調査報告書 24－10

How Expanding Insurance Coverage Shapes Drug Innovation and Prices: Evidence from China

令和 7（2025）年 3 月

公益財団法人　アジア成長研究所

How Expanding Insurance Coverage Shapes Drug Innovation and Prices: Evidence from China

Abstract

This study examines how insurance coverage expansion shapes drug pricing and innovation in China. Using drug application and procurement data, we explore how pharmaceutical firms adjust their R&D investments and pricing strategies in response to increased reimbursement coverage. While past studies in other markets suggest that broader insurance coverage often leads to higher drug prices due to greater demand or altered insurer negotiations, our preliminary results indicate minimal price changes, especially for cancer drugs. However, firms appear to adjust their innovation strategies, particularly in response to broader market access opportunities. Our findings provide early insights into the interactions between insurance policy changes and pharmaceutical innovation strategies in China's cancer drug market.

Key Words: Insurance Coverage; Pricing Strategy; Pharmaceutical Innovation; Health Policy

I. Introduction

Expanding health insurance coverage has important implications for pharmaceutical markets, particularly in shaping research and development (R&D) incentives and drug pricing. As coverage broadens, financial barriers to healthcare access decrease, leading to higher utilization of medical treatments (Finkelstein et al., 2012; Ghosh et al., 2019 Economic theory suggests that expanded insurance coverage enlarges market size, incentivizing greater R&D investments (Acemoglu and Linn, 2004; Blume-Kohout and Sood, 2013).

This market expansion effect is particularly relevant in pharmaceutical development, where new drug development costs typically range from $802 million to over $2 billion per drug (DiMasi et al., 2016; Wouters et al., 2020), with development timelines often exceeding 10 years. When more individuals are covered, pharmaceutical companies anticipate higher potential revenues, justifying the significant financial investment required before a new drug reaches the market, including research, clinical trials, regulatory approval, and manufacturing setup.

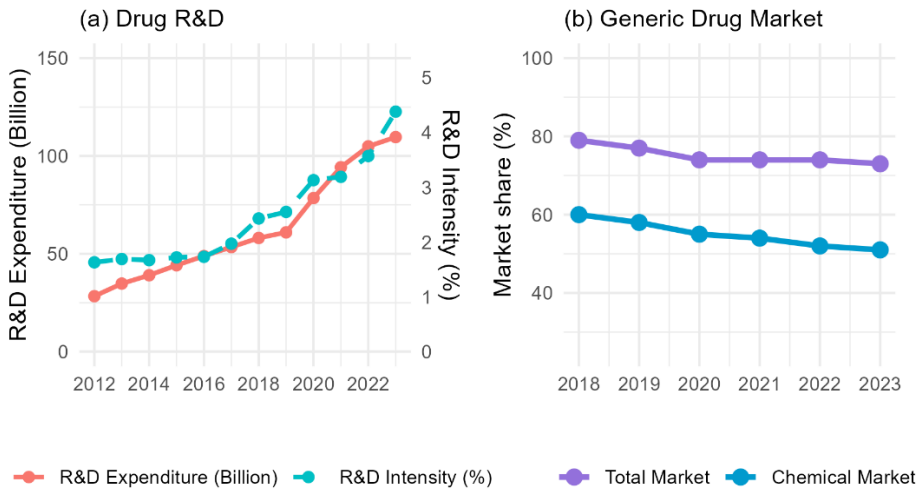
Empirical evidence supports this theoretical prediction. Dubois et al. (2015) found that a 10% increase in market size leads to approximately a 2.31% increase in pharmaceutical innovation, while Yin (2008) demonstrated that Orphan Drug Act aimed at expanding coverage for rare diseases can drive targeted R&D efforts. The implementation of Medicare Part D in the United States offers a particularly instructive case study, as it significantly expanded prescription drug coverage for older adults. Subsequent research by Blume-Kohout and Sood (2013) and Dranove et al. (2014) documented increased pharmaceutical R&D specifically directed toward therapeutic categories with high Medicare consumption, suggesting that firms strategically respond to coverage expansions by reallocating innovation resources.

Beyond R&D spending increases, insurance coverage can influence the direction and nature of innovation. Clemens (2013) found that expansions in U.S. public insurance programs created incentives for innovation, accounting for approximately 25% of global medical equipment patenting. Similarly, Kyle and McGahan (2012) demonstrated that stronger patent rules encouraged companies to shift innovative efforts toward regions that adopted these new protections, affecting not just how much companies invested, but also which diseases they chose to address. Another example is China's rural health insurance scheme, which increased access to healthcare and created incentives for drug companies to innovate. Zhang and Nie (2016) showed that the expansion of this scheme encouraged pharmaceutical firms to invest in developing new medicines, particularly treatments targeting diseases affecting rural populations.

While the link between insurance coverage, market size, and R&D investment is well-established, its effect on drug pricing is less straightforward. On one hand, insurance may reduce patients' price sensitivity, potentially allowing manufacturers to charge higher prices (Pauly, 2004). On the other hand, insurers often exercise bargaining power to lower prices (Duggan and Scott Morton, 2010). To gain broader patient access through reimbursement, firms may accept lower per-unit prices, potentially offsetting margin reductions with increased sales volume.

In emerging markets, where the pharmaceutical industry historically prioritized manufacturing over innovation, the effects of insurance expansion on investment and pricing strategies remain less clear. China provides a notable example, as generic drugs dominated its Market (Mills et al., 2019). Recently, however, increased R&D spending

indicates a shift toward innovation, with pharmaceutical R&D expenditures rising sharply from 28 billion to 110 billion Yuan, and R&D intensity increasing from 1.7% to 4.2%, particularly accelerating after 2016 (Figure 1(a)). In addition, the share of generic chemical drugs declined from 60% in 2018 to 51% in 2023, whereas generics within the chemical drug market dropped from 79% to 73% (Figure 1(b)). In oncology, the share of generic drugs has dropped to 43%, reflecting growing market penetration of innovative cancer treatments.



Note: The data for subfigure (a) is sourced from the National Bureau of Statistics, while the data for subfigure (b) comes from the 2023 Report on *China Generic Drug Development,* jointly published by the Institute of Materia Medica, Chinese Academy of Medical Sciences, the China Pharmaceutical Industry Information Center, and the National Institutes for Food and Drug Control.

Figure 1. Trends in Pharmaceutical R&D and Generic Drug Market

These trends align with government policies designed to balance drug affordability and innovation. Measures such as centralized procurement and therapeutic substitution have intensified price competition, narrowing profit margins for generic manufacturers. Additionally, updates to the National Reimbursement Drug List (NRDL) have shifted resources toward innovative drugs, further challenging the generic market. In particular, the 2017 NRDL update introduced price negotiation mechanisms, allowing innovative drugs to enter the insurance system at negotiated prices.

This study aims to empirically investigate how health insurance expansion influences pharmaceutical innovation and pricing strategies in emerging markets, using China's pharmaceutical sector as a case study. We seek to provide early insights into the resulting transformation of market incentives for drug development and productization.

