良' (Cow, pig, sheep, rabbit, chicken, duck, breed, fish, planting, tree, vegetable, seed, embryo, breeding, good breed, cultivation, trial planting, high-quality)

– **Developing Township and Village Enterprises**

- Events are flagged as 1 when the following keywords are present:
'镇企业、乡镇企业、社队企业、乡镇集体企业、乡镇集体工业、乡镇办企业、乡镇工业、村办企业、乡村企业、乡镇&社队、户办企业、联户办&企业、乡镇属企业、乡镇街道企业、乡办企业、"乡镇、街道企业"、"乡镇、区街企业"、乡镇股份制、乡镇集体股份制、乡镇承办企业、乡镇集体、镇村企业、"乡镇、县属企业"、乡镇办的&厂、乡镇办的&企业、乡镇所属&企

业、乡镇重点企业、乡镇骨干企业、乡镇"明星企业"、乡企' (Town enterprise, township enterprise, commune and brigade enterprise, township collective enterprise, township collective industry, township-run enterprise, township industry, village-run enterprise, rural enterprise, township & commune, household-run enterprise, joint household-run & enterprise, township-affiliated enterprise, township street enterprise, township-run enterprise (xiangban qiye), "township, street enterprise", "township, district street enterprise", township shareholding system, township collective shareholding system, township-run enterprise (xiangzhen chengban qiye), township collective, town and village enterprise, "township, county-affiliated enterprise", township-run & factory, township-run & enterprise, township-affiliated & enterprise, key township enterprise, backbone township enterprise, township "star enterprise", township enterprise)

– **Rural Financial Reform**

- Events are flagged as 1 when the following keywords are present:
'信用社&浮动、信用社&自负盈亏、信用社&改革、信用社&民主、信用社&民办、信用社&民间、信用社&选举、信用社&入股、信用社&扩股、信用社&成立、信用社&承包经营、信用社&经营承包、信用&联合社、信用&合作社、信用&联社、农村&金融改革、农村金融&改革、信用合作、合作基金会、民间信用、民间借贷' (Credit union & floating, credit union & self-financing, credit union & reform, credit union & democratic, credit union & private, credit union & non-governmental, credit union & election, credit union & shareholding, credit union & expanding shares, credit union & establishment, credit union & contracted management, credit union & management contract, credit & joint cooperative, credit & cooperative, credit & cooperative association, rural & financial reform, rural financial & reform, credit cooperation, cooperative foundation, non-governmental credit, private lending)

- The above events are re-flagged as 0 in the following cases:

  - Containing '城市' (City)

– **Wage System Reform**

- Events are flagged as 1 when the following keywords are present:
'按劳分配、行政级别工资、工资制度改革、工资改革、工资浮动、浮动工资、工资分配&放开、工资分配&权、计件工资、结构工资、效益工资制、记件工资、工资&浮动&固定、工资&浮动&效益、工资&浮动&指标、奖金&挂钩、工资&挂钩、工资&浮动&试行、工资&浮动& 实行、计件付酬、按劳取酬、工资奖励、工效挂钩' (Distribution according to work, administrative level salary, salary system reform, salary reform, salary fluctuation, floating salary, salary distribution & liberalization, salary distribution & rights, piecework salary, structural

salary, benefit-based salary system, piece-rate salary, salary & fluctuation & fixed, salary & fluctuation & benefits, salary & fluctuation & indicators, bonus & linked, salary & linked, salary & fluctuation & trial, salary & fluctuation & implementation, piecework remuneration, remuneration according to work, salary rewards, work efficiency linked)

- The above events are re-flagged as 0 in the following cases:
  - Containing '公社、生产队、农村、农业、社员、包产到户、包产到组' (Commune, production team, rural, agriculture, member, household responsibility system, group responsibility system)

– **Horizontal Economic Cooperation**

- Events are flagged as 1 when the following keywords are present:
'经济联合、联合经营、联合体、推动联合、横向联合、联合企业、横向协作' (Economic union, joint operation, union, promoting union, horizontal union, joint enterprises, horizontal cooperation)

– **Urban Credit Cooperative Development**

- Events are flagged as 1 when the following keywords are present:
'信用合作、信用社、信用联社、信用联合社、信用中心合作社、金融服务社、金融服务部&市、市商业银行、城市合作银行' (Credit cooperation, credit union, credit cooperative association, credit joint cooperative, credit center cooperative, financial service cooperative, financial service department & city, city commercial bank, urban cooperative bank)
- The above events are re-flagged as 0 in the following cases:
  - Containing '农村、农行、农业银行、农民、农业' (Rural, Agricultural Bank, Agricultural Bank of China, farmer, agriculture)

– **SOE Managerial Responsibility Contract**

- Events are flagged as 1 when the following keywords are present:
'经济责任制&企业、经济责任制&公司、经济责任制&厂、经济责任制&国有、经济责任制&国营、经济责任制&系统、经济责任制&工业、经济责任制&财贸、经济责任制&商业、经济责任制&服务、经济责任制&工交、经济责任制&行业、承包&企业、承包&公司、承包&厂、承包&国有、承包&国营、承包&系统、承包&工业、承包&财贸、承包&商业、承包&服务、承包&工交、承包&行业、利润包干&企业、利润包干&公司、利润包干&厂、利润包干&国有、利润包干&国营、利润包干&系统、利润包干&工业、利润包干&财贸、利润包干&商业、利润

包干&服务、利润包干&工交、利润包干&行业、租赁&企业、租赁&公司、租赁&厂、租赁&国有、租赁&国营、租赁&系统、租赁&工业、租赁&财贸、租赁&商业、租赁&服务、租赁&工交、租赁&行业、自负盈亏&企业、自负盈亏&公司、自负盈亏&厂、自负盈亏&国有、自负盈亏&国营、自负盈亏&系统、自负盈亏&工业、自负盈亏&财贸、自负盈亏&商业、自负盈亏&服务、自负盈亏&工交、自负盈亏&行业、厂长&负责制、经理&负责制、厂长&责任制、经理&责任制、自主权&扩大、利润留成、利润提留、利润&留成' (Economic responsibility system & enterprise, economic responsibility system & company, economic responsibility system & factory, economic responsibility system & state-owned, economic responsibility system & state-run, economic responsibility system & system, economic responsibility system & industry, economic responsibility system & financial trade, economic responsibility system & commerce, economic responsibility system & service, economic responsibility system & transport and communication, economic responsibility system & sector, contract & enterprise, contract & company, contract & factory, contract & state-owned, contract & state-run, contract & system, contract & industry, contract & financial trade, contract & commerce, contract & service, contract & transport and communication, contract & sector, profit contract & enterprise, profit contract & company, profit contract & factory, profit contract & state-owned, profit contract & state-run, profit contract & system, profit contract & industry, profit contract & financial trade, profit contract & commerce, profit contract & service, profit contract & transport and communication, profit contract & sector, lease & enterprise, lease & company, lease & factory, lease & state-owned, lease & state-run, lease & system, lease & industry, lease & financial trade, lease & commerce, lease & service, lease & transport and communication, lease & sector, self-financing & enterprise, self-financing & company, self-financing & factory, self-financing & state-owned, self-financing & state-run, self-financing & system, self-financing & industry, self-financing & financial trade, self-financing & commerce, self-financing & service, self-financing & transport and communication, self-financing & sector, factory director & responsibility system, manager & responsibility system, factory director & accountability system, manager & accountability system, autonomy & expansion, profit retention, profit allocation, profit & retention)

- The above events are re-flagged as 0 in the following cases:
  - Containing '企业&工业&农民、企业&工业&农村、企业&工业&公社、社队企业、乡镇企业、领导下的&厂长负责制、工程&without 负责制&without 责任制&without 自主权&without 厂长' (Enterprise & industry & farmer, enterprise & industry & rural, enterprise & industry & commune, commune and brigade enterprise, township enterprise, under the leadership & factory director responsibility system, project & without responsibility system & without accountability system & without autonomy & without factory director)

– **Urban Pension System Reform**

- Events are flagged as 1 when the following keywords are present:
  '养老保险、社会养老、养老&保险、退休&保险、养老&统筹、退休&统筹、养老&社会发放、退休&社会发放、养老&社会保障、退休&社会保障、养老金&企业、养老金&工人、养老&社会&发放、养老&银行&发放、退休&社会&发放、退休&银行&发放、养老金&发放、养老&改革、养老&制度' (Pension insurance, social pension, pension & insurance, retirement & insurance, pension & overall planning, retirement & overall planning, pension & social distribution, retirement & social distribution, pension & social security, retirement & social security, pension funds & enterprises, pension funds & workers, pension & social & distribution, pension & bank & distribution, retirement & social & distribution, retirement & bank & distribution, pension funds & distribution, pension & reform, pension & system)

- The above events are re-flagged as 0 in the following cases:

  - Containing '结扎、农村&without 企业、农民、村&干部&without 企业、兵' (Sterilisation, rural & without enterprises, farmers, village & cadres & without enterprises, soldier)

– **FDIs and SEZs**

- Events are flagged as 1 when the following keywords are present:
  '外资、三资、中外合资、中外合作、中外合营、经济开发区、技术开发区、产业开发区、中日合资、中美合资、出口特区、广东省经济特区条例、招商&外、外企&合资、外企&投资、外企&独资、外企&办企业、外企&开业、收购&外企、转让&外企、经营&外企、引资&外企、外商&合资、外商&投资、外商&独资、外商&办企业、外商&开业、收购&外商、转让&外商、经营&外商、引资&外商' (Foreign capital, joint ventures, Sino-foreign joint ventures, Sino-foreign cooperation, Sino-foreign joint operations, economic development zone, technology development zone, industrial development zone, Sino Japanese joint ventures, Sino American joint ventures, export special zone, Guangdong province special economic zone regulations, investment promotion & foreign, foreign enterprise & joint venture, foreign enterprise & investment, foreign enterprise & wholly owned, foreign enterprise & establish enterprise, foreign enterprise & commence business, acquisition & foreign enterprise, transfer & foreign enterprise, management & foreign enterprise, investment introduction & foreign enterprise, foreign investor & joint venture, foreign investor & investment, foreign investor & wholly owned, foreign investor & establish enterprise, foreign investor & commence business, acquisition & foreign investor, transfer & foreign investor, management & foreign investor, investment introduction & foreign investor.)

- The above events are re-flagged as 0 in the following cases:

- Containing '预算外' (extrabudgetary)

– **Transformation of SOEs into Shareholding Companies**

- Events are flagged as 1 when the following keywords are present:
'股份制&企业、股份制&公司、股份制&厂、股份制&国有、股份制&国营、股份制&城市、股份制&城镇、股份制&银行、股份制&金融、股份制&机构、股份制&商业、股份制&商店、股份&企业、股份&公司、股份&厂、股份&国有、股份&国营、股份&城市、股份&城镇、股份&银行、股份&金融、股份&机构、股份&商业、股份&商店、股票&企业、股票&公司、股票&厂、股票&国有、股票&国营、股票&城市、股票&城镇、股票&银行、股票&金融、股票&机构、股票&商业、股票&商店、入股&企业、入股&公司、入股&厂、入股&国有、入股&国营、入股&城市、入股&城镇、入股&银行、入股&金融、入股&机构、入股&商业、入股&商店、分红&企业、分红&公司、分红&厂、分红&国有、分红&国营、分红&城市、分红&城镇、分红&银行、分红&金融、分红&机构、分红&商业、分红&商店' (Shareholding system & enterprise, shareholding system & company, shareholding system & factory, shareholding system & state-owned, shareholding system & state-operated, shareholding system & city, shareholding system & town, shareholding system & bank, shareholding system & finance, shareholding system & institution, shareholding system & commerce, shareholding system & store, shares & enterprise, shares & company, shares & factory, shares & state-owned, shares & state-operated, shares & city, shares & town, shares & bank, shares & finance, shares & institution, shares & commerce, shares & store, stock & enterprise, stock & company, stock & factory, stock & state-owned, stock & state-operated, stock & city, stock & town, stock & bank, stock & finance, stock & institution, stock & commerce, stock & store, equity participation & enterprise, equity participation & company, equity participation & factory, equity participation & state-owned, equity participation & state-operated, equity participation & city, equity participation & town, equity participation & bank, equity participation & finance, equity participation & institution, equity participation & commerce, equity participation & store, dividend & enterprise, dividend & company, dividend & factory, dividend & state-owned, dividend & state-operated, dividend & city, dividend & town, dividend & bank, dividend & finance, dividend & institution, dividend & commerce, dividend & store)

- The above events are re-flagged as 0 in the following cases:

  - Containing '农民、农村、村民、农户' (Farmers, rural, villagers, rural households)

– **Price Reform**

- Events are flagged as 1 when the following keywords are present:
'价&浮动、价&改革、价&放开、价&市场调节、企业&定价、价&随行就市、价&开放、自主定价、自由交易、自由&价、放开&上市交易、定价权、流通&改革、商品&市场、商品&集市、取消&粮票、停止&粮票、合同订购、合同定购、取消&猪&派购' (Price & floating, price & reform, price & liberalization, price & market regulation, enterprise & pricing, price & follow the market, price & open, independent pricing, free trade, free & price, liberalization & listing trading, pricing power, circulation & reform, commodity & market, commodity & bazaar, cancel & grain coupon, stop & grain coupon, contract purchase, contract procurement, cancel & pork & allocation)

– **Land Use System Reform**

- Events are flagged as 1 when the following keywords are present:
'土地&拍卖、土地&转让、土地&出让、土地&估价、土地&定级、土地&评估、土地&招标、土地&无流动&可流动、土地&交易、交易&使用权、土地&有偿、土地使用制度、地价、土地增值、土地&批租' (Land & auction, land & transfer, land & conveyance, land & valuation, land & grading, land & assessment, land & bidding, land & non-transferable & transferable, land & transaction, transaction & usage rights, land & compensated, land use system, land price, land appreciation, land & leasehold)

- The above events are re-flagged as 0 in the following cases:

  - Containing '农业、农场、农民、农村、农户、公社、社员、大队、土地承包、四荒、耕地、有偿承包。以上事件必须不包含企业、城镇这些关键词。' (Agriculture, farm, farmer, rural, household, commune, member, brigade, land contracting, barren land, cultivated land, compensated contracting. The above cases must not contain the keywords enterprise and town.)
  - Containing '非法、滥用、不准、禁止' (Illegal, abuse, not allowed, prohibited)

