

From the Sixth Floor to the Street: How Retrofitting Elevators in China's Older Residential Communities Can Activate the Home-Based Silver Economy

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Abstract. China passed a demographic milestone in 2025: 323.38 million people, or 23 percent of the population, were aged 60 or over. Almost all of them will grow old at home rather than in institutions, which makes the physical condition of ordinary apartment buildings an economic question and not only a welfare question. Millions of older residents live in walk-up blocks built before 2000 that have no elevator, and a flight of stairs is enough to keep a person with weak knees indoors for weeks. This paper argues that retrofitting elevators should be understood as consumption infrastructure for the silver economy. It sets out a threshold model in which a trip is taken only when its value exceeds ordinary costs plus stair-climbing costs, and shows that the model predicts the pattern found in the data: benefits concentrate on upper floors and on frailer residents. Using official statistics and published studies of Guangzhou and Hangzhou, the paper replicates the lifetime cost and benefit calculation for one retrofitted unit block and finds a break-even price premium of roughly 1.8 percent against an estimated premium of 5.53 percent. A further calculation shows that the cost-sharing ladder used in practice is only loosely aligned with those gains, leaving two of the four paying floors close to break-even.

Keywords: Silver Economy, Ageing in Place, Elevator Retrofitting, Urban Renewal, Cost Sharing

1. Introduction

In a six-story apartment block built in the early 1990s, the distance between an eighty-year-old resident and the street is about ninety steps. For a healthy adult that distance is trivial. For someone with arthritic knees or a heart condition it is a wall. Residents in such buildings describe reducing how often they go out simply to avoid the climb [1], and Chinese media have given this group a name that translates roughly as the suspended elderly, people who live several floors above a city they can no longer reach.

Most discussion of elevator retrofitting treats it as a welfare project or a neighbourhood dispute. Both framings are accurate but incomplete. China is simultaneously trying to expand what policymakers call the silver economy, meaning the whole set of goods and services bought by and for older people. The State Council issued the country's first dedicated policy document on this

sector in January 2024. A report by the China Association of Social Welfare and Senior Service estimated the sector at roughly 7 trillion yuan, about 6 percent of gross domestic product, and projected 30 trillion yuan by 2035 [2, 3]. Both are estimates rather than measured national accounts, but a large share of that spending is meant to happen close to home, in the form of meal services, day care, rehabilitation, community clinics, short trips and leisure classes.

This creates a mismatch that is easy to overlook. A community can build a canteen for older residents on the ground floor and still find that the people on the fifth floor never use it. The service exists, the demand exists, and the staircase sits between them. The central claim of this paper is therefore straightforward: in walk-up housing, vertical access is the binding constraint on home-based elderly consumption, and installing an elevator is a form of consumption infrastructure rather than a charitable gesture.

The paper makes three contributions. It formalises the access constraint in a threshold model that predicts which floors gain most. It replicates the published lifetime cost calculation and reports the break-even price premium, a figure the original study does not state. And it tests the cost-sharing ladder used in practice against the estimated floor-level gains.

2. Background

2.1. An older population that stays at home

At the end of 2021 there were 267.36 million people in China aged 60 and over, equal to 18.9 percent of the population. By the end of 2025 that number had reached 323.38 million, or 23 percent, with 223.65 million people aged 65 and over and average life expectancy at 79.25 years [4, 5]. Figure 1 shows the trend.

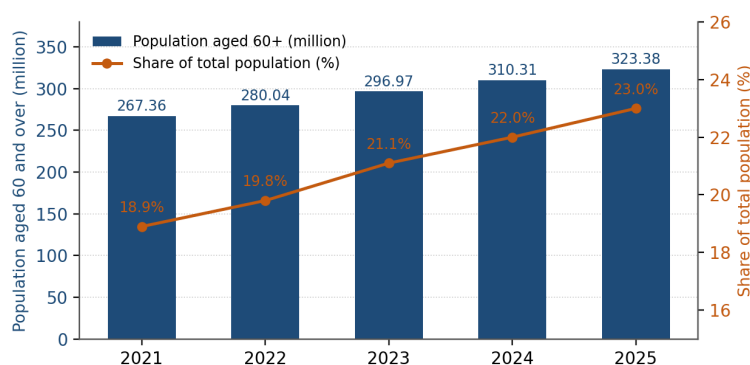


Figure 1. Population aged 60 and over in China, 2021 to 2025

Where those people age matters as much as how many there are. Chinese planning is organised around a framework commonly labelled 9073, under which the large majority of older people are to be cared for at home, a small share through community services and a very small share in institutions. This is a policy target rather than a measured distribution, and recent practice has shifted it further toward home settings [6]. Either way the apartment is the intended site of care, so the building becomes part of the care system.