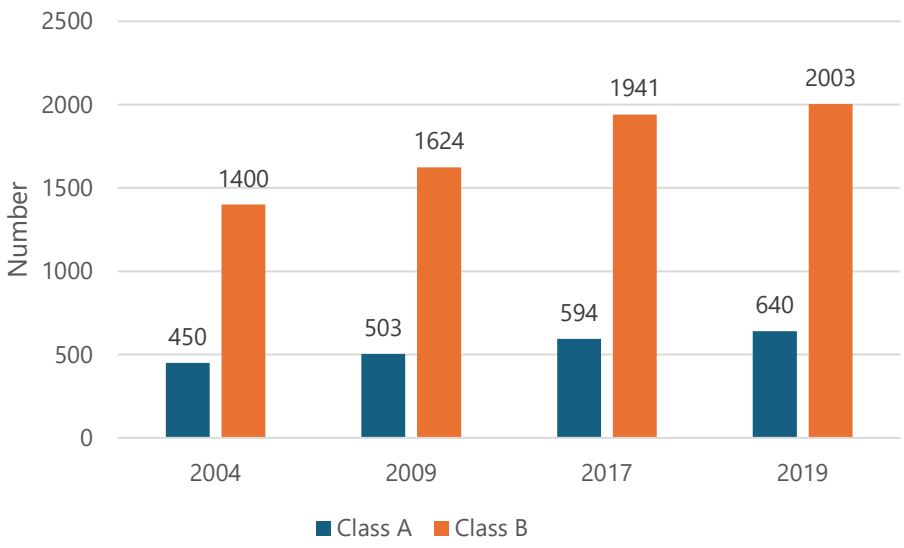
II. Institutional Background of Drug Policy Reforms

China has implemented a series of drug policy reforms to improve drug affordability and accessibility. These reforms have focused on three key areas: drug reimbursement coverage, procurement mechanisms, and distribution systems.

The NRDL, established in 2000, functions as the primary mechanism governing drug coverage and price control in China's healthcare system. Initially, the NRDL operated under a two-tier structure: Class A drugs with full reimbursement and Class B drugs with partial coverage. Class A primarily includes essential medicines and most first-line therapies, whereas Class B covers additional expensive second-line drugs that require co-payments and restricted formulary authorizations (Guan et al., 2011; Liu et al., 2022). The system also allowed substantial provincial flexibility. Local government could adjust their provincial reimbursed drug lists (PRDL) by up to 15 percent of the national list. While reimbursement rates for NRDL drugs were nationally standardized, PRDL reimbursement levels varied depending on local insurance policies and fiscal capacity.

The NRDL was updated periodically to reflect evolving healthcare needs and medical advancements, though these updates were infrequent before 2019 (see Figure 2). After its initial release in 2000, the list was updated in 2004 to include 1,850 drugs, followed by the 2009 version, which added 277 drugs, including newer formulations and dosage forms. A major expansion occurred in 2017, raising the number of listed drugs to 2,535 and adding high-cost cancer drugs and treatments for rare diseases. By 2019, the NRDL covered 2,643 drugs. However, the infrequent updates and substantial regional disparities continued to hinder timely access to new medicines.

The year 2017 marked a turning point when China introduced systematic reforms to the NRDL process. The government established annual negotiations between the National Healthcare Security Administration (NHSA) and pharmaceutical manufacturers, formalizing regular updates and standardizing evaluation criteria for drug inclusion. The negotiation process led to average price reduces of approximately 60% in exchange for national reimbursement, significantly improving access to innovative therapies (Zhou et al., 2024).



Note: The data were retrieved and consolidated from updates to the National Reimbursement Drug List, published by the NHSA and the Ministry of Human Resources and Social Security in the years 2004, 2009, 2017, and 2019.

Figure 2. Number of Drugs in the NRDL

Alongside NRDL updates, China has transformed its drug procurement system. Before 2018, procurement was managed through a fragmented, province-based system where each province conducted its drug selection and pricing negotiations. Procurement typically followed a first-price auction model, in which the lowest-priced manufacturer won the bid. However, these auctions lacked binding purchase commitments, as winning bids did not guarantee actual procurement. Hospitals retained discretion over whether to purchase the selected drugs and in what quantities.

In November 2018, China introduced the "4+7" volume-based procurement (VBP) program, a centralized system designed to reduce drug prices and streamline distribution. Piloted in 11 cities (4 municipalities and 7 major cities) covering 30% of China's pharmaceutical market, the program initially covered 31 off-patent drugs with generic competitors that had passed the generic quality consistency evaluation. The VBP consolidated government purchasing power by implementing national price negotiations, hospital volume commitments, and a "winner-takes-all" approach, where a single manufacturer secured the contract. The program achieved dramatic price reductions, with an average 52% drop in selected drug prices and some reductions exceeding 90%.

These reforms have been implemented with the framework of China's universal health insurance, which includes the Urban Employee Basic Medical Insurance, Urban Resident Basic Medical Insurance, and the New Rural Cooperative Medical Scheme. Together, these initiatives have significantly reshaped China's pharmaceutical sector, promoting greater access to medicines.

III. Data and Methods

We employ three datasets to investigate how insurance coverage affects drug pricing and innovation activities in China's pharmaceutical market. Our primary dataset originates from the National Medical Products Administration (NMPA) database, focusing on domestic innovative chemical drugs approved between 2005 and 2020. We classify new drugs into three categories: breakthrough innovations (novel chemicals that offer significant therapeutic advantages), incremental innovations (new formulations, combinations, or indications of existing drugs), and new-to-China generics (drugs marketed abroad but not previously available in China). We supplement this with clinical trial data from NMPA registries and company filings to track innovation activities. Using WHO Anatomical Therapeutic Chemical (ATC) classification codes, we organize trials and marketing applications by therapeutic area.

For drug pricing, we collect drug procurement records from provincial competitive bidding spanning 2006 to 2018. We restrict the data to the pre-VBP period because the introduction of centralized procurement in late 2018 changed the pricing mechanism, complicating comparisons across regimes. This dataset is organized at drug and firm levels, capturing price variations across provinces and over time under the decentralized system. Our third dataset tracks NRDL policy changes through official revision documents (2004-2017). We collect information on drug inclusion decisions, reimbursement categories (Class A vs. B), and implementation dates for each update. The NRDL defines drugs by their International Nonproprietary Name (INN) and specific dosage forms. We then match each INN to its corresponding ATC code, which enables consolidation with the other two datasets.

We use descriptive and regression analyses to examine how insurance coverage influences drug pricing and pharmaceutical innovation. The descriptive analysis documents the distribution of drug approvals across innovation categories (breakthrough, incremental, and new-to-China generics), tracks trends in therapeutic areas over time, and explores variations in procurement prices across drugs, firms, and provinces. K-means clustering (Lloyd, 1982)

is employed to identify patterns in drug pricing and innovation by grouping drugs according to their market concentration. To determine the optimal number of clusters (K), we use the elbow method, which assesses within-cluster variance across different K values. The K value is identified at the inflection point where adding more clusters yields diminishing returns in variance reduction.