– **Tax Sharing Reform**

- Events are flagged as 1 when the following keywords are present:
'分税制、新税制、中央税、共享税、分级预算、分税财政、两套税务、税制改革&国家税、新&财税制、新&财税体制、国家税务局&地方税务局、国税局&地税局、"国、地税"、"国税、地税"、"地税、国税"、国地税、国税与地税、"国家、地方税"、国家税务局&成立、国家税务&成立、国税局&成立、地方税局&成立、地方税务&成立、地税局&成立、国家税务局&挂牌、国家税务&挂牌、国税局&挂牌、地方税局&挂牌、地方税务&挂牌、地税局&挂牌、国家税务局&设立、国家税务&设立、国税局&设立、地方税局&设立、地方税务&设

立、地税局&设立、国家税务局&分设、国家税务&分设、国税局&分设、地方税局&分设、地方税务&分设、地税局&分设、国家税务局&组建、国家税务&组建、国税局&组建、地方税局&组建、地方税务&组建、地税局&组建、国家税务局&建立、国家税务&建立、国税局&建立、地方税局&建立、地方税务&建立、地税局&建立、国家税务局&设、国家税务&设、国税局&设、地方税局&设、地方税务&设、地税局&设、税务机构&分设、国家税局&地方税局、国家税务&地方税务' (Tax division system, new tax system, central tax, shared tax, graded budget, tax-divided finance, two sets of taxes, tax reform & national tax, new & fiscal tax system, new & fiscal tax system, state administration of taxation & local taxation bureau, national tax bureau & local tax bureau, 'national, local tax', 'national tax, local tax', 'local tax, national tax', national and local tax, national tax and local tax, 'national, local tax', state administration of taxation & , state taxation & establish, national tax bureau & establish, local tax bureau & establish, local taxation & establish, local tax bureau & establish, state administration of taxation & establish separately, state taxation & establish separately, national tax bureau & establish separately, local tax bureau & establish separately, local taxation & establish separately, local tax bureau & establish separately, state administration of taxation & establish, state taxation & establish, national tax bureau & establish, local tax bureau & establish, local taxation & establish, local tax bureau & establish, state administration of taxation & split, state taxation & split, national tax bureau & split, local tax bureau & split, local taxation & split, local tax bureau & split, state administration of taxation & formation, state taxation & formation, national tax bureau & formation, local tax bureau & formation, local taxation & formation, local tax bureau & formation, state administration of taxation & establish, state taxation & establish, national tax bureau & establish, local tax bureau & establish, local taxation & establish, local tax bureau & establish, state administration of taxation & establish, state taxation & establish, national tax bureau & establish, local tax bureau & establish, local taxation & establish, local tax bureau & establish, tax authorities & split, national tax bureau & local tax bureau, state taxation & local taxation)

– **Labor Contract System**

- Events are flagged as 1 when the following keywords are present:
'劳动合同、合同工制、"合同工"制、用工制度&改革、转为合同工、转为合同制、劳动制度&改革、合同工&保险、合同制工人&保险、合同制职工&保险、合同工&养老金、合同制工人&养老金、合同制职工&养老金、合同工&试行、合同工&招、合同工&录取、合同工&录用、合同工&聘用、合同制&招、合同制&录取、合同制&聘用、改固定工、固定工改、铁饭碗、劳动法、职工合同制、工人合同制、合同制&用工、合同制&全员' (Labor contract, contract worker system, "contract worker" system, employment system & reform, converted

to contract worker, converted to contract system, labor system & reform, contract worker & insurance, contract system worker & insurance, contract system staff & insurance, contract worker & pension, contract system worker & pension, contract system staff & pension, contract worker & trial, contract worker & recruitment, contract worker & admission, contract worker & employment, contract system & recruitment, contract system & admission, contract system & employment, change to permanent worker, permanent worker change, iron rice bowl, labor law, staff contract system, worker contract system, contract system & employment, contract system & all employees)

- The above events are re-flagged as 0 in the following cases:
  - Containing '农村、粮食、农业、经济合同制、经济责任制、厂长（经理）负责制、经营责任制' (Rural, grain, agriculture, economic contract system, economic responsibility system, factory director (manager) responsibility system, management responsibility system)

– **Development of Private Economy**

- Events are flagged as 1 when the following keywords are present:
  '私营、民营、私人企业、私人经商、私人经营、私人股份制、私人&买断、私人&办&企业' (private, private sector, private enterprise, private business, private management, private joint-stock, private & buyout, private & run & enterprise)
- The above events are re-flagged as 0 in the following cases:
  - Containing '留民营' (liuminying village)

– **Privatization of SOEs**

- Events are flagged as 1 when the following keywords are present:
  '国有&出售、国有&转让、国有&放小、国有&拍卖、国有&改制&民营、国有&改制&私营、国有&出让、国有&买断、国有&民营化、国有&民营转变、国有转民营、国有&购买、国有&收购&民营、国有&成为&民营、国有&转制&民营、国有&转制&私营、国营&出售、国营&转让、国营&放小、国营&拍卖、国营&改制&民营、国营&改制&私营、国营&出让、国营&买断、国营&民营化、国营&民营转变、国营转民营、国营&购买、国营&收购&民营、国营&成为&民营、国营&转制&民营、国营&转制&私营、国有企业&卖、国有&卖&民营、国有&卖&小、国有&卖&产权、国有&收购&外企、国有&收购&外资、市属&出售、市属&转让、市属&放小、市属&拍卖、市属&改制&民营、市属&改制&私营、市属&出让、市属&买断、市属&民营化、县属&出售、县属&转让、县属&放小、县属&拍卖、县属&改制&民营、县

属&改制&私营、县属&出让、县属&买断、县属&民营化、国有&转为&私营、国营&转为&私营、转为&民营、国有民营、社有民营、公有民营、私营&改制、民营&改制、改制&私、改制&转让、改制&拍卖、国营&退出、国有&退出、转制&私营、转制&民营、改制&民营、民有民营、国有&变&民营、国有&变&私营、国营&变&民营、国营&变&私营' (State-owned & sale, state-owned & transfer, state-owned & downsizing, state-owned & auction, state-owned & restructuring & privatization, state-owned & restructuring & private, state-owned & assignment, state-owned & buyout, state-owned & privatization, state-owned & transition to private, state-owned to private, state-owned & purchase, state-owned & acquisition & private, state-owned & becoming private, state-owned & transition & private, state-owned & transition & private, state-run & sale, state-run & transfer, state-run & downsizing, state-run & auction, state-run & restructuring & privatization, state-run & restructuring & private, state-run & assignment, state-run & buyout, state-run & privatization, state-run & transition to private, state-run to private, state-run & purchase, state-run & acquisition & private, state-run & becoming private, state-run & transition & private, state-run & transition & private, state-owned enterprise & sell, state-owned & sell & private, state-owned & sell & small, state-owned & sell & property rights, state-owned & acquisition & foreign enterprise, state-owned & acquisition & foreign capital, municipal-owned & sale, municipal-owned & transfer, municipal-owned & downsizing, municipal-owned & auction, municipal-owned & restructuring & privatization, municipal-owned & restructuring & private, municipal-owned & assignment, municipal-owned & buyout, municipal-owned & privatization, county-owned & sale, county-owned & transfer, county-owned & downsizing, county-owned & auction, county-owned & restructuring & privatization, county-owned & restructuring & private, county-owned & assignment, county-owned & buyout, county-owned & privatization, state-owned & transition to private, state-run & transition to private, transition to private, state-owned private, cooperative-owned private, public-owned private, private & restructuring, private & restructuring, restructuring & private, restructuring & transfer, restructuring & auction, state-run & exit, state-owned & exit, transition & private, transition & private, restructuring & private, private-owned private, state-owned & change & private, state-owned & change & private, state-run & change & private, state-run & change & private.)

- The above events are re-flagged as 0 in the following cases:
  - containing '土地、用地、地块、房地产、房产' (land, site, plot, real estate, property)

– **Housing Reform**

- Events are flagged as 1 when the following keywords are present:

'住房&售、住房&改革、房产&售、住宅&售、住宅商品、商品住宅、住房商品、商品住房、商品房、商品楼、公房&售、私房交易、职工购房、住房制度、售房、房地产交易、房地产开发、房地产业、房地产公司、房地产企业、房地产股份、房地产市场、房地产&售、房地产&开发、房产&信贷、房地产&贷款、购房&贷款、住房&市场化、住房&商品化、住房&商品性、住宅&商品性、公积金、安居工程、经济适用房、经济适用住房、租金&改革、租金&调整、租金&提高、租金&补贴、职工&购买&住房、房贷、按揭、房改&without改造&without改建&without改为&without改成' (Housing & sale, housing & reform, real estate & sale, residential & sale, residential commodities, commodity housing (shangpin zhuzhai), housing commodities, commodity housing (shangpin zhufang), commodity house, commodity building, public housing & sale, private house transaction, employee house purchase, housing system, house sale, real estate transaction, real estate development, real estate industry, real estate company, real estate enterprise, real estate shares, real estate market, real estate & sale, real estate & development, real estate & credit, real estate & loan, house purchase & loan, housing & marketization, housing & commodification, housing & commodity nature, residential & commodity nature, housing fund, Anju project, affordable housing, economically affordable housing, rent & reform, rent & adjustment, rent & increase, rent & subsidy, employee & purchase & housing, housing loan, mortgage, housing reform & without transformation & without reconstruction & without conversion & without change)

– **Setting Up A Modern Enterprise System**

- Events are flagged as 1 when the following keywords are present:
'公司制&改革、公司制&实行、现代工业制度、现代&企业制度、现代&产权制度、国家试点企业集团、国有&重组&公司、国有&改组&公司、国有&改制&公司、国有&转制&公司、国营&重组&公司、国营&改组&公司、国营&改制&公司、国营&转制&公司、国企&重组&公司、国企&改组&公司、国企&改制&公司、国企&转制&公司、产权清晰&权责明确&政企分开&管理科学、企业制度&创新、国有资产监督、国有资产管理委员会' (Company system & reform, company system & implementation, modern industrial system, modern & enterprise system, modern & property rights system, national pilot enterprise group, state-owned & restructuring & company, state-owned & reorganization & company, state-owned & reform & company, state-owned & conversion & company, state-run & restructuring & company, state-run & reorganization & company, state-run & reform & company, state-run & conversion & company, state enterprise & restructuring & company, state enterprise & reorganization & company, state enterprise & reform & company, state enterprise & conversion & company, clear property rights & defined responsibilities & separation of government and enterprise & scientific management, enterprise system & innovation, state-owned asset supervision, state-owned assets

management committee)

- The above events are re-flagged as 0 in the following cases:
  - Containing '民营、民有、私营、出售' (Private, privately-owned, privately-operated, sale)

– **Advancing Western Development**

- Events are flagged as 1 when the following keywords are present:
  '西部&大开发、西部开发' (Western development & great development, western development)

– **Hukou Reform**

- Events are flagged as 1 when the following keywords are present:
  '落户&进城、落户&进县城、农转非、自理口粮、户口&放开&价、户口&放宽、户口&蓝、户籍制度&改革、户口&非农&转、户口&城市&转、户口&城镇&转、户籍&改革、城镇户口&办理、户口&同等&待遇、城市&外来&户口、户口政策&新、户籍政策&新、暂住人口、暂住人员、暂住证' (Settle & move to city, settle & move to county town, agricultural to non-agricultural, self-managed grain ration, household registration & open & price, household registration & relaxed, household registration & blue, household registration system & reform, household registration & non-agricultural & transfer, household registration & urban & transfer, household registration & town & transfer, household registration & reform, town household registration & processing, household registration & equal treatment, city & external & household registration, household registration policy & new (hukou zhengce & xin), household registration policy & new (huji zhengce & xin), temporary population, temporary residents, temporary residence permit)

- The above events are re-flagged as 0 in the following cases:
  - Containing '知青、知识青年、平反、下放、右派、倒卖、非法、不合法、不合政策、不正、不符合、罪犯、插队、军人、清退、清理、清查、违反、违犯、党风、违纪、文化大革命、职权、土地承包、犯罪' (Educated youth, intellectual youth, rehabilitation, sent down, rightist, trafficking, illegal, unlawful, against policy, improper, non-compliant, criminal, sent to countryside, soldier, expulsion, clearance, investigation, violation, breach, party conduct, disciplinary violation, Cultural Revolution, authority, land contracting, crime)

– **Rural Tax and Fee Reform**

- Events are flagged as 1 when the following keywords are present:
  '税费改革、农业税改革、取消&税&农业、取消&税&牧业、农业税&降低、农业税&下调、农业税&免征、农业税&终止、农业税&全免、农业税&免除、农业税&减免、农业税&停征、农业税&停止征收、农业税&停止&征收、农业税&改革、农业税&废止、农业税&废除、农业税&减征、农业税&试点、牧业税&降低、牧业税&下调、牧业税&免征、牧业税&终止、牧业税&全免、牧业税&免除、牧业税&减免、牧业税&停征、牧业税&停止征收、牧业税&停止&征收、牧业税&改革、牧业税&废止、牧业税&废除、牧业税&减征、牧业税&试点' (Tax and fee reform, agricultural tax reform, abolish & tax & agriculture, abolish & tax & animal husbandry, agricultural tax & reduction (nongyeshui & jiangdi), agricultural tax & decrease, agricultural tax & exemption, agricultural tax & termination, agricultural tax & full exemption, agricultural tax & waiver, agricultural tax & reduction or exemption, agricultural tax & suspension, agricultural tax & stop collection, agricultural tax & stop & collection, agricultural tax & reform, agricultural tax & abolishment, agricultural tax & repeal, agricultural tax & reduction (nongyeshui & jianzheng), agricultural tax & pilot, animal husbandry tax & reduction (muyeshui & jiangdi), animal husbandry tax & decrease, animal husbandry tax & exemption, animal husbandry tax & termination, animal husbandry tax & full exemption, animal husbandry tax & waiver, animal husbandry tax & reduction or exemption, animal husbandry tax & suspension, animal husbandry tax & stop collection, animal husbandry tax & stop & collection, animal husbandry tax & reform, animal husbandry tax & abolishment, animal husbandry tax & repeal, animal husbandry tax & reduction (muyeshui & jianzheng), animal husbandry tax & pilot)

- The above events are re-flagged as 0 in the following cases:

  - Containing '灾、贫困' (Disaster, poverty)

– Bankruptcy Regulation

- Events are flagged as 1 when the following keywords are present:
  '破产、倒闭、濒临倒闭' (Bankruptcy, closure, on the verge of closure)

A.3 Details of Supervised Machine Learning Approach

Training sample. We construct the training sample by randomly selecting 800 counties, resulting in a subsample of 590,080 entries of local events. The key step is to label these events as either related or unrelated to the representative reforms, which will then be used to train and test our classification model.

This task is challenging due to the large number of events. To address this, we adopt a "seed-expansion" approach. We begin by using keywords to construct "seed sets" of 50 entries for each reform type within the subsample of 800 counties. These seed entries are then manually validated, and false positives are replaced to ensure each reform type has exactly 50 entries.

The expansion phase relies on using textual similarity to reduce workload and increase precision. Specifically, for each reform type, we calculate the textual similarity between each event in the "seed sets" and each event in the subsample, generating a $50 \times 590,080$ similarity matrix. For each event, we then average the similarity with the 50 seed events, resulting in a $1 \times 590,080$ matrix. The events are sorted by average similarity, and we manually identify up to 350 events that belong to each specific reform. This procedure is repeated for all 25 reforms. To construct the sample of non-reform events, we classify events that fall below the 50th percentile of the average similarity with the "seed sets" across all reform types, resulting in a total of $N = 105,890$ events.

Training. To train a classification model, we face the challenge of a highly imbalanced dataset, with significantly fewer reform events compared to non-reform events. Specifically, non-reform events are approximately 12 times more frequent than reform events. To address this, we utilize the Focal Loss function to calculate the loss value during training. This function addresses the sample imbalance problem by giving more weight (increasing the punishment intensity) to incorrectly classified samples.

The training procedure consists of two steps. First, we train a binary classification model to distinguish between reform-related events and non-reform events. Second, within the predicted reform sample, we train a multi-class model with 25 classes to further classify the events into specific reform policies.

Manual Annotation. For each reform policy, we manually review and annotate each labeled related event to exclude any remaining false positives. This step is crucial because the machine learning model can sometimes confuse events related to different policies that share similar expressions. For example, events associated with the Household Responsibility System and the SOE Managerial Responsibility Contract often use similar terms such as '承包责任制' (contract responsibility system), '经济责任制' (economic responsibility system), or '联产计酬' (quota-based remuneration).

A.4 Geographic Spread of Reforms: Additional Details

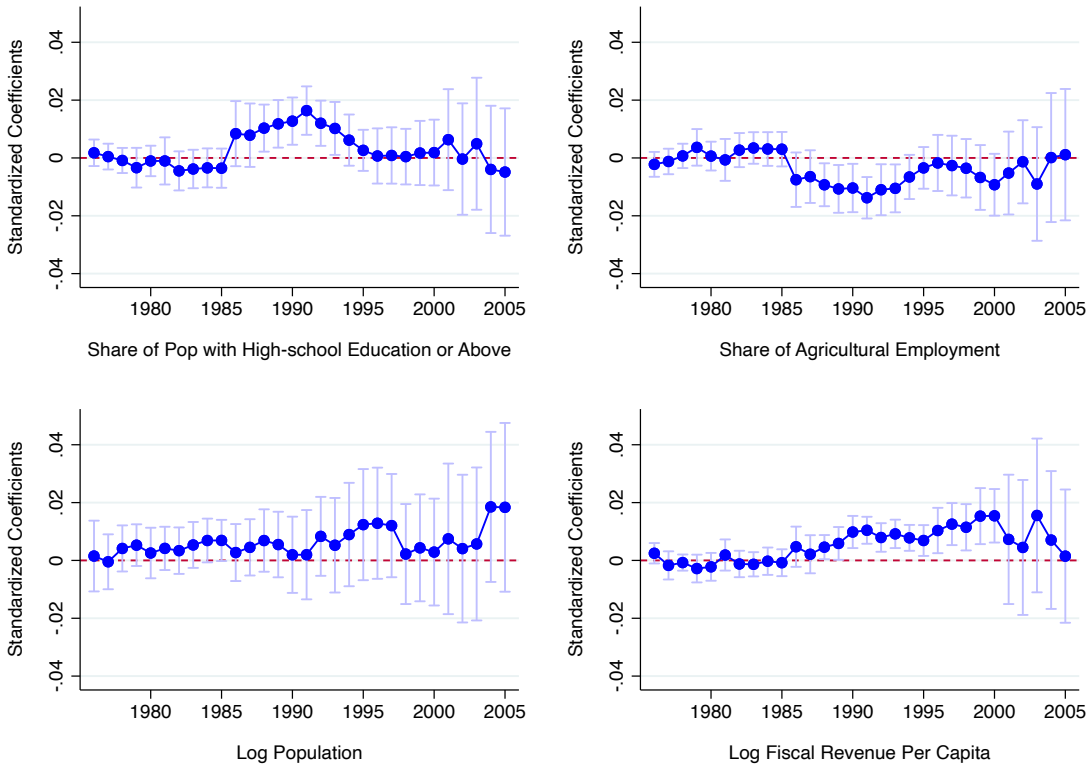
Figure A.2 illustrates the diffusion process of the Household Responsibility System (HRS) across several provinces, including Anhui, Heilongjiang, Jiangsu, Jilin, and Sichuan. Figure A.4 presents the diffusion process for all transformative economic policy reforms listed in Table 1. For all the policies under study, the diffusion processes inferred from the keyword matching approach closely resemble those derived from the approach combing machine learning techniques and manual annotation.

A.5 Identifying Events Related to Visits by PSC Members

From *A Dictionary of the CCP Central Committee Members of Various Plenums, 1921-2003* (Organization Department of the CCP and Party History Research Center of the CCP Central Committee, 2004), we obtain the name list of PSC members for each year and month. For each year and month, we search the names in our dataset on county-level major events. We label an event as related to visits by PSC members if a name appears alongside one of the following keywords: '视察、考察、检查、调研、看望、探望、莅临、亲临、指导工作、作重要讲话、作了重要讲话、作重要指示、作了重要指示' (Inspect, survey, check, research, visit, call on, be present, personally present, guide work, make an important speech, make an important speech, give important instructions, give important instructions). We also exclude the events related to visits prompted by disasters and accidents, identified by the following keywords: '灾、事故、伤、亡' (Disaster, accident, injury, death).

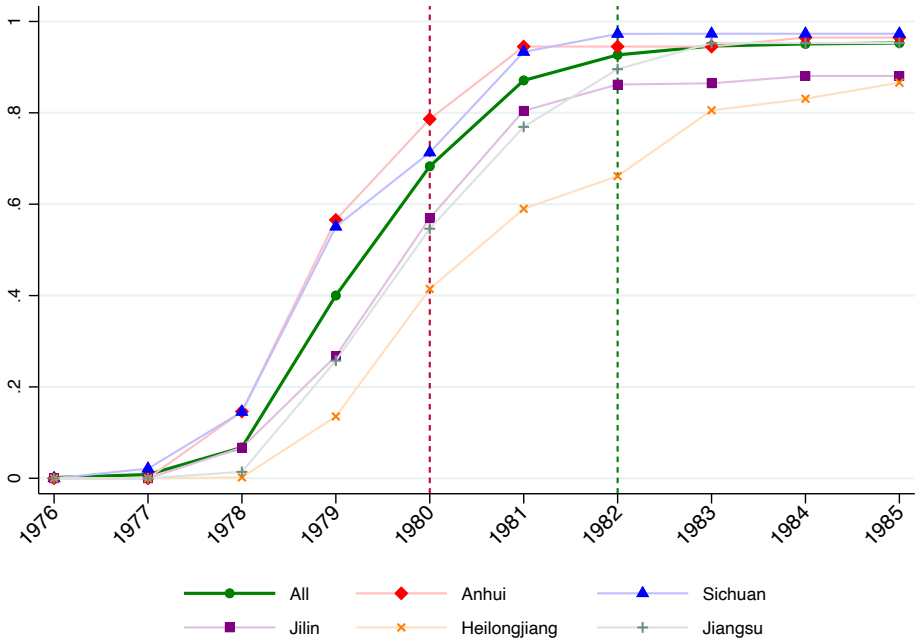
Some events feature multiple names of PSC members. Therefore, for each identified event, we count the number of visits based on the number of unique names mentioned. We aggregate the data to the county-year level, so the variable $NumVisit_{it}$ represents the number of visits made by PSC members to county i in year t.

Figure A.1: Missing Status and County Characteristics



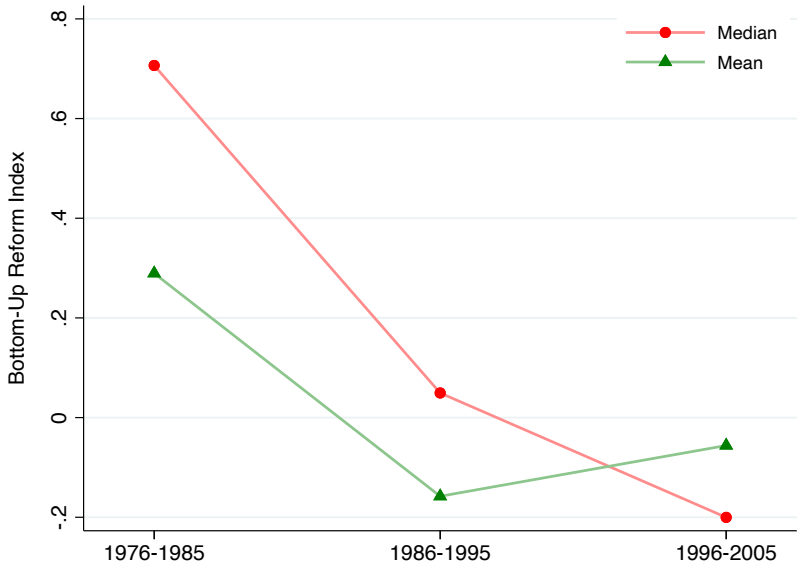
Notes: This figure reports the regression results of county missing status on various county characteristics. The regression is conducted separately for each year. The estimates are standardized by the standard deviation of the independent variable, and the vertical bars indicate the corresponding 90% confidence intervals. The measures of share of population with high-school education or above, share of agricultural employment, and population are constructed using data from the 1990 Population Census. The measure of fiscal revenue per capita is obtained from *Statistical Material for Prefectures, Cities, and Counties Nationwide* (Ministry of Finance, 1993).

Figure A.2: Share of Population Living in Counties That Have the HRS in Place



Notes: This figure presents the spread of HRS over time, captured by the share of population living counties that have adopted the policy, across different provinces—Anhui,Heilongjiang,Jiangsu,Jilin and Sichuan—as well as for China as a whole. There are two key time points: (i) the year the central government granted partial consent to experiment with the reform policy (indicated by a red dashed line), and (ii) the year the central government endorsed the reform policy for nationwide adoption (indicated by a green dashed line).

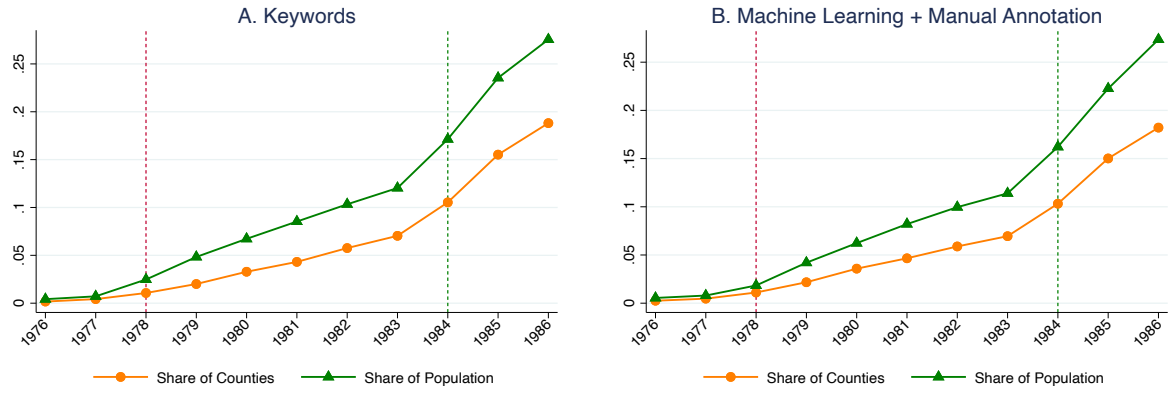
Figure A.3: Changes in Bottom-Up Reform Index Over Time



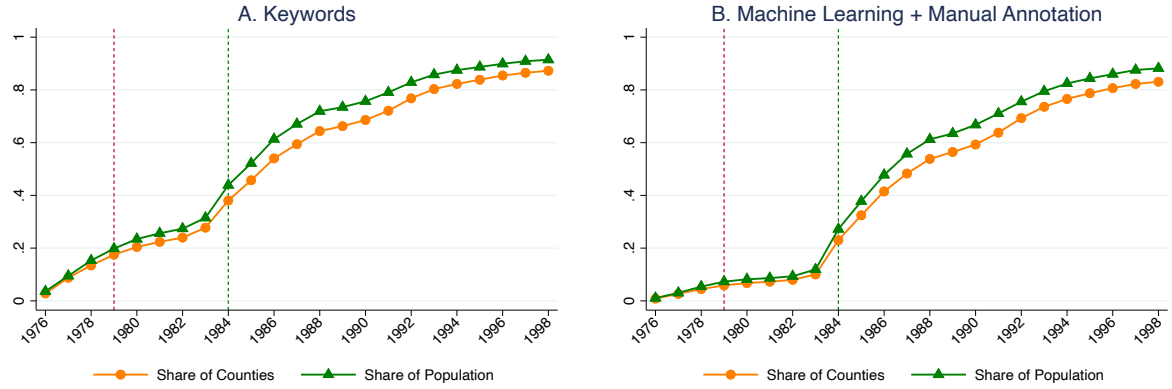
Notes: This figure shows the median and average values of the bottom-up reform index for policies endorsed during the periods 1976-1985, 1986-1995, and 1996-2005.