For the regression analysis, we adopt an event study framework to assess the dynamic effects of insurance coverage changes. Specifically, we estimate the following specification:

$$Y_{it} = \sum_{k=-K}^{K} \beta_k \mathbf{1}(\mathrm{t} = \mathrm{G_i} + \mathrm{k}) + X_{it} + \gamma_i + \delta_t + \varepsilon_{it}$$

where Y_{it} represents the outcome variable, including drug pricing at the drug-firm level and R&D activity at the therapeutic area level. The indicator function $\mathbf{1}(\mathrm{t} = \mathrm{G_i} + \mathrm{k})$ equals 1 if unit i is k periods away from the first year of insurance coverage expansion (G_i), allowing us to estimate dynamic treatment effects. We normalize β_{-1} to zero, making the period immediately before coverage expansion the reference point. The coefficients β_k capture the relative changes in outcomes before and after coverage expansion.

IV. Results

Trends in R&D Activities

Clinical trial activities showed divergent patterns from 2009 to 2020. New drug applications in China were primarily dominated by two categories: new-to-China generics and incremental innovations, with novel drugs representing a smaller but growing segment (Figure 3).

New-to-China generics represented a significant portion of applications, increasing from 286 in 2009 to a peak of 1,237 in 2015. These drugs require smaller-scale clinical trials compared to novel drugs, resulting in lower development costs and shorter approval timelines (typically six years versus 10-12 years for novel drugs). Additionally, successful applications receive a four-year monitoring period during which similar drug applications are not accepted, providing first-movers with a significant market advantage.

Incremental innovations followed a strong upward trend, rising from 207 applications in 2009 to 707 in 2015. For novel drugs, applications grew from 27 in 2009 to peak at 109 in

2013, then stabilized at 40-50 applications annually through 2014-2015. After the 2015 drug approval reforms aimed to expedite approval times and reduce the backlog, applications declined sharply across all categories. However, novel drug submissions maintained a more stable level of 20-30 applications annually, reaching 33 in 2020.

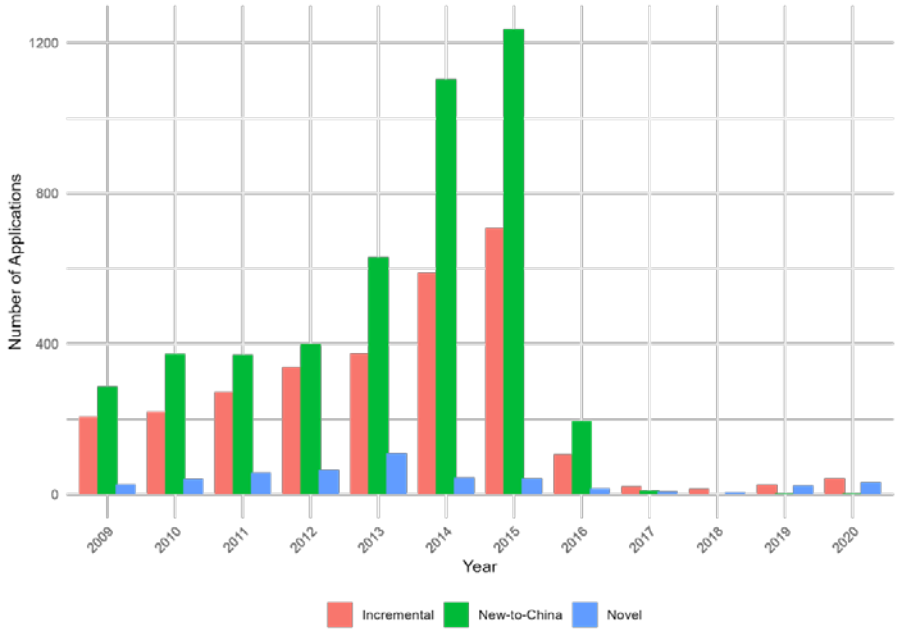


Figure 3. Trends in Drug Applications by Innovation Category

Novel and incremental new drugs show varying patterns across therapeutic areas. Antineoplastic (cancer) drugs maintained consistent activity throughout the period, with notable peaks in 2011 and 2020. Other categories, including alimentary (digestive), anti-infective, blood, and cardiovascular drugs, initially grew to peak around 2015 before declining in later years. Genito-urinary system drugs bucked this trend with late increases, suggesting emerging interest. These patterns reflect a shift toward high-impact therapeutic areas such as cancer and metabolic diseases, while traditional areas such as infectious diseases have seen reduced focus (Figure 4 (a)).

Generic drug applications followed a different trajectory. Applications peaked before 2015, particularly in the cardiovascular, nervous system, and cancer areas. Following regulatory reforms in 2015, applications dropped sharply across all categories. By 2017, most therapeutic areas saw minimal activity, with only occasional submissions in cardiovascular and nervous system categories (Figure 4 (b)).

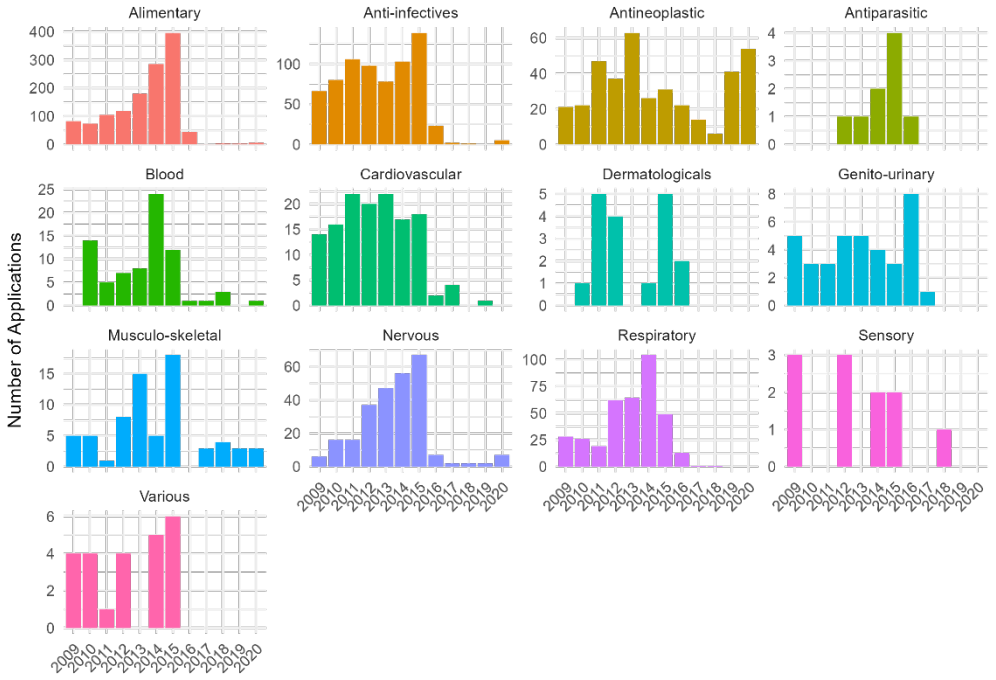
Between 2009 and 2020, 1,215 firms submitted clinical trial applications. New-to-China generics accounted for 66.9% of new drug applications, while novel drugs made up just 6.8%. Among these firms, only 119 (9.8%) applied for clinical trials for novel drugs, including 35 that applied across all three categories, 16 for novel drugs alongside incremental new drugs and new generics, and 68 that focused solely on novel drugs.