Figure A.4: Diffusion of Transformative Economic Reform Policies

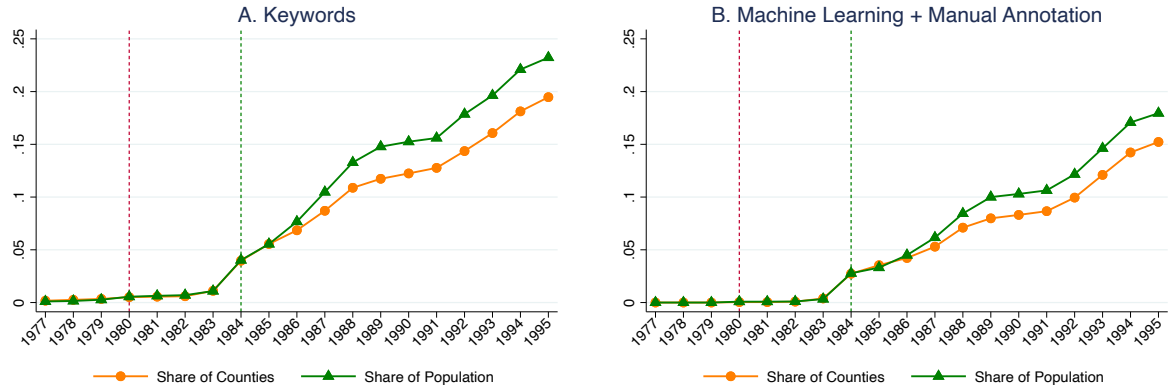
Importing Technology and Complete Sets of Equipment



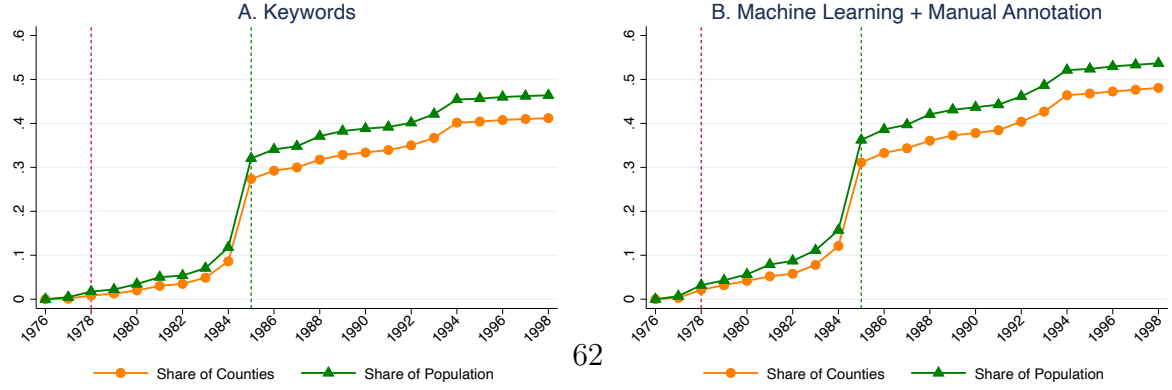
Developing Township and Village Enterprises



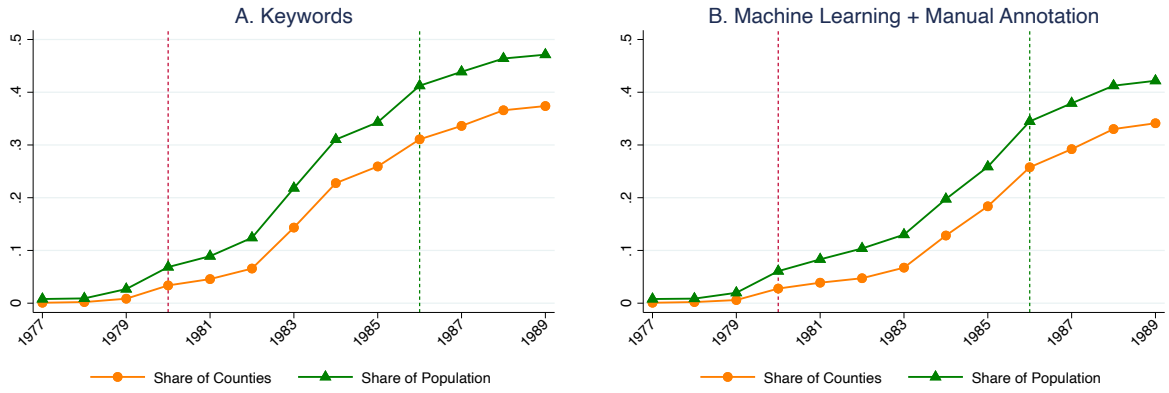
Rural Credit Coorporative Reform



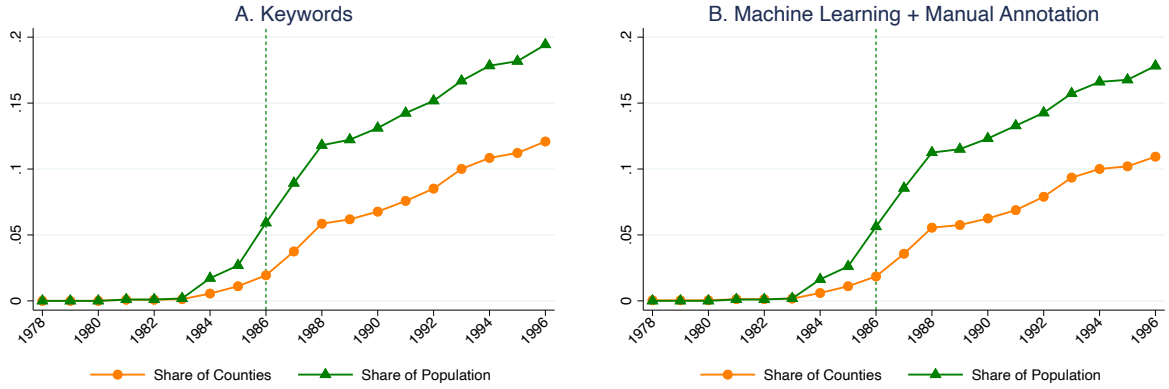
Wage System Reforms



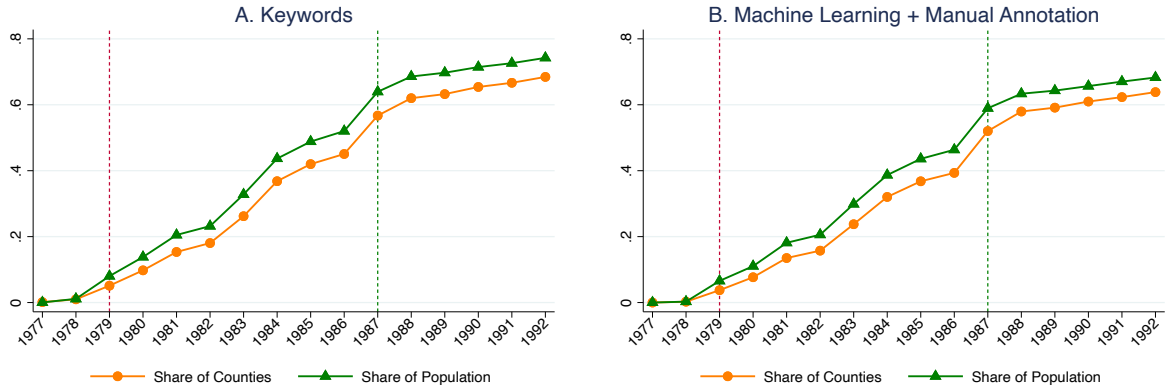
Horizontal Economic Cooperation



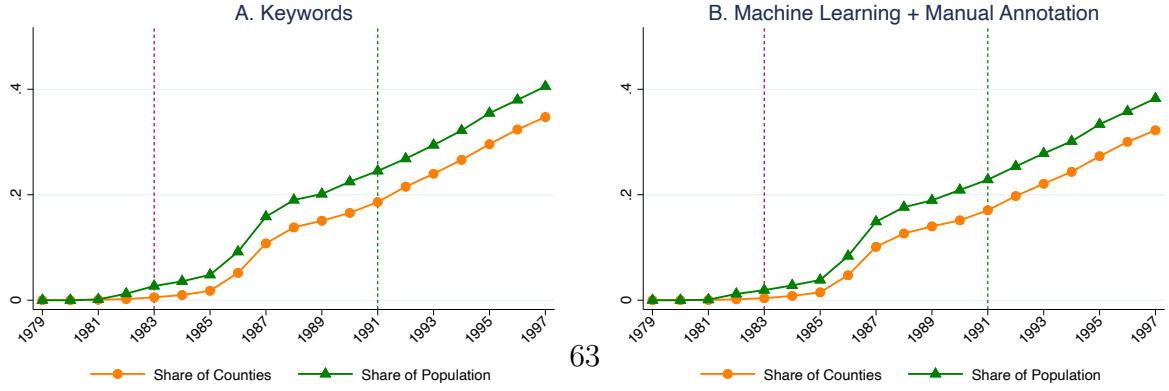
Urban Credit Coorporative Development



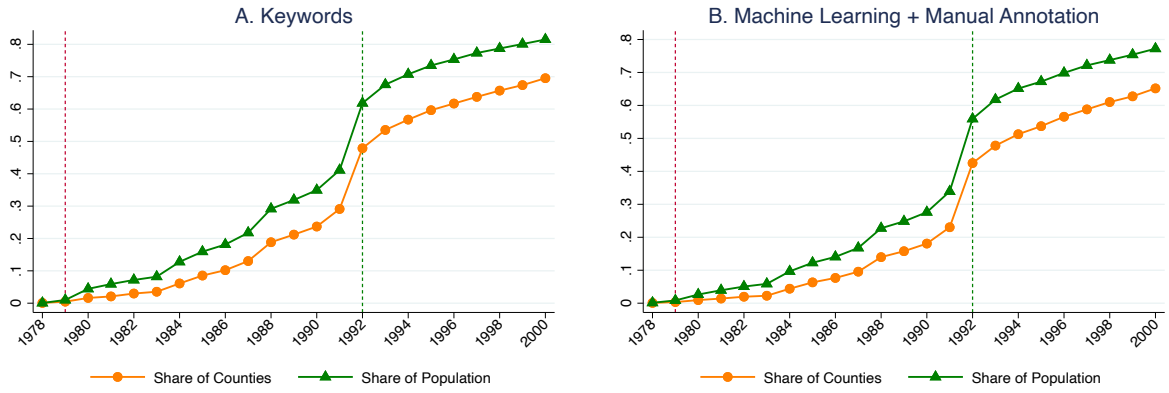
SOE Managerial Responsibility Contract



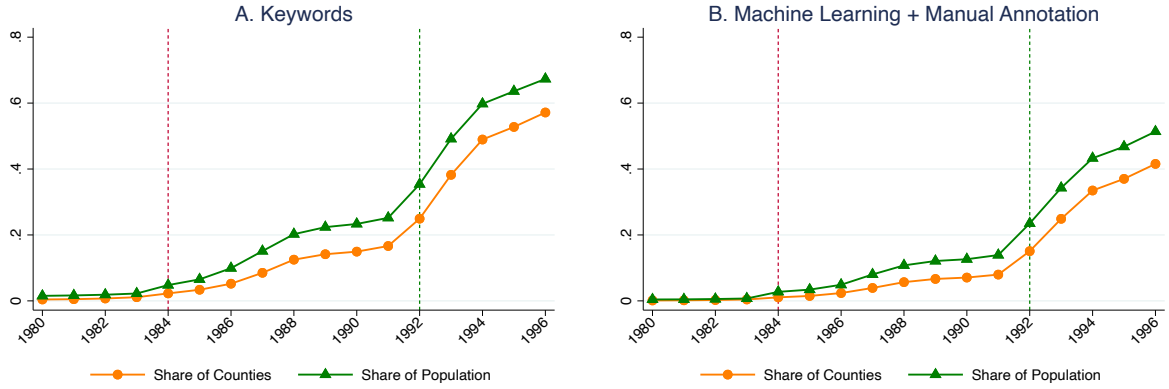
Urban Pension System Reform



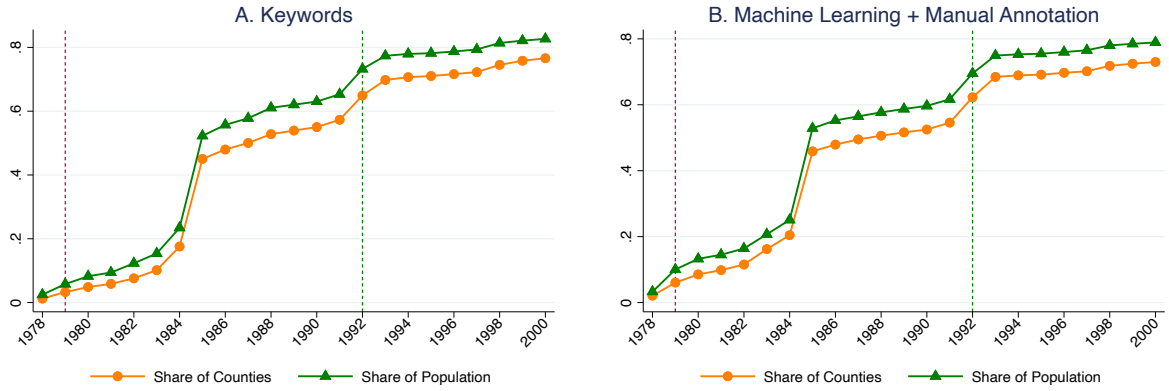
FDI and Special Economic Zones



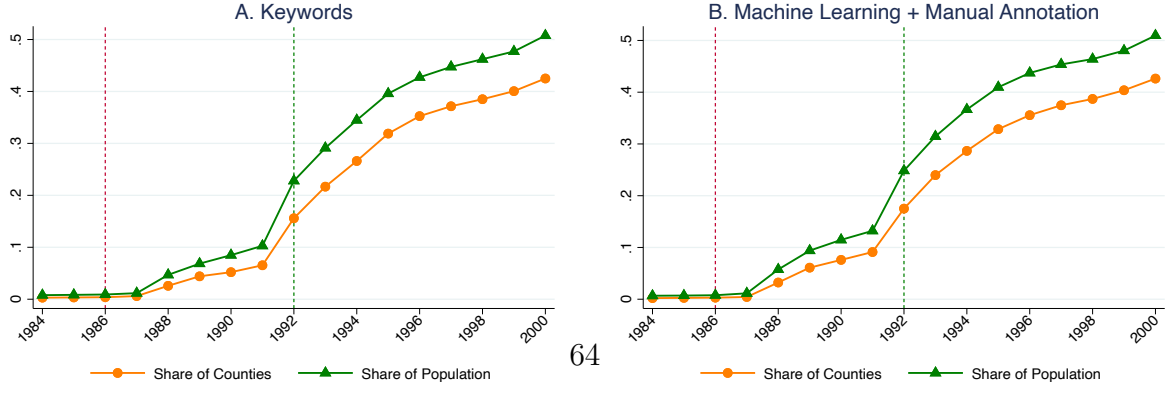
Transforming SOEs into Shareholding Companies



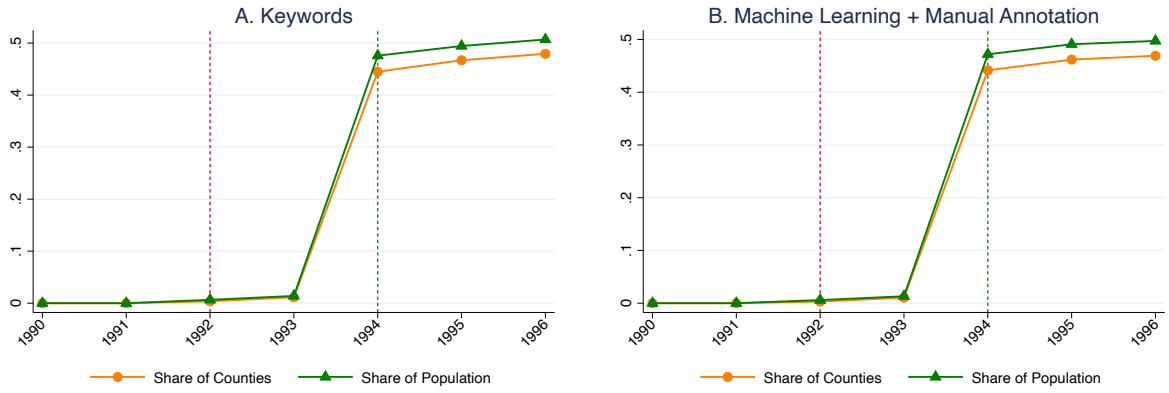
Price Reform



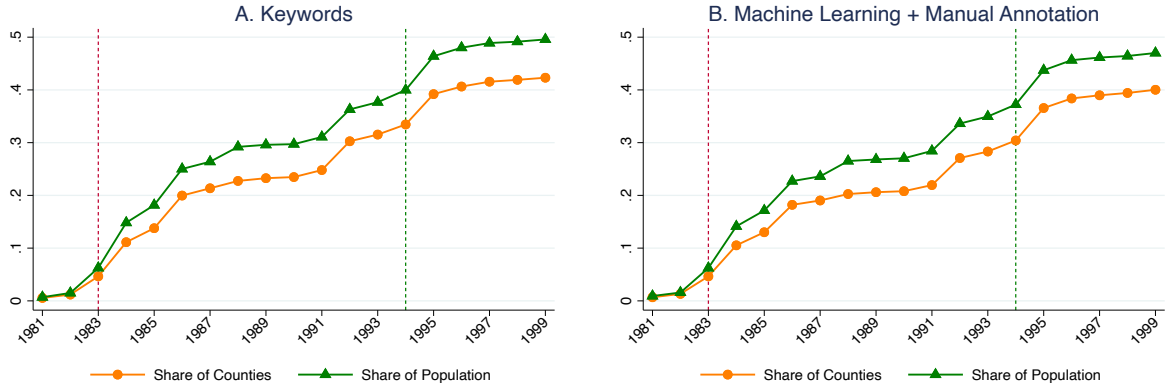
Land Use System Reform



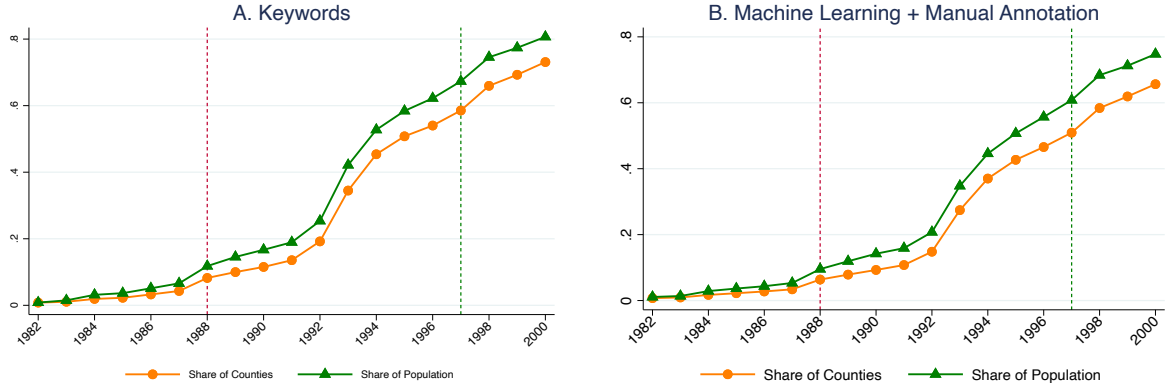
Tax Sharing Reform



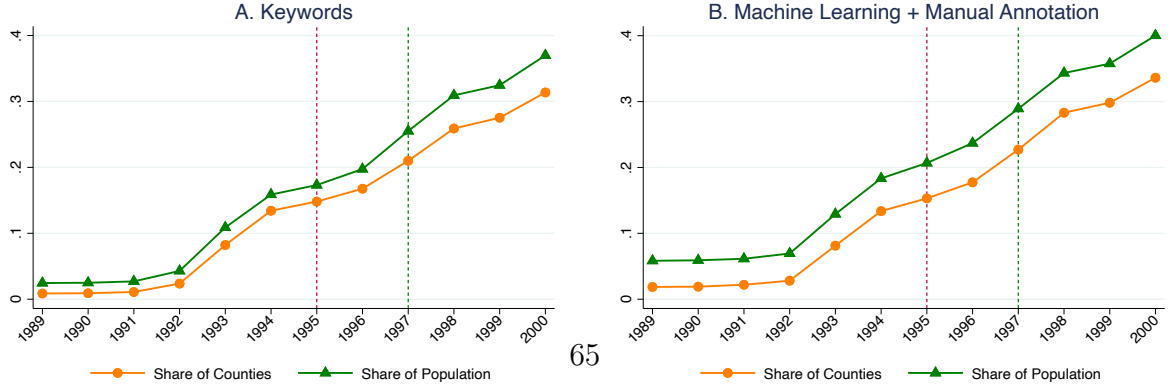
Labor Contract System



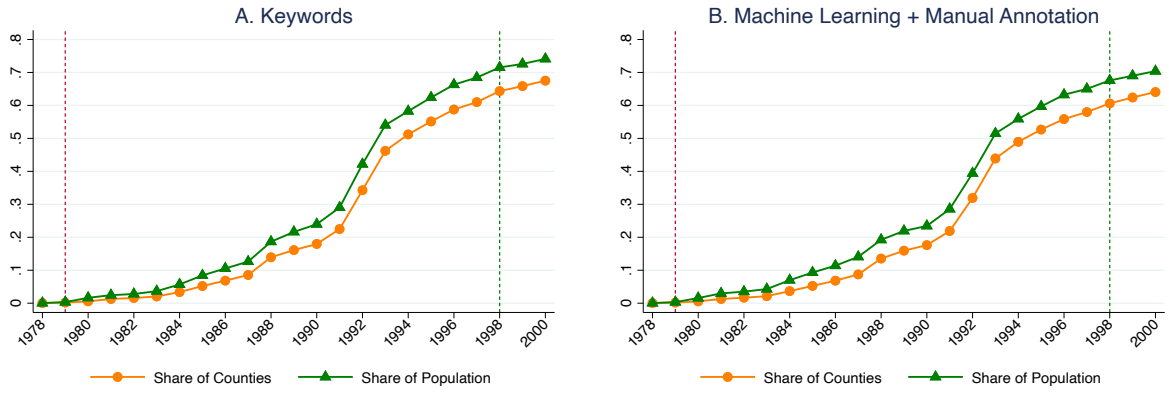
Development of Private Economy



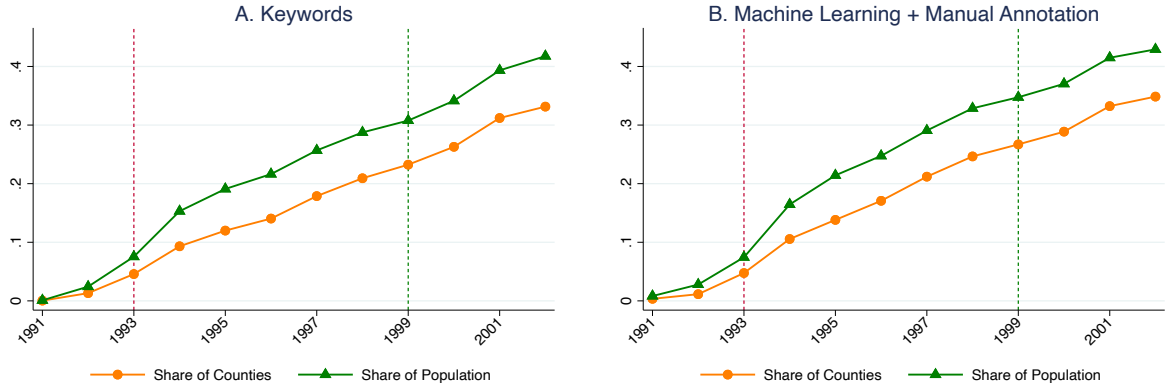
Privatization of SOEs



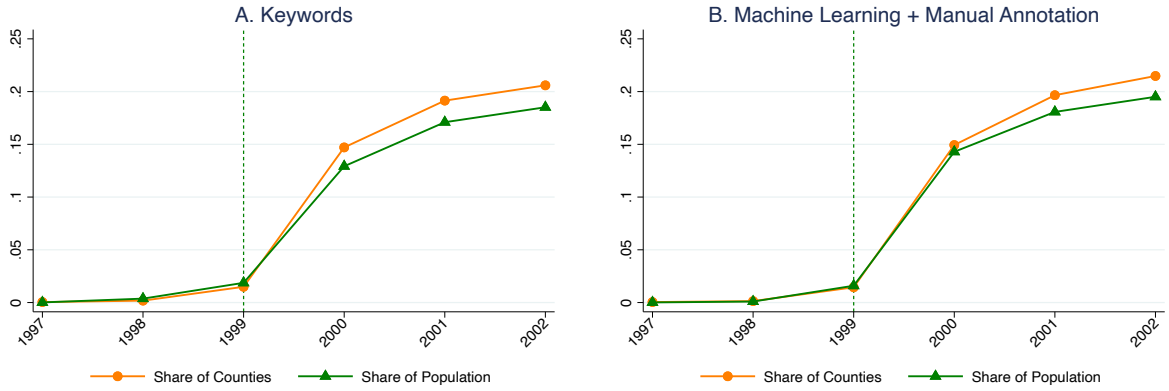
Housing Reform



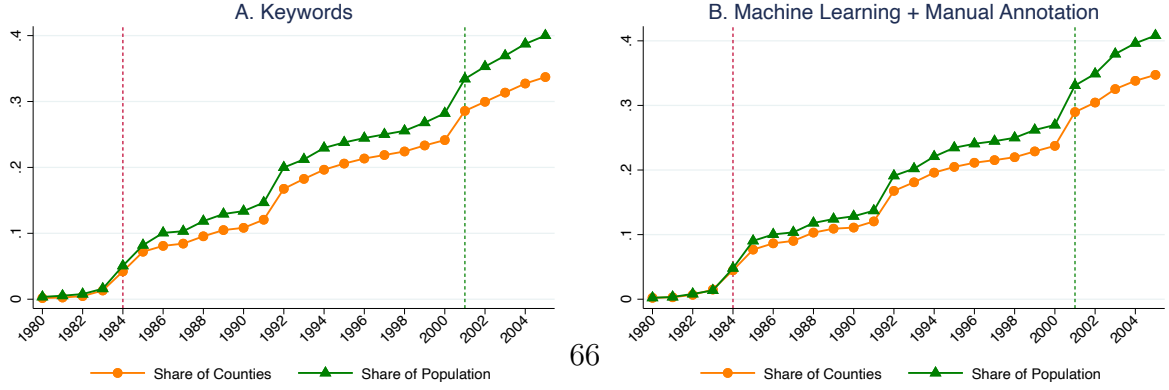
Setting Up A Modern Enterprise System



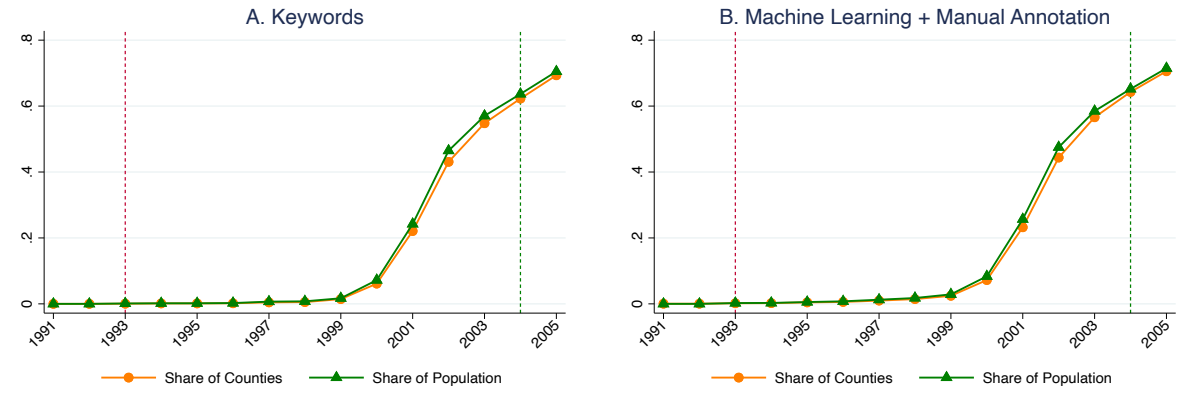
Advancing Western Development



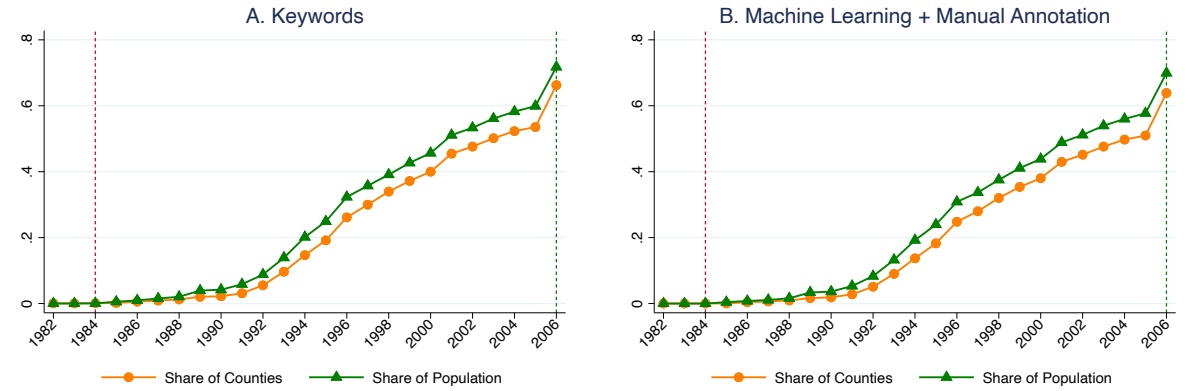
Hukou Reform



Rural Tax and Fee Reform



Bankruptcy Reform



Notes: Panel A illustrates the dispersion of reform policies across counties over time using the keyword matching approach. Panel B depicts the diffusion of these policies based on the combined machine learning and manual annotation approach. For each policy, we report two key time points: (i) the year the central government granted partial consent to experiment with the reform policy (indicated by a red dashed line), and (ii) the year the central government endorsed the reform policy for nationwide adoption (indicated by a green dashed line). For two specific policies—Urban Credit Cooperative Development and Advancing Western Development—these two time points coincide. We report, for each year, the share of counties that have adopted the reform policy (indicated by a connected orange line with circles) and the share of the population living in those counties (indicated by a connected green line with triangles).