This trend suggests that firms may face financial and capacity constraints when investing in novel drug development. While pursuing novel drugs can offer strategic advantages as early market entrants, the high R&D costs and long development timelines may limit participation. In contrast, generics require lower investment and faster market entry, making them a more accessible option for many firms. An analysis of the top 10 firms with the highest novel drug applications reveals that these are large companies, with total assets ranging from $5.57 million to $3.32 billion USD. Their financial commitment to innovation varies significantly, with R&D intensities (R&D expenditure over total assets) averaging 3.5%, and the highest reaching 9.75%.

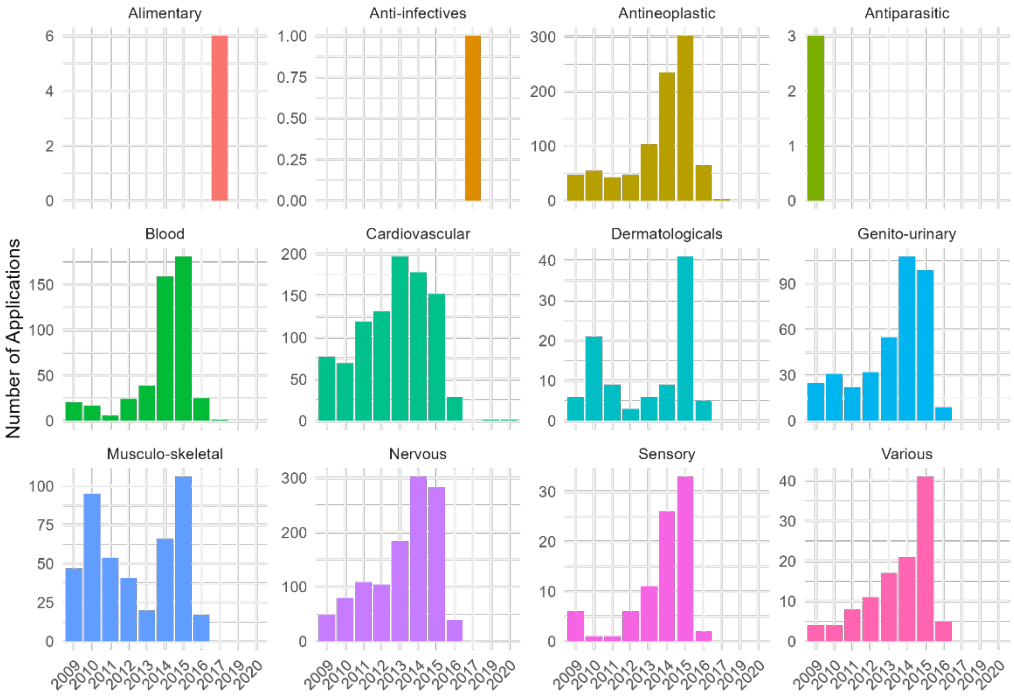
Trends in Price Offers

As shown in the R&D activity trends, oncology remains a therapeutic area with sustained clinical trial applications and strong market interest. We now focus this area by examining its market concentration and price offers.

We collected 7,543 winning records for cancer drugs (ATC code L01: Antineoplastic Agents) from provincial-level procurement data from 2006 to 2020. These drugs are used for lymphomas, leukemias, breast and lung cancer (Table A1, Appendix). The dataset includes 71 distinct drugs supplied by 82 pharmaceutical firms, with each drug uniquely identified by its International Nonproprietary Name (INN), dosage form, and strength. Our focus is on oral solid dosage forms, specifically tablets and capsules.



(a) novel and incremental drugs



(b) new-to-China generic drugs

Figure 4. Trends in Clinical Trials Applications by Therapeutic Area

We first looked at its market concentration by calculating the Herfindahl-Hirschman Index (HHI) for each drug-year combination. The HHI is based on a firm's market share, measured as the proportion of provinces where the firm won bids relative to the total provinces procuring the drug that year. The mean HHI of 8,053, more than three times the high concentration benchmark (2,500), indicates that most markets were dominated by a few suppliers. The density plot (Figure 5) and the median HHI of 10,000 further confirm that at least half of the drug classes used for cancer treatment in a given year were monopolized. Even the lowest recorded HHI (1,837) falls within the range of moderate concentration (1,500–2,500), suggesting that even the most competitive drug classes were still somewhat concentrated.

However, the average HHI has declined over time (Figure 5), indicating a gradual increase in market competition. While many markets remain highly concentrated, the decreasing trend suggests that more firms participated in procurement over the years, leading to a shift toward greater competition.

We then applied K-means clustering to drug prices, grouping them into three categories based on market concentration. Table 1 shows that the largest cluster (3,812 observations) has lower market concentration (mean HHI: 5,318), indicating some level of competition. In contrast, two smaller high-price clusters, together representing just 10% of observations, operate under near-monopolistic conditions (median HHI: 10,000). This pattern suggests that monopolistic markets sustain higher prices, while even moderate competition helps constrain drug prices.

Additional analysis examined price trends by market concentration (Figure B1, Appendix). The findings indicate that relatively competitive drug classes maintained consistently low prices with small fluctuations throughout the period. In contrast, monopolistic drug classes, despite their high prices, showed a gradual decline before stabilizing. This premium-priced concentrated segment is particularly sensitive to price fluctuations.

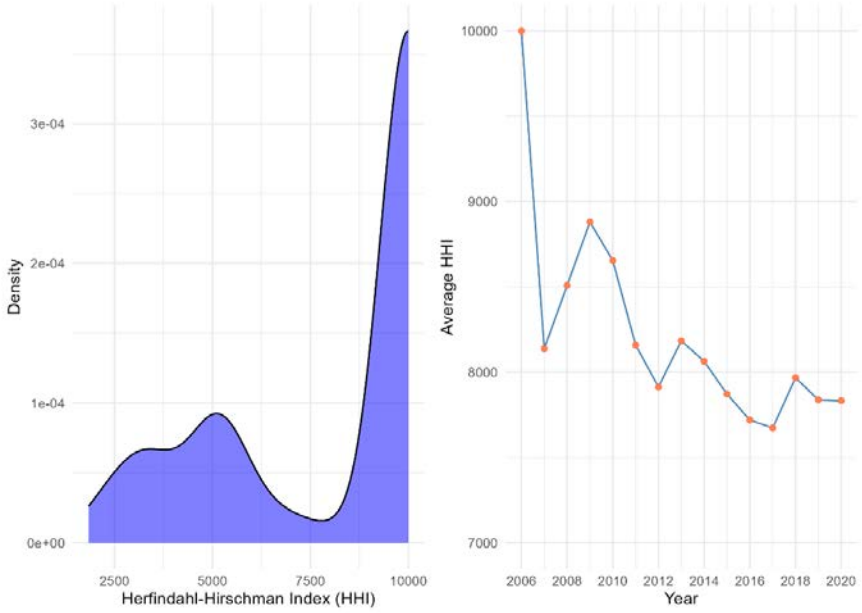


Figure 5. HHI Distribution and Trends Over Time

Table 1. HHI by Price Cluster

Cluster	Obs.	Mean	Median	Min.	Max
Cluster 2 (More Competitive)	3,812	5,318	5,000	1,837	10,000
Cluster 3 (Highly Concentrated)	110	9,576	10,000	6,033	10,000
Cluster 1 (Monopolized)	324	9,775	10,000	4,624	10,000