B Additional Empirical Results

B.1 Reform Policy Innovation

In Columns (1)-(3) of Table B.1, we re-estimate the regressions from Table 6, but replace the measures of $Innovator_{i,q}$ and $Bottom\text{-}Up\ Index_q$ with their alternatives constructed using a method that combines machine learning with manual annotation.

Additionally, the measures of policy innovation and adoption from a single textual analysis approach may be prone to false positives and false negatives, resulting in measurement errors for some explanatory variables, such as $Bottom\text{-}Up\ Index_q$. To mitigate this concern, we employ alternative approaches not only to cross-validate the measures but also to design an IV strategy. This strategy addresses the attenuation bias introduced by classical measurement errors specific to each individual method, insofar as the measurement error associated with the two approaches is uncorrelated.Specifically, in Column (4), $Bottom\text{-}Up; Index_q$ is measured using the keyword matching approach, and the interaction terms are instrumented by the corresponding interaction terms with the bottom-up index constructed using the combined method of machine learning and manual annotation. In sum, our baseline results are robust to alternative measures and IV specification.

In Figure B.2, we use alternative measures of $NumInnov^{BU}i, t-\tau$ and $NumInnov^{CS}i, t-\tau$, derived from a combined approach of machine learning and manual annotation, to re-estimate Equation (B.1). The detected patterns closely resemble those observed in Figure B.1.

B.2 Reform Diffusion

Additional Heterogeneity Analysis. In the baseline analysis, we construct the measures of reform exposure and similarity based on the set of early adopters across the country. In Column (1) of Table B.2, we replace Λ^{iqt} and $Sim^{Avg}_{i,\Omega_{q,t-1}}$ with their within-province and outside-province counterparts, and re-estimate the hazard model. Specifically,

$$\Lambda^{Within}_{iqt} = \sum_j \frac{(Dist_{ij})^{-1} \cdot Pop_{j0}}{\sum_{j'} \left(Dist_{ij'}\right)^{-1} \cdot Pop_{j'0}} \mathbf{1}(j \in \Omega^{Within}_{iq,t-1}),\ \Lambda^{Outside}_{iqt} = \sum_j \frac{(Dist_{ij})^{-1} \cdot Pop_{j0}}{\sum_{j'} \left(Dist_{ij'}\right)^{-1} \cdot Pop_{j'0}} \mathbf{1}(j \in \Omega^{Outside}_{iq,t-1});$$

$$Sim^{Avg,Within}_{i,\Omega_{iq,t-1}} = -\frac{1}{K}\sum_k \left[\frac{1}{N_{q,t-1}} \sum_{j \in \Omega^{Within}_{iq,t-1}} \left|x^k_{i0} - x^k_{j0}\right|\right],\ Sim^{Avg,Outside}_{i,\Omega_{iq,t-1}} = -\frac{1}{K}\sum_k \left[\frac{1}{N_{q,t-1}} \sum_{j \in \Omega^{Outside}_{q,t-1}} \left|x^k_{i0} - x^k_{j0}\right|\right].$$

Here, $\Omega^{Within}_{q,t-1}$ (respectively, $\Omega^{Outside}_{q,t-1}$) denotes the set of counties that had adopted reform q by $t-1$ within (respectively, outside) the province that county i is located. We find that

the estimated coefficient for similarity with early adopters outside the province is significantly larger compared to that with early adopters within the province. This finding suggests that there could be common preferences across counties within the same province in policies, reducing the influence of suitability that a county might infer from other counties in the same province.

In Columns (2)-(4), we separately estimate the specification for each of the three decades in our sample, namely 1976-1985, 1986-1995, and 1996-2005. The effect of the suitability channel declines monotonically over time, yet remains significantly positive throughout the entire period. This pattern could be related to the changing attributes of the reform policies across different decades. As illustrated in Figure A.3, the median bottom-up indices are 0.729, 0.071, and -0.182 for policies endorsed during the periods 1976-1985, 1986-1995, and 1996-2005, respectively.

Robustness. In Figure B.3, we explore the heterogeneous effects of reform exposure and similarity on diffusion processes across reforms in a less parametric way. Specifically, we categorize reforms into three groups by their bottom-up index—those in the top quartile, the middle two quartiles, and the bottom quartile, and estimate equation 12 separately for each group. We observe the smallest learning effect for policies characterized by top-down forces (i.e., those in the bottom quartile) and the largest suitability effect for policies driven by bottom-up forces (i.e., those in the top quartile).

Panel A of Table B.3 assesses the robustness of the baseline results to an alternative measure of similarity. Specifically, we replace $Sim^{Avg}_{i,\Omega_{q,t-1}}$ with the measure defined as follows:

$$Sim^{p10}_{i,\Omega_{q,t-1}} = -\frac{1}{K}\sum_{k}\left[\underset{j\in\Omega_{q,t-1}}{10\%\text{ile}}\left(\left|x^{k}_{i0}-x^{k}_{j0}\right|\right)\right],$$

where $\underset{j\in\Omega_{q,t-1}}{10\%\text{ile}}$ refers to the 10th percentile of the absolute differences in characteristic k between county i and the counties in $\Omega_{q,t-1}$. This alternative measure captures how adoption decisions are influenced by counties that have characteristics most similar to those of county i. By concentrating on the 10th percentile of these disparities, we underscore the influence of counties that bear the most resemblance, which arguably offer the most pertinent experiences for county i. The estimated coefficient on $Sim^{p10}_{i,\Omega_{q,t-1}}$ remains positive and statistically significant, which is consistent with our previous results that similarity to early adopters increases the likelihood of a county adopting the reform. It is also significantly larger than that of the baseline measure. This is expected: the experiences shared by counties with the most similar characteristics should have a larger influence on policy adoption decisions.

In Panel B, we estimate a linear probability model instead of logit. The results are qualitatively similar to the baseline findings. Lastly, Panel C demonstrates the robustness of the

findings to alternative measures constructed based on the approach of machine learning and manual annotation.

B.3 Institutional Innovation and Economic Growth

Pre-trend Tests. Our baseline analysis in Table B.4 examines the economic growth across different provinces over the periods 1981-1983, ..., 2002-2004, in relation to their policy innovation and adoption activities during the preceding one-year periods (1980-1982, ..., 2001-2003). A potential issue is that the observed effects may be influenced by province-specific pre-existing trends in income and productivity growth that also determine the localities' policy innovation and adoption activities. To address this concern, we conduct a Granger test to assess whether economic growth is correlated with future policy shocks. Specifically, we connect the outcomes of interest from the three-year periods 1978-1980, ..., 1998-2000, to policy innovation and adoption activities during the periods 1980-1982, ..., 2001-2003. Table B.4 reports the regression results. It is reassuring that none of the estimates is statistically or economically significant, suggesting that our baseline findings is unlikely be driven by confounding trends. Columns (3)-(4) of Table B.8 implement similar pre-trend tests corresponding to the specifications in Columns (3) and (6) of Table 4, focusing on firm entry outcomes and future policy shocks at the prefecture level. The estimated coefficient for $Bottom\text{-}Up\ Policy\ Follower_{j\tau}$ is negative and significant, suggesting that, if anything, the pre-existing trends in private firm entry may lead us to find an opposite effect of adopting bottom-up policies.

In Table B.6, we regress the change in agricultural employment shares to over the periods 1982-1990 and 1990-2000 to policy shocks in the subsequent decades.[19] Again, none of the estimates is statistically significant, except for the estimate of $Bottom\text{-}Up\ Policy\ Follower_{j\tau}$ which is significantly negative. The findings suggest that the observed effect of bottom-up policy diffusion on structural change, as shown in Table 5, may be overstated.

Alternative Measurements and Specifications. Here, we perform additional robustness checks to demonstrate that the baseline results remain stable across alternative measurements and specifications. In Panel A of Tables B.5 and B.7, as well as in Table B.9, we use alternative measures of policy innovation and adoption, which are constructed using a method that combines machine learning with manual annotation. In Panel B of Tables B.5 and B.7, we adopt an IV strategy that uses these alternative measures as instruments for the corresponding variables derived from the keyword matching approach. This strategy helps mitigate potential attenuation bias due to classical measurement errors, to the extent that the errors across the

[19] All the measures are rescaled so that they are on a comparable decadal scale.

two different textual analysis methods are independent. As anticipated, the IV estimates are larger in magnitude than the corresponding OLS estimates in Tables 3 and 5. The difference is smaller in the province-level analysis, likely because measurement errors tend to cancel out when aggregating county-level measures to the province level. Furthermore, the attenuation bias seems to be more pronounced for the estimated effect of $Bottom\text{-}Up\ Policy\ Innovator_{i\tau}$ in the county-level analysis. This suggests a higher incidence of false positives and negatives in identifying policy innovators at the disaggregated level, as well as additional measurement errors introduced by the bottom-up reform index in Equation (9).

B.4 Innovators and Diffusion

We investigate the interactions between reform innovators and the central government by the Possion quasi-maximum likelihood (Poisson MLE) model as follows:

$$NumVisit_{it} = \exp\left(\sum_{\tau=-3}^{3} \beta^{\tau} NumInnov^{BU}_{i,t-\tau} + \sum_{\tau=-3}^{3} \gamma^{\tau} NumInnov^{CS}_{i,t-\tau} + X'_{i0}\delta + D_p + D_t\right)\varepsilon_{it}, \tag{B.1}$$

where $NumVisit_{it}$ denotes the number of visits made by members of the PSC; τ indicates the number of years relative to reform innovation; $NumInnov^{BU}_{i,t-\tau}$ represents the number of policy innovations classified as Bottom-Up Reform in county i and year $t-\tau$; and $NumInnov^{CP}_{i,t-\tau}$ represents the number of policy innovations classified as Centrally-Sponsored Reform in county i and year $t-\tau$. Specifically, to construct these measures, we consider county i an innovator of reform q if it belongs to the first 3 percent of counties to adopt reform q. Then, $NumInnov^{BU}_{i,t-\tau} = \sum_{q\in BU} Innovator_{i,q,t-\tau}$ and $NumInnov^{CP}_{i,t} = \sum_{q\in CP} Innovator_{i,q,t-\tau}$, where $Innovator_{i,q,t-\tau}$ is an indicator variable equal to 1 if county i is a policy innovator of reform q and the innovation occurs in year $t-\tau$, and 0 otherwise. BU and CP denote the set of policies classified as Bottom-Up Reforms and Centrally-Sponsored Reforms, respectively. As with the previous analysis, these two types of reforms are the classified based on whether the index $Bottom\text{-}Up\ Index_q$ falls within the top quartile or not.[20] Additionally, X_{i0} is a vector of baseline characteristics. D_p and D_t denote the province and year fixed effects, respectively. These fixed effects account for unobserved characteristics that influence the baseline likelihood of receiving visits from top leaders across different provinces and years. Robust standard errors are clustered at the province level to account for autocorrelation and correlations among counties within the same province.

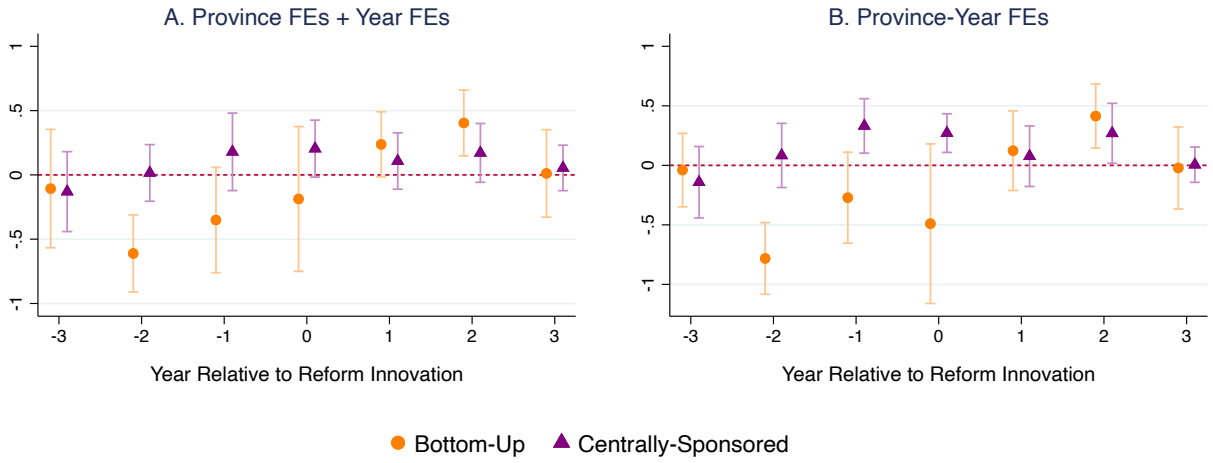
The lead-lag structure in specification (B.1) allows us to examine how the frequency of visits by PSC members changes in response to different types of policy innovations occurring within a seven-year time window. Panel A of Table B.1 presents the estimates of β^{τ} and γ^{τ} from the baseline model. Panel B further includes province-year fixed effects as additional controls. The estimation results reveal distinct patterns in the interactions between central and local governments before, during, and after policy innovations, depending on the type of reform.

For centrally-sponsored reforms we find that PSC members are more likely to visit the innovators one year before and during the innovation (i.e., when $\tau = -1$ and $\tau = 0$), consistent with the top-down selection of experimental sites.[21] We also observe increased visits two years

[20] To assess robustness, we adopt an alternative grouping where Bottom-Up Reforms are those with a bottom-up index in the top tertile. The regression results (available upon request) remain stable.

[21] The correlation between PSC visits and reform adoption may reflect several mechanisms: central leaders

Figure B.1: Reform Innovations and Visits by the Purliburo Standing Committee Members



Notes: The figure plots the estimated coefficients of β^{τ} and γ^{τ} and their 90% confidence intervals for the Poisson MLE regression in (B.1).The specification in Panel A includes the province dummies and year dummies, while that in Panel B controls for province-year dummies. For both panels, the controls of baseline county characteristics include the share of the population with college education or above, the share of the population with middle- or high-school education, the share of employment in the agricultural sector, the share of employment in the industrial sector, log population, log agricultural and industrial output per capita, log distance to the railway network, and an indicator variable for whether the county is located in the provincial capital. Standard errors are clustered at the province level.

post-innovation ($\tau = 2$), likely for outcome evaluation.

For bottom-up reforms, PSC members are less likely to visit innovators before and during the innovation ($\tau = -2$, $\tau = -1$, and $\tau = 0$), contrasting sharply with the pattern observed in centrally sponsored reforms. The negative estimates when $\tau = -1, -2$ suggest that reduced central attention may provide local authorities greater latitude to initiate politically uncertain policy experiments. The negative estimate when $\tau = 0$ likely reflects central leaders' strategic avoidance of early-stage visits to politically risky reforms, as such visits could be interpreted as endorsement. This cautious approach allows central leaders to maintain distance if local experiments fail (Xu, 2011). The coefficient turns positive and significant two years post-innovation ($\tau = 2$), consistent with both policy outcome inspection and implicit central approval—as illustrated by the Zhucheng SOE privatization case.[22]

gathering local information for site selection, successful lobbying by career-motivated local officials, or underlying patronage networks influencing both visits and experiment allocation. The latter two scenarios suggest potential selection bias in policy experiments (Wang and Yang, 2024).

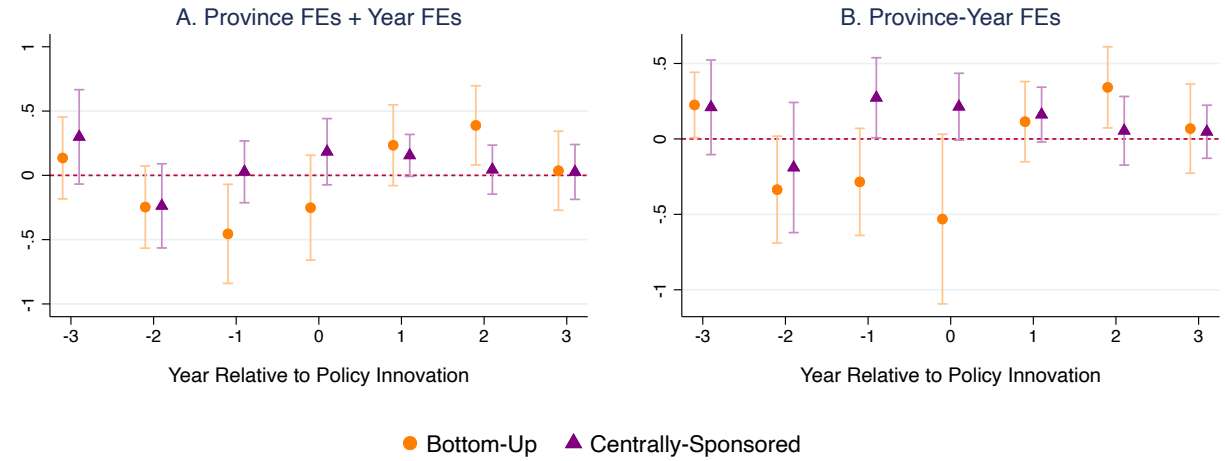
[22]Figure B.2 confirms the robustness of these patterns using alternative measures of $NumInnov^{BU}_{i,t-\tau}$ and $NumInnov^{CS}_{i,t-\tau}$ derived from the machine learning and manual annotation approach.

Table B.1: Characteristics of Reform Policy Innovators:
Alternative Measures and Specifications

Dependent Variable: $Innovator_{i,q}$	(1) OLS	(2) OLS	(3) OLS	(4) IV
$Share\ College\ or\ above_i$	0.0169**	0.0133*	0.0133*	0.0109
	(0.0065)	(0.0075)	(0.0075)	(0.0066)
$Bottom\text{-}Up\ Index_q \times Share\ College\ or\ above_i$			0.0044*	0.0037
			(0.0025)	(0.0023)
$Share\ Middle\ \&\ HighSchool_i$	0.0000	0.0013	0.0013	-0.0004
	(0.0055)	(0.0065)	(0.0065)	(0.0044)
$Bottom\text{-}Up\ Index_q \times Share\ Middle\ \&\ HighSchool_i$			0.0007	0.0026*
			(0.0010)	(0.0014)
$Share\ Agri_i$	-0.0314	-0.0334	-0.0334	-0.0396
	(0.0272)	(0.0302)	(0.0302)	(0.0280)
$Bottom\text{-}Up\ Index_q \times Share\ Agri_i$			0.0066	0.0070
			(0.0067)	(0.0068)
$Share\ Ind_i$	-0.0272	-0.0297	-0.0297	-0.0328
	(0.0242)	(0.0257)	(0.0257)	(0.0244)
$Bottom\text{-}Up\ Index_q \times Share\ Ind_i$			0.0056	0.0053
			(0.0051)	(0.0050)
$Log\ Pop_i$	0.0275***	0.0280***	0.0280***	0.0262***
	(0.0079)	(0.0075)	(0.0075)	(0.0068)
$Bottom\text{-}Up\ Index_q \times Log\ Pop_i$			0.0036	0.0027
			(0.0034)	(0.0026)
$Log\ Dist.\ to\ Railway_i$	0.0021**	0.0025***	0.0025***	0.0029***
	(0.0010)	(0.0009)	(0.0009)	(0.0010)
$Bottom\text{-}Up\ Index_q \times Log\ Dist.\ to\ Railway_i$			0.0008*	0.0014***
			(0.0005)	(0.0005)
$Log\ Fiscal\ Revenue_i$	-0.0040	-0.0020	-0.0020	-0.0014
	(0.0070)	(0.0049)	(0.0049)	(0.0045)
$Bottom\text{-}Up\ Index_q \times Log\ Fiscal\ Revenue_i$			-0.0022	-0.0021
			(0.0024)	(0.0016)
$Log\ Agri\ \&\ Ind\ Output\ per\ capita_i$	0.0093	0.0108**	0.0108**	0.0106**
	(0.0055)	(0.0048)	(0.0048)	(0.0049)
$Bottom\text{-}Up\ Index_q \times Log\ Agri\ \&\ Ind\ Output\ per\ capita_i$			0.0020	0.0021
			(0.0016)	(0.0019)
coast	0.0005			
	(0.0068)			
Province FEs	N	Y	Y	Y
Reform FEs	N	Y	Y	Y
Observations	56,750	56,750	56,750	56,750
R-squared	0.0648	0.0833	0.0842	–

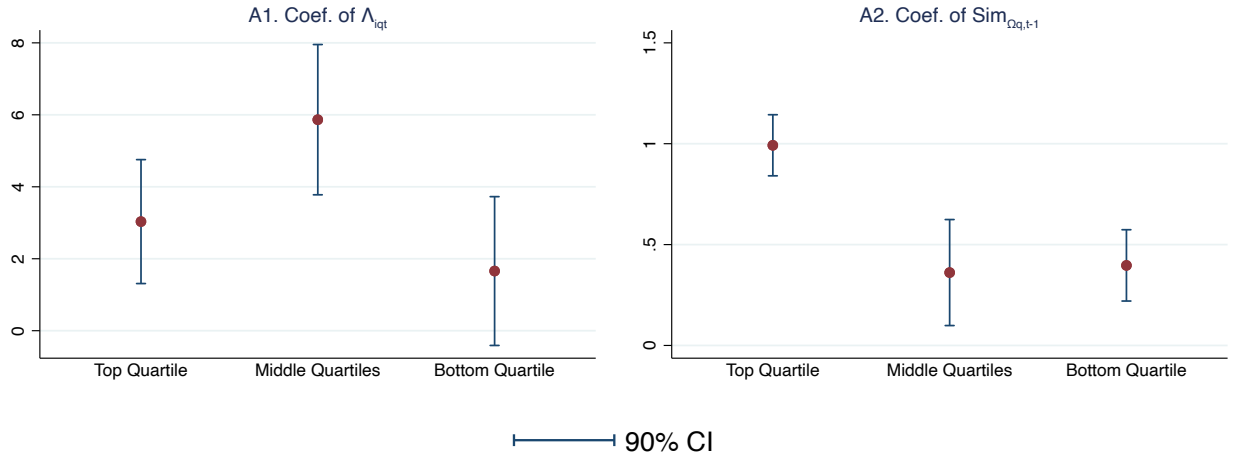
Notes: Regressions in Columns (1)-(3) employ the bottom-up index which is constructed using a method that combines machine learning with manual annotation. In Column (4), $Bottom\text{-}Up; Index_q$ is measured using the keyword approach, and the interaction terms are instrumented by the corresponding interaction terms with the bottom-up index constructed using the combined method of machine learning and manual annotation. All regressions are weighted by county population in 1982. Robust standard errors are clustered at the province level. *** p<0.01, ** p<0.05, * p<0.1

Figure B.2: Reform Innovations and Visits by the Purliburo Standing Committee Members: Alternative Measures



Notes: The figure plots the estimated coefficients of β^{τ} and γ^{τ} and their 90% confidence intervals for the Poisson MLE regression in (B.1). The specification in Panel A include the province dummies and year dummies, while that in Panel B controls for province-year dummies. For both panels, the control variables for baseline county characteristics include the share of the population with college education or above, the share of the population with middle-school education, the share of employment in the agricultural sector, the share of employment in the industrial sector, log population, log agricultural and industrial output per capita, log distance to the railway network, and an indicator variable for whether the county is located in the provincial capital. Standard errors are clustered at the province level.

Figure B.3: Spatial Diffusion of Reform Policies: Alternative Groupings



Notes: This figure presents the estimated coefficients of λ_{iqt} and $Sim_{i,\Omega_{q,t-1}}$ from Equation (12), along with their corresponding 90% confidence intervals, for three distinct groups of reform policies: those with a bottom-up index in the top quartile, the middle two quartiles, and the bottom quartile. Standard errors are clustered at the province level.

Table B.2: Spatial Diffusion of Reforms: Additional Heterogeneity Analysis

Dependent Variable: $Y_{iqt} = 1$	(1)	(2)	(3)	(4)
Λ_{iqt} (within prov)	0.7700***			
	(0.1462)			
Λ_{iqt} (outside prov)	0.4967			
	(1.0475)			
$Sim^{Avg}_{i,\Omega_{q,t-1}}$ (within prov)	0.2460***			
	(0.0586)			
$Sim^{Avg}_{i,\Omega_{q,t-1}}$ (outside prov)	0.4007***			
	(0.0930)			
Λ_{iqt}		2.3188**	3.7386***	0.9780
		(0.9265)	(0.8356)	(1.1820)
$Sim^{Avg}_{i,\Omega_{q,t-1}}$		0.6935***	0.5179***	0.4286***
		(0.1184)	(0.0773)	(0.1517)
Sample:	All	1976-1985	1986-1995	1996-2005
County Baseline Characteristics	Y	Y	Y	Y
Region×Reform FEs	Y	Y	Y	Y
Reform×Year FEs	Y	Y	Y	Y
Region×Year FEs	Y	Y	Y	Y
Observations	480,819	219,442	264,935	100,745

Notes: County baseline characteristics include: share of population with college degree or above, share of population with middle- or high-school education, share of employment in the agricultural sector, share of employment in the industrial sector, log population, and log agricultural and industrial output per capita. All these measures are constructed using data from the 1982 Population Census. For each year t, the sample is restricted to counties that have not yet adopted reform q. For each reform, the estimation sample starts in the first year when at least 5 counties have adopted the reform, and concludes five years post the final endorsement of the reform by the central government. Robust standard errors are clustered at the province level. *** p<0.01, ** p<0.05, * p<0.1

Table B.3: Spatial Diffusion of Reforms: Alternative Measures and Specifications

Dependent Variable: $Y_{iqt} = 1$	(1)	(2)	(3)	(4)
Panel A: Alternative Measure of Suitability				
Λ_{iqt}	2.8276***	2.8604***	3.8513***	3.8744***
	(0.7024)	(0.6970)	(0.6015)	(0.5969)
$Bottom\text{-}Up\ Index_q \times \Lambda_{iqt}$		0.5631		0.4689
		(0.3856)		(0.4318)
$Sim^{p10}_{i,\Omega_{q,t-1}}$	1.1541***	1.1249***	1.1557***	1.1294***
	(0.0906)	(0.0909)	(0.0893)	(0.0898)
$Bottom\text{-}Up\ Index_q \times Sim^{p10}_{i,\Omega_{q,t-1}}$		0.0617***		0.0566**
		(0.0228)		(0.0228)
Observations	587,004	587,004	557,255	557,255
Panel B: Linear Probability Model				
Λ_{iqt}	0.1789***	0.1815***	0.2388***	0.2397***
	(0.0364)	(0.0356)	(0.0324)	(0.0317)
$Bottom\text{-}Up\ Index_q \times \Lambda_{iqt}$		0.0419		0.0226
		(0.0252)		(0.0274)
$Sim^{Avg}_{i,\Omega_{q,t-1}}$	0.0063**	0.0058**	0.0063**	0.0058**
	(0.0027)	(0.0027)	(0.0026)	(0.0026)
$Bottom\text{-}Up\ Index_q \times Sim^{Avg}_{i,\Omega_{q,t-1}}$		0.0058***		0.0055***
		(0.0012)		(0.0012)
Observations	587,004	587,004	587,004	587,004
Panel C: Alternative Measures Based on ML+Manual Annotation				
Λ_{iqt}	2.5772***	2.5888***	3.6012***	3.6015***
	(0.8016)	(0.8033)	(0.7152)	(0.7175)
$Bottom\text{-}Up\ Index_q \times \Lambda_{iqt}$		0.2584		0.1278
		(0.4150)		(0.4326)
$Sim^{Avg}_{i,\Omega_{q,t-1}}$	0.6368***	0.6215***	0.6295***	0.6155***
	(0.0798)	(0.0790)	(0.0804)	(0.0796)
$Bottom\text{-}Up\ Index_q \times Sim^{Avg}_{i,\Omega_{q,t-1}}$		0.0799***		0.0759***
		(0.0163)		(0.0159)
Observations	605,217	605,217	571,489	571,489
County Baseline Characteristics	Y	Y	Y	Y
Region×Reform FEs	Y	Y	N	N
Reform×Year FEs	Y	Y	N	N
Region×Year FEs	Y	Y	N	N
Region×Reform×Year FEs	N	N	Y	Y