Insurance Coverage

While R&D activity and pricing strategies provide insights into market behavior, policy interventions play a crucial role in shaping firm incentives. These interventions can operate through various supply-side channels. Regulatory frameworks set market entry conditions and approval timelines, intellectual property regimes define exclusivity periods and competitive structures, innovation subsidies reduce R&D costs, tax incentives influence investment returns, and reference pricing systems shape pricing strategies across markets

(Bloom et al., 2019). Healthcare insurance coverage, alongside these mechanisms, is considered as a demand-side intervention that affects market access, pricing strategies, and investment decisions. Evidence suggests that expanding insurance coverage increases a drug's market size, raising expected revenues and incentivizing greater R&D investment (Blume-Kohout and Sood, 2013).

However, in China, the extent to which insurance expansion drives these effects remains unclear. Unlike in other markets where broader coverage is linked to increased R&D investment and volume-driven pricing adjustments (Lakdawalla and Sood, 2009; Berndt and Newhouse, 2012), China's reimbursement system introduces price negotiations and centralized procurement that require firms to accept substantial price reductions to gain coverage. For high-cost drugs, especially oncology treatments, manufacturers face a trade-off between price concessions and market expansion, potentially altering pricing strategies and investment decisions.

Figure 6 illustrates the new drug applications for oncology drug categories (L01 ATC codes) between insurance coverage expansions from 2005 to 2020. Most therapeutic classes exhibit a clear temporal lag between application submissions and insurance inclusion. This pattern is particularly evident in L01XE (protein kinase inhibitors), which experienced a surge in applications around 2015, followed by a gradual increase in insurance coverage in subsequent years. Similarly, L01XA (platinum compounds) and L01XX (other antineoplastic agents) show a delay between application peaks and coverage expansion. In contrast, traditional cytotoxic agents such as L01BA (alkylating agents) and L01BC (antimetabolites) demonstrate high application volumes but lower insurance coverage. It suggests that these well-established treatments were not prioritized for inclusion at the same rate as newer targeted therapies.

The implementation of major reimbursement reforms, particularly the enhanced NRDL negotiation mechanisms introduced in 2017, appears to have accelerated insurance inclusion for several drug classes. For instance, L01DB (anthracyclines) and L01CE (platinum compounds) show a notable increase in coverage after 2017. However, the extent of insurance expansion varies across drug categories.

Some targeted therapies, such as L01CA (vinca alkaloids and analogues) and L01CX (other cytotoxic agents), achieved higher coverage rates relative to their application volumes, indicating a shift in reimbursement priorities toward innovative treatments. This selective expansion suggests a policy emphasis on newer, high-impact oncology drugs rather than a broad inclusion of all newly developed therapies. Once a drug category was included in the reimbursement list, coverage remained relatively stable, with few updates over the following years.

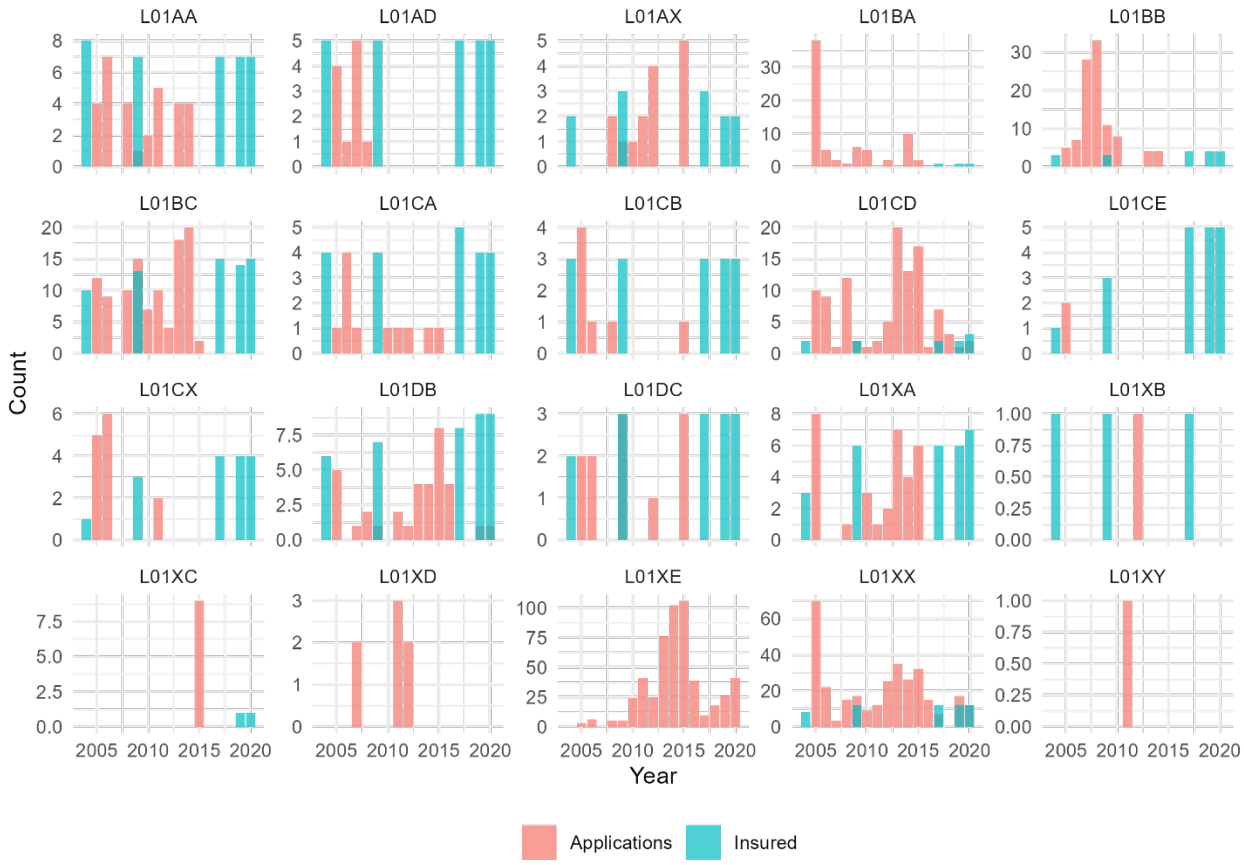
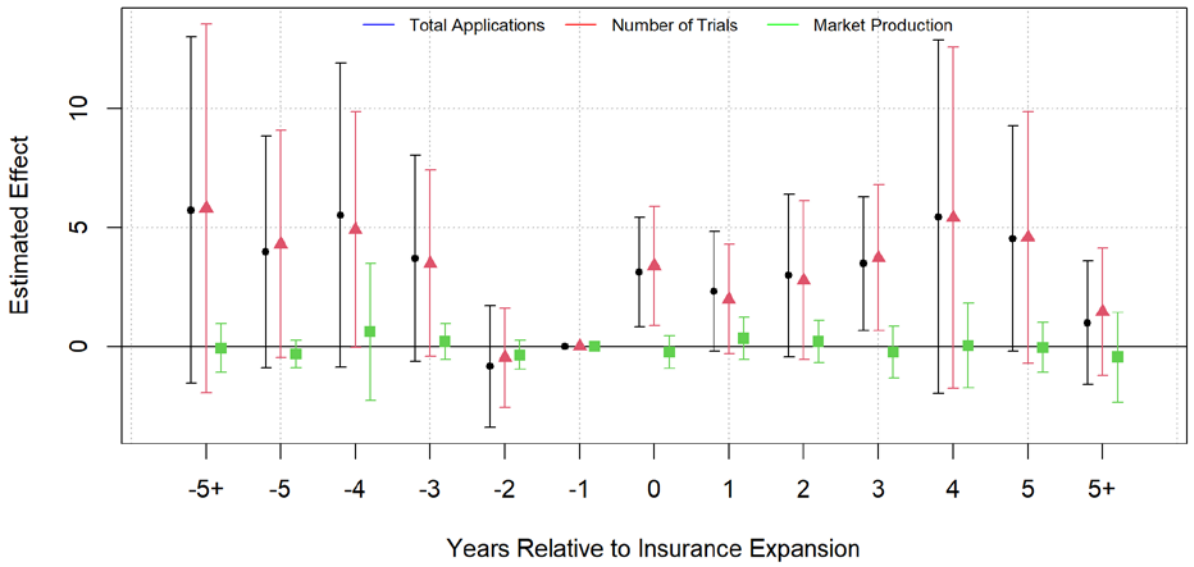


Figure 6. Clinical Trial Applications and Insurance Coverage by Drug Class

We conduct a drug-level event study analysis to examine how R&D activities respond to the expansion of the drug reimbursement list. This analysis examines the new drug applications for 17 drugs in the L01 category, which were gradually covered by insurance from 2004 to 2020. Unlike regular NRDL updates, where drugs are systematically added to the list, the negotiation list, introduced in 2017, involves annual price negotiations for drugs seeking

temporary inclusion, typically lasting one year. For analytical consistency, we focus on regularly updated drugs, excluding those subject to annual negotiation.

The treated group is defined at the drug level, based on the first expansion year for each ATC category, determined by the first year when the number of insured drugs increases. We employ a staggered adoption design (Goodman-Bacon, 2019; Sun and Abraham, 2020), accommodating the fact that different drug classes (ATC categories) experienced insurance coverage expansion at different time points. Using this expansion year as the treatment time, we construct relative time indicators from 5 years before to 5 years after expansion, with periods beyond this window binned into "-5+" and "5+" categories. The analysis examines total new drug applications, which includes the total number of clinical trials and market production.



Note: The graph reports estimate with a 90% confidence interval (CI), based on regression models that incorporate drug class and year fixed effects to control for time-invariant differences between drug classes and common time trends. The standard errors are clustered at the drug level to account for within-group correlation.

Figure 7. Event Study Plot: New Drug Applications

Figure 7 presents the estimates from the event study. Insurance expansion appears to be associated with an increase in new drug applications and clinical trials over time, whereas market production shows a more limited response. The estimates suggest that the policy may have encouraged later-stage R&D activities. Notably, both new drug applications and

clinical trials exhibit increases in years following expansion, particularly after three years of expansion. This pattern may indicate a delayed response as pharmaceutical companies reallocate resources (e.g., funding, researchers, marketing) to products that are more likely to succeed or adjust timelines to match regulatory windows.

Although coverage expansion appears to stimulate later-stage innovation, the slower growth in market production suggests that competition has not intensified immediately. This delayed entry may influence how firms set prices, as they seek to recover R&D costs while preparing for future competitive pressures. To investigate pricing behavior, we conducted a drug-firm-level event study, examining how prices evolve after insurance coverage expands. Since procurement is managed at the provincial level, firms may vary pricing across regions in response to local market conditions and reimbursement policies.

To capture these differences, we calculate annual average firm prices, weighted by the number of health facilities in each province to reflect regional demand. The treated group is defined by the first year a firm's drug gained insurance coverage. Treatment timing varies across drug-firm pairs due to staggered coverage expansion, so we apply the same staggered adoption approach as in the drug-level analysis.

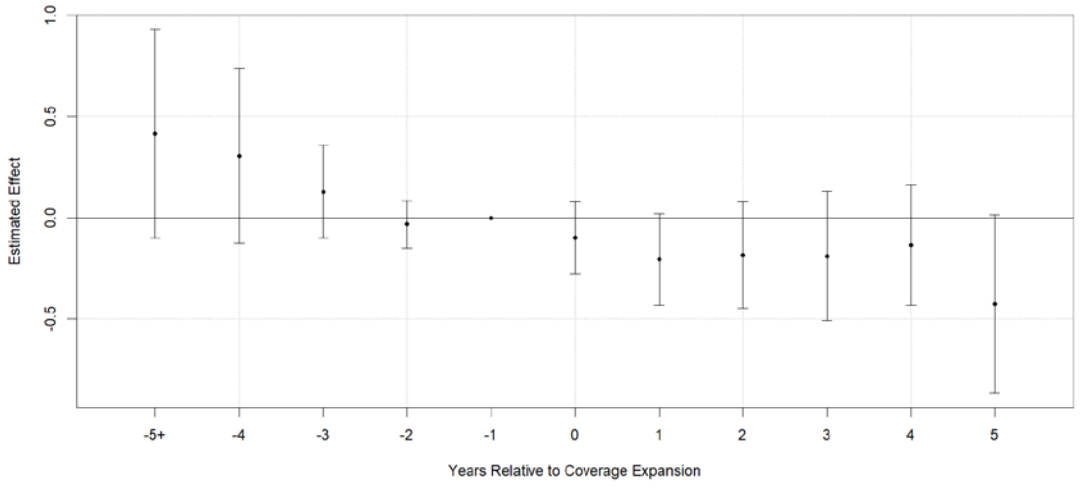


Figure 8. Event Study Plot: Firm Pricing Strategy

Existing studies show that coverage expansions usually increase prescription drug utilization and higher spending but do not directly result in lower drug prices (e.g., Mahendraratnam et

al., 2017; Rome et al., 2021). Figure 8 illustrates that drug prices remained largely unchanged despite downward pressure from centralized procurement policies. While some drugs included in the list have experience 40% price cuts, these reductions did not translate to significant overall price changes across therapeutic categories. For cancer drugs specifically, the lack of therapeutic alternatives may reduce competitive pressure, contributing to price stability. This pattern is consistent with findings from the U.S. market, where price reductions primarily occur for drugs with strong therapeutic competition, while those with fewer substitutes tend to maintain stable pricing (Duggan and Scott Morton, 2010).