Notes: County baseline characteristics include: share of population with college degree or above, share of population with middle- or high-school education, share of employment in the agricultural sector, share of employment in the industrial sector, log population, and log agricultural and industrial output per capita. All these measures are constructed using data from the 1982 Population Census. For each year t, the sample is restricted to counties that have not yet adopted reform q. For each reform, the estimation sample starts in the first year when at least 5 counties have adopted the reform, and concludes five years post the final endorsement of the reform by the central government. Robust standard errors are clustered at the province level. *** p<0.01, ** p<0.05, * p<0.1

Table B.4: Reform Policy Innovation, Adoption, and Economic Growth: Pre-trend Test

Dependent Variable:	3-$Year$ *Lagged Period* $\Delta \ln GDP$ *per worker*$_{p\tau}$ (1)	3-$Year$ *Lagged Period* $\Delta \ln GDP$ *per worker*$_{p\tau}$ (2)	3-$Year$ *Lagged Period* $\Delta \ln TFP_{p\tau}$ ($\alpha = 0.5$) (3)	3-$Year$ *Lagged Period* $\Delta Investment$ *Rate*$_{p\tau}$ (4)
Policy Innovator$_{p\tau}$	-0.0361	-0.0355	-0.0347	0.0437
	(0.0381)	(0.0407)	(0.0428)	(0.0397)
Bottom-Up Policy Innovator$_{p\tau}$	0.0378	0.0216	0.0123	0.0260
	(0.0322)	(0.0303)	(0.0303)	(0.0276)
Policy Follower$_{p\tau}$	0.0016	-0.0067	-0.0105	0.0185
	(0.0099)	(0.0119)	(0.0121)	(0.0109)
Bottom-Up Policy Follower$_{p\tau}$	-0.0035	-0.0083	-0.0104	-0.0075
	(0.0122)	(0.0120)	(0.0115)	(0.0132)
3-$Year$ *Lagged Period* $\Delta \ln$ *Capital per worker*$_{p\tau}$		0.3273***		
		(0.0666)		
Province Baseline Characteristics×Period	Y	Y	Y	Y
Province	Y	Y	Y	Y
Year	Y	Y	Y	Y
Observations	232	232	232	232
R-squared	0.7495	0.7766	0.7874	0.6309

Notes: In Columns (1) and (2), the dependent variables are the change in log GDP per worker during the three-year lagged period of τ in province p. In Column (3), the dependent variable is the change in log TFP during the three-year lagged period of τ in province p. In Column (4), the dependent variable is the change in investment rate during the three-year lagged period of τ in province p. Province baseline characteristics include: log employment in 1978, log GDP per capita in 1978, log capital per capita in 1978, a dummy indicating whether the province is in the coastal area, and a dummy variable indicating whether the province is a municipality. Robust standard errors are clustered at the province level. *** p<0.01, ** p<0.05, * p<0.1

Table B.5: Reform Policy Innovation, Adoption, and Economic Growth: Alternative Measures and Specifications

Dependent Variable:	$\Delta \ln GDP$ *per worker*$_{p\tau}$ (1)	$\Delta \ln GDP$ *per worker*$_{p\tau}$ (2)	$\Delta \ln TFP_{p\tau}$ ($\alpha = 0.5$) (3)	Δ*Investment Rate*$_{p\tau}$ (4)
Panel A: Alternative Measures Based on ML+Manual Annotation				
Policy Innovator$_{p\tau}$	-0.0181	-0.0304	-0.0310	0.0532***
	(0.0222)	(0.0212)	(0.0217)	(0.0160)
Bottom-Up Policy Innovator$_{p\tau}$	0.0770***	0.0720***	0.0717***	-0.0361**
	(0.0234)	(0.0239)	(0.0238)	(0.0156)
Policy Follower$_{p\tau}$	0.0125	0.0209**	0.0214**	-0.0527***
	(0.0124)	(0.0099)	(0.0099)	(0.0100)
Bottom-Up Policy Follower$_{p\tau}$	0.0344***	0.0222**	0.0216**	-0.0187**
	(0.0111)	(0.0099)	(0.0101)	(0.0084)
$\Delta \ln$ *Capital per worker*$_{p\tau}$		0.4754***		
		(0.0540)		
Observations	232	232	232	232
R-squared	0.7372	0.8117	0.7441	0.6586
Panel B: IV Estimation				
Policy Innovator$_{p\tau}$	-0.0405	-0.0396	-0.0395	0.1200**
	(0.0486)	(0.0447)	(0.0449)	(0.0451)
Bottom-Up Policy Innovator$_{p\tau}$	0.1296***	0.1010***	0.0990***	-0.0712*
	(0.0357)	(0.0298)	(0.0294)	(0.0368)
Policy Follower$_{p\tau}$	0.0291*	0.0340***	0.0343***	-0.0483***
	(0.0150)	(0.0109)	(0.0106)	(0.0102)
Bottom-Up Policy Follower$_{p\tau}$	0.0580**	0.0425**	0.0414**	-0.0228
	(0.0246)	(0.0182)	(0.0182)	(0.0149)
$\Delta \ln$ *Capital per worker*$_{p\tau}$		0.4667***		
		(0.0512)		
Observations	232	232	232	232
F-stat	6.265	6.162	6.265	6.265
Province Baseline Characteristics×Period	Y	Y	Y	Y
Province	Y	Y	Y	Y
Year	Y	Y	Y	Y

Notes: Panel A employs the measures of *Policy Innovator*$_{p\tau}$, *Bottom-Up Policy Innovator*$_{p\tau}$, *Policy Follower*$_{p\tau}$, and *Bottom-Up Policy Follower*$_{p\tau}$ constructed based on the method combining machine learning and manual annotation. Panel B uses these these measures as IVs for the corresponding variables derived from the keyword matching approach. Province baseline characteristics include: log employment in 1978, log GDP per capita in 1978, log capital per capita in 1978, a dummy indicating whether the province is in the coastal area, and a dummy variable indicating whether the province is a municipality. Robust standard errors are clustered at the province level. *** p<0.01, ** p<0.05, * p<0.1

Table B.6: Policy Innovation, Adoption, and Structural Change: Pre-trend Test

Dependent Variable: *Lagged Period* $\Delta \ln$ *Share Agri*$_{i\tau}$	(1)	(2)
Policy Innovator$_{i\tau}$	0.0043	0.0061
	(0.0259)	(0.0293)
Bottom-Up Policy Innovator$_{i\tau}$		0.0031
		(0.0158)
Policy Follower$_{i\tau}$	0.0012	0.0009
	(0.0017)	(0.0018)
Bottom-Up Policy Follower$_{i\tau}$		-0.0033*
		(0.0017)
County Baseline Characteristics×Period	Y	Y
Province×Period	Y	Y
Observations	4,532	4,532
R-squared	0.1750	0.1757

Notes: The regressions in the table examine the changes in the logarithm of agricultural employment share over the periods 1982-1990 and 1990-2000, respectively, in relation to the measures of policy innovation and adoption during the periods 1990-2000 and 2000-2005.The control variables for baseline county characteristics include the share of the population with college education or above, the share of the population with middle-school education, the share of employment in the agricultural sector, the share of employment in the industrial sector, log population, log agricultural and industrial output per capita, and log distance to the railway network. Robust standard errors are clustered at the province level. *** p<0.01, ** p<0.05, * p<0.1

Table B.7: Policy Innovation, Adoption, and Structural Change: Alternative Measures and Specifications

Dependent Variable: $\Delta \ln Share\ Agri_{i\tau}$	(1)	(2)	(3)	(4)
Panel A: Alternative Measures Based on ML+Manual Annotation				
$Policy\ Innovator_{i\tau}$	-0.0648**	-0.0626**	-0.0643**	-0.0623**
	(0.0261)	(0.0238)	(0.0261)	(0.0238)
$Bottom\text{-}Up\ Policy\ Innovator_{i\tau}$		-0.0400***		-0.0404***
		(0.0088)		(0.0087)
$Policy\ Follower_{i\tau}$	0.0025**	0.0020	0.0014	0.0008
	(0.0012)	(0.0012)	(0.0020)	(0.0020)
$Bottom\text{-}Up\ Policy\ Follower_{i\tau}$		-0.0048**		-0.0065**
		(0.0020)		(0.0028)
Observations	6,806	6,806	4,539	4,539
R-squared	0.2886	0.2909	0.1821	0.1867
Panel B: IV Estimation				
$Policy\ Innovator_{i\tau}$	-0.0992**	-0.1008***	-0.0983**	-0.0998***
	(0.0363)	(0.0325)	(0.0364)	(0.0326)
$Bottom\text{-}Up\ Policy\ Innovator_{i\tau}$		-0.0664***		-0.0674***
		(0.0148)		(0.0147)
$Policy\ Follower_{i\tau}$	0.0033**	0.0023	0.0022	0.0011
	(0.0014)	(0.0015)	(0.0023)	(0.0023)
$Bottom\text{-}Up\ Policy\ Follower_{i\tau}$		-0.0062**		-0.0084**
		(0.0025)		(0.0034)
Observations	6,806	6,806	4,539	4,539
Kleibergen-Paap F-stat	157.4	43.45	154.8	42.32
Sample:	82-90,90-00,00-05		82-90,90-00	
County Baseline Characteristics×Period	Y	Y	Y	Y
Province×Period	Y	Y	Y	Y

Notes: Panel A employs the measures of $Policy\ Innovator_{i\tau}$, $Bottom\text{-}Up\ Policy\ Innovator_{i\tau}$, $Policy\ Follower_{i\tau}$, and $Bottom\text{-}Up\ Policy\ Follower_{i\tau}$ constructed based on the method combining machine learning and manual annotation. Panel B uses these these measures as IVs for the corresponding variables derived from the keyword matching approach. Columns (1)-(2) stack the first differences for three periods: 1982-1990, 1990-2000, and 2000-2005, while Columns (3)-(4) stack the first differences for two periods: 1982-1990 and 1990-2000. The control variables for baseline county characteristics include the share of the population with college education or above, the share of the population with middle-school education, the share of employment in the agricultural sector, the share of employment in the industrial sector, log population, log agricultural and industrial output per capita, and log distance to the railway network. Robust standard errors are clustered at the province level. *** p<0.01, ** p<0.05, * p<0.1

Table B.8: Policy Innovation, Adoption, and Firm Entry:
Alternative Outcomes and Pre-trend Test

Dependent Variable:	*Entriess of SOEs per Capita*$_{j\tau}$ (1)	*Entries of COEs per Capita*$_{j\tau}$ (2)	3-*Year Lagged Period Entries of Private Firms per Capita*$_{j,\tau}$ (3)	3-*Year Lagged Period Entries of SOEs&COEs per Capita*$_{j,\tau}$ (4)
Policy Innovator$_{j\tau}$	-0.1074*	0.0021	0.0564	0.0308
	(0.0573)	(0.0346)	(0.0381)	(0.0255)
Bottom-Up Policy Innovator$_{j\tau}$	-0.1049***	-0.0281	-0.0351	-0.0117
	(0.0330)	(0.0220)	(0.0284)	(0.0167)
Policy Follower$_{j\tau}$	0.0058	0.0018	-0.0034	0.0010
	(0.0038)	(0.0029)	(0.0038)	(0.0028)
Bottom-Up Policy Follower$_{j\tau}$	0.0057	0.0079*	-0.0063**	0.0051
	(0.0057)	(0.0041)	(0.0029)	(0.0051)
Prefecture Baseline Characteristics×Period	Y	Y	Y	Y
Province×Period	Y	Y	Y	Y
Prefecture	Y	Y	Y	Y
Observations	2,608	2,608	2,608	2,608

Notes: Poisson MLE models are used to estimate regressions across all columns. In Columns (1) and (2), the dependent variables are the number of state-owned enterprise (SOE) entries and collectively-owned enterprise (COE) entries during period τ in prefecture j, respectively. In Columns (3), the dependent variable is the number of domestic and foreign private firm entries per capita during the three-year lagged period of τ in prefecture j. In Column (4), the dependent variable is the number of SOE and COE entries per capita during three-year lagged period of τ in prefecture j. The control variables for baseline prefecture characteristics include the share of the population with college education or above, the share of the population with middle-school education, the share of employment in the agricultural sector, the share of employment in the industrial sector, log population, log agricultural and industrial output per capita, and log distance to the railway network. Robust standard errors are clustered at the province level. *** p<0.01, ** p<0.05, * p<0.1

Table B.9: Policy Innovation, Adoption, and Firm Entry: Alternative Measures

Dependent Variable:	*Entries of Private Firms per Capita*$_{j\tau}$			*Entries of SOEs&COEs per Capita*$_{j\tau}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Policy Innovator$_{j\tau}$	0.2370***	0.3137***	0.0464*	0.0296	0.0240	-0.0346
	(0.0876)	(0.0730)	(0.0246)	(0.0387)	(0.0385)	(0.0487)
Bottom-Up Policy Innovator$_{j\tau}$		0.1521***	0.0173		-0.0531*	-0.0512
		(0.0494)	(0.0238)		(0.0292)	(0.0324)
Policy Follower$_{j\tau}$	0.0240**	0.0254**	0.0020	0.0085	0.0097*	0.0004
	(0.0115)	(0.0110)	(0.0024)	(0.0053)	(0.0052)	(0.0025)
Bottom-Up Policy Follower$_{j\tau}$		0.0042	0.0041		0.0093	0.0063
		(0.0098)	(0.0037)		(0.0057)	(0.0051)
Prefecture Baseline Characteristics×Period	Y	Y	Y	Y	Y	Y
Province×Period	Y	Y	Y	Y	Y	Y
Prefecture	N	N	Y	N	N	Y
Observations	2,608	2,608	2,608	2,608	2,608	2,608

Notes: Poisson MLE models are used to estimate regressions across all columns. In Columns (1)-(3), the dependent variable is the number of domestic and foreign private firm entries per capita during period τ in prefecture j. In Columns (4)-(6), the dependent variable is the number of state-owned enterprise (SOE) and collectively-owned enterprise (COE) entries per capita during period τ in prefecture j. The control variables for baseline prefecture characteristics include the share of the population with college education or above, the share of the population with middle-school education, the share of employment in the agricultural sector, the share of employment in the industrial sector, log population, log agricultural and industrial output per capita, and log distance to the railway network. Robust standard errors are clustered at the province level. *** p<0.01, ** p<0.05, * p<0.1