V. Discussion

Understanding how pharmaceutical markets respond to insurance coverage expansion is crucial for policymakers aiming to improve drug accessibility. China's recent initiative offers a distinctive context due to its centralized drug procurement system and stringent price negotiation practices, differing from markets where increased coverage often drives higher drug prices. This analysis examines how pharmaceutical firms strategically adjust their innovation and pricing behaviors under these unique regulatory conditions.

Our preliminary analysis indicates that expanded health insurance coverage in China is associated with increased pharmaceutical R&D activity without triggering substantial price increases. Although our analysis does not directly establish causal effects, the staggered adoption design used in the event study provides suggestive evidence of market changes that coincide with the timing of policy implementation.

Historically, the market has been dominated by generic drugs due to their affordability; however, recent trends reveal increased innovative drug applications and clinical trial activities, especially within the oncology segment. Notably, investigational new drug applications in China have risen year-over-year since 2018 (about 80% from domestic companies) with oncology being the leading therapeutic area (Wang et al., 2024).

Despite this rise in innovation activities, actual market entry and drug production remain relatively stagnant in the short term. The oncology sector demonstrates significant market concentration, with a persistently high HHI exceeding 5000. Such high concentration reflects limited immediate competitive pressures. This market structure may suggest that

firms might strategically delay market entry while prioritizing longer-term R&D investments aligned with anticipated demand expansion from growing insurance coverage.

Policymakers could view these trends as evidence that expanding insurance coverage can stimulate innovation. However, the nature of the resulting innovations warrants scrutiny. If companies predominantly pursue incremental or “me-too” products which offer minor improvements in reduced side effects without significantly enhancing clinical outcomes, the broader public health impact may be limited.

Regarding pricing, these findings suggest that insurance expansion, alongside stringent price negotiations and centralized procurement, can enhance drug accessibility without driving up prices. Recent NRDL negotiations demonstrate average price reductions of approximately 60% (Xia et al., 2023), illustrating how insurance expansion can coexist with cost containment strategies. Nevertheless, excessively aggressive price reductions might risk undermining future R&D incentives.

This study has several limitations that highlight avenues for future research. First, our analysis focused solely on oncology, potentially limiting generalizability to other therapeutic areas where profit margins are lower, or science is less mature. Future work could expand the analysis to a broader range of therapeutic categories. Second, our assessment accounted for basic firm characteristics but did not fully consider other crucial factors such as firm size, comprehensive R&D investments, and market positioning, which could provide deeper insights into varied firm responses to insurance expansion. Third, the study relied on late-stage R&D indicators, such as clinical trial registrations and drug filings. Future research could incorporate early-stage innovation indicators, including preclinical research, patent applications, and academic partnerships.

This preliminary analysis offers insights into how firms respond to insurance expansion within China’s regulatory context. While early results indicate increased innovation activity, the long-term effects on drug availability and public health remain to be seen. Further research across diverse therapeutic areas will be essential to determine whether these trends persist and their broader implications.

Reference

Acemoglu, D., & Linn, J. (2004). "Market Size in Innovation: Theory and Evidence from the Pharmaceutical Industry." The Quarterly Journal of Economics, 119(3), 1049-1090.

Blume-Kohout, M. E., & Sood, N. (2013). "Market Size and Innovation: Effects of Medicare Part D on Pharmaceutical Research and Development." Journal of Public Economics, 97, 327-336.

Clemens, J. (2013). "The Effect of U.S. Health Insurance Expansions on Medical Innovation." NBER Working Paper No. 19761.

DiMasi, J. A., Grabowski, H. G., & Hansen, R. W. (2016). "Innovation in the Pharmaceutical Industry: New Estimates of R&D Costs." Journal of Health Economics, 47, 20-33.

Dranove, D., Garthwaite, C., & Hermosilla, M. (2014). "Pharmaceutical Profits and the Social Value of Innovation." NBER Working Paper No. 20212.

Dubois, P., de Mouzon, O., Scott-Morton, F., & Seabright, P. (2015). "Market Size and Pharmaceutical Innovation." The RAND Journal of Economics, 46(4), 844-871.

Duggan, M., & Scott Morton, F. (2010). "The Effect of Medicare Part D on Pharmaceutical Prices and Utilization." American Economic Review, 100(1), 590-607.

EFPIA (2025). "The Pharmaceutical Industry in Figures: Key Data 2025." European Federation of Pharmaceutical Industries and Associations, Brussels.

Finkelstein, A., Taubman, S., Wright, B., Bernstein, M., Gruber, J., Newhouse, J. P., Allen, H., & Baicker, K. (2012). "The Oregon Health Insurance Experiment: Evidence from the First Year." The Quarterly Journal of Economics, 127(3), 1057-1106.

Ghosh, A., Simon, K., & Sommers, B. D. (2019). "The Effect of Health Insurance on Prescription Drug Use Among Low-Income Adults: Evidence from Recent Medicaid Expansions." Journal of Health Economics, 63, 64-80.

Goodman-Bacon, A. (2021). "Difference-in-differences With Variation in Treatment Timing." Journal of Econometrics 225 (2): 254–77.

Guan, X., Liang, H., Xue, Y., & Shi, L. (2011). An analysis of China's national essential medicines policy. Journal of Public Health Policy, 32(3), 305-319.

Kyle, M. K., & McGahan, A. M. (2012). "Investments in Pharmaceuticals Before and After TRIPS." Review of Economics and Statistics, 94(4), 1157-1172.

Liu, G. G., Wu, J., He, X., & Jiang, Y. (2022). "Policy Updates on Access to and Affordability of Innovative Medicines in China." Value in Health Regional Issues, 30, 59-66.

Pauly, M. V. (2004). "Medicare Drug Coverage and Moral Hazard." Health Affairs, 23(1), 113-122.

Rome, B. N., Feldman, W. B., Desai, R. J., & Kesselheim, A. S. (2021). "Correlation between changes in Brand-Name drug prices and patient Out-of-Pocket costs." JAMA Network Open, 4(5), e218816.

Sun, L., & Abraham, S. (2020). "Estimating Dynamic Treatment Effects in Event Studies with Heterogeneous Treatment Effects." Journal of Econometrics, 225(2), 175–199.

Wouters, O. J., McKee, M., & Luyten, J. (2020). "Estimated Research and Development Investment Needed to Bring a New Medicine to Market, 2009-2018." JAMA, 323(9), 844-853.

Yin, W. (2008). "Market Incentives and Pharmaceutical Innovation." Journal of Health Economics, 27(4), 1060-1077.

Lakdawalla, D., & Sood, N. (2009). "Innovation and the welfare effects of public drug insurance." Journal of Public Economics, 93(3-4), 541-548.

Lloyd, S. 1982. "Least Squares Quantization in PCM." IEEE Transactions on Information Theory 28 (2): 129–37.

Mahendraratnam, N., Dusetzina, S. B., & Farley, J. F. (2017). "Prescription drug utilization and reimbursement increased following state Medicaid expansion in 2014." Journal of Managed Care & Specialty Pharmacy, 23(3), 355–363.

Xia, M., Wen, J., Liu, Q., Zheng, Z., & Ran, Q. (2023). "Promoting access to innovative anticancer medicines: a review of drug price and national reimbursement negotiation in China." Inquiry. 60:00469580231170729.

Mills, M., Zhang, A., & Kanavos, P. (2019). "Pharmaceutical Policy in China. London School of Economics." https://doi.org/10.21953/lse.fg2t522b8r1x.

Wang, F., Ruan, D., & Xu, R. (2024). Challenges and opportunities in oncology drug development and clinical research in China. Cell, 187(7), 1578–1583.

Zhang, X., & Nie, H. (2020). "Public Health Insurance and Pharmaceutical Innovation: Evidence from China." Journal of Development Economics 148 (October): 102578.

Zhou, J., Lan, T., Lu, H., & Pan, J. (2024). "Price negotiation and pricing of anticancer drugs in China: An observational study." PLoS Medicine, 21(1), e1004332.

Appendix

A Tables

Table A1. ATC code and Therapeutic Indications

ATC Code	Category	Indications
L01AA	Alkylating Agents	Lymphoma, leukemia, breast cancer
L01AB	Alkylating Agents	Brain tumors, lymphoma
L01AC	Alkylating Agents	Chronic Myeloid Leukemia, bone marrow transplant
L01AX	Alkylating Agents	Glioblastoma
L01BA	Antimetabolites	Leukemia, breast cancer
L01BB	Antimetabolites	Acute Lymphoblastic Leukemia, Chronic Lymphocytic Leukemia
L01BC	Antimetabolites	Colorectal cancer, breast cancer
L01CA	Plant Alkaloids	Leukemia, lymphoma
L01CB	Plant Alkaloids	Ovarian cancer, breast cancer
L01CD	Epipodophyllotoxins	Lung cancer, testicular cancer
L01CE	Texans	Breast cancer, lung cancer
L01CX	Other Plant Alkaloids	Soft tissue sarcoma
L01DA	Cytotoxic Antibiotics	Breast cancer, lymphoma
L01DB	Cytotoxic Antibiotics	Wilms' tumor, sarcoma
L01DC	Cytotoxic Antibiotics	Gastric cancer, bladder cancer
L01EA	Protein Kinase Inhibitors	Chronic Myeloid Leukemia
L01EB	Protein Kinase Inhibitors	Non-Small Cell Lung Cancer, pancreatic cancer
L01EC	Protein Kinase Inhibitors	Kidney cancer, liver cancer
L01FA	Monoclonal Antibodies	Lymphoma, leukemia
L01FB	Monoclonal Antibodies	Breast cancer, gastric cancer
L01FC	Monoclonal Antibodies	Colorectal cancer, lung cancer
L01XD	Sensitizers for Photodynamic Therapy	Esophageal cancer, Non-Small Cell Lung Cancer
L01XE	Protein Kinase Inhibitors	Non-Small Cell Lung Cancer, pancreatic cancer
L01XX	Other Antineoplastic Agents	Multiple myeloma, leukemia
L01XY	Combination Therapies	Colorectal cancer, lymphoma

B Figures

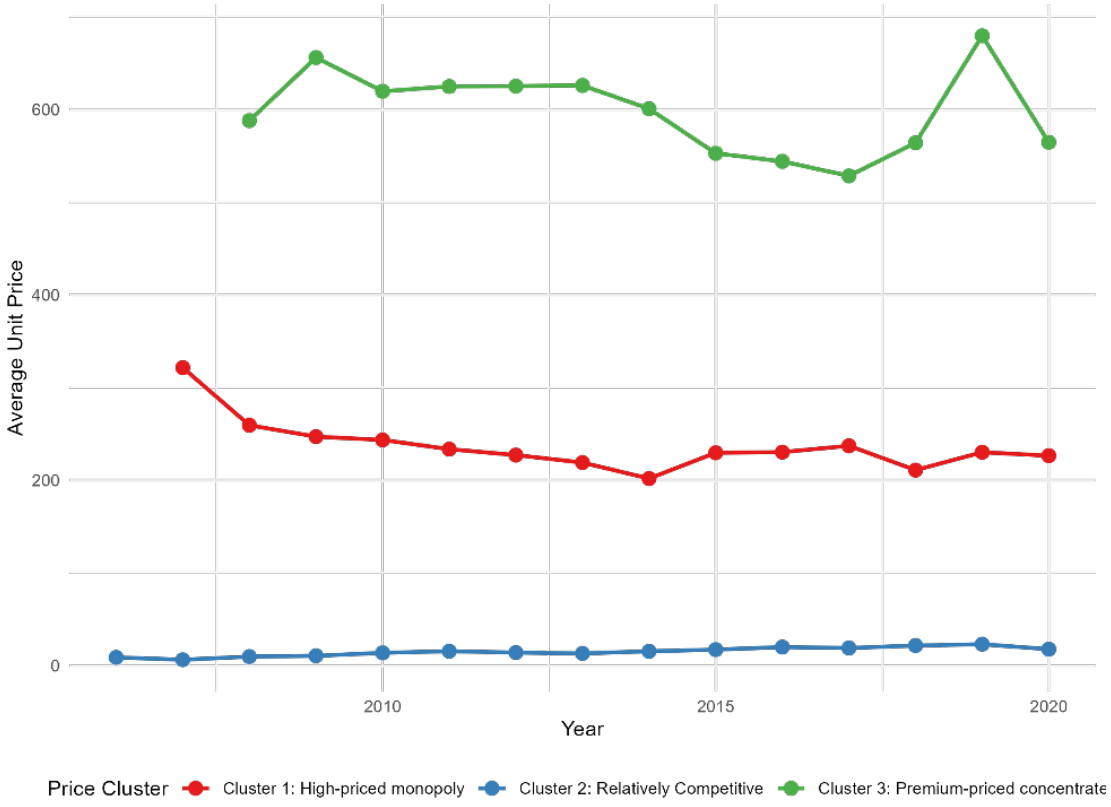


Figure B1. Price Trends by Market Concentration

How Expanding Insurance Coverage Shapes Drug Innovation and Prices: Evidence from China

令和 7（2025）年 3 月発行

発行所　公益財団法人アジア成長研究所
〒803-0814　北九州市小倉北区大手町 11 番 4 号
Tel：093-583-6202／Fax：093-583-6576
URL：https://www.agi.or.jp
E-mail：office@agi.or.jp