2.2. A housing stock that was not designed for old age

Much of the urban housing built between 1980 and 2000 consists of six-storey walk-ups, because Chinese residential design standards of the period generally did not require elevators for buildings of six storeys or below and the residents who moved in were then young. Dai, Yu, Ma and Zheng report that roughly 58 percent of urban dwellings of seven storeys or fewer have no elevator, though they take this from earlier work on ageing neighbourhoods rather than estimate it themselves, so it is best read as an order of magnitude [7, 8]. Those who moved in during the 1980s are now in their seventies and eighties, so older residents are concentrated precisely where accessibility is worst. Table 1 summarises what the national renovation programme delivered.

Table 1. Outcomes of China's old urban community renovation programme, Fourteenth Five-Year Plan period

Indicator (2021 to 2025)	Figure	Note
Old urban communities renovated	over 240,000	roughly 110 million residents
Households benefiting	over 40 million	reported by MOHURD
Elevators retrofitted	129,000	about 14,000 in 2025 alone
Communities given age-friendly or barrier-free upgrades	56,000	ramps, handrails, lighting
New community service facilities for elderly and child care	64,000	canteens, day-care rooms

Source: Ministry of Housing and Urban-Rural Development, State Council Information Office press conference, 11 October 2025 [9].

Retrofitting 129,000 elevators in five years is substantial, yet spread across more than 240,000 renovated communities it means the average community received well under one. Coverage remains thin, and the Fifteenth Five-Year Plan accordingly targets 115,000 further communities and names elevators as one of three priority problems, alongside parking and charging points.

3. A simple model of access and spending

Consider an older resident facing a stream of possible outings: buying vegetables, visiting a clinic, joining an exercise group, eating at the canteen. Each carries a private value v that varies from occasion to occasion and can be treated as a draw from a distribution F . Each also carries a cost with two parts. The first, m , is ordinary and would exist in any building, covering money, time and effort at ground level. The second, s , is the cost of the stairs, rising with floor number and with frailty. The trip happens when value clears total cost, so the probability that an occasion becomes a trip is

$$p = 1 - F(m + s) \quad (1)$$

If there are N potential occasions in a month and the average outing involves spending x , then monthly local consumption is $C = N p x$. An elevator does not change m , the value of the outing, or the resident's income. It changes one thing only, which is that s falls to approximately zero. The gain in monthly spending is therefore

$$\Delta C = Nx[F(m + s) - F(m)] \quad (2)$$

Equation 2 is elementary but carries three testable predictions. First, the effect is larger where s is larger, meaning higher floors and frailer residents, so gains should be concentrated rather than evenly spread. Second, it works through the number of trips rather than the value of each, so it should appear as more frequent small purchases rather than larger ones. Third, because F is cumulative, the same fall in s helps most those whose typical outing value sits near the threshold, which describes the residents who currently go out occasionally rather than never or daily.

Two further channels operate alongside this one. Recovered contact with neighbours shifts F rather than s , since people learn about activities and are invited to join them. And a higher apartment value relaxes the budget constraint behind m and x . Figure 2 sets out the full structure.

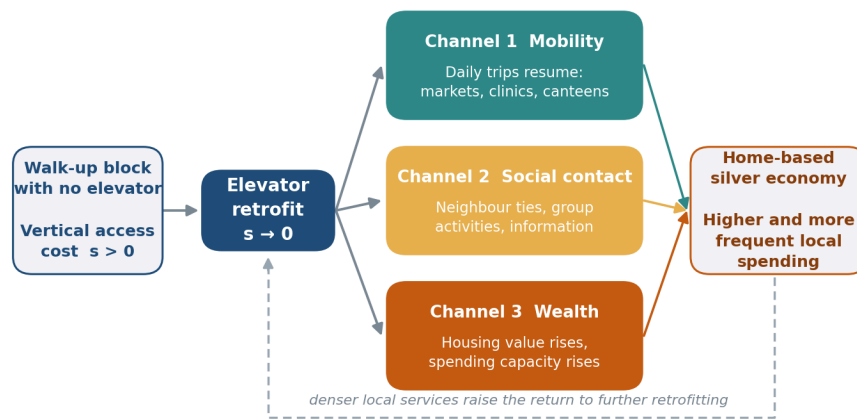


Figure 2. Conceptual framework linking elevator retrofitting to home-based elderly consumption through three channels

4. Evidence

4.1. Mobility and social contact

A survey of 455 households in Guangzhou, of which 150 lived in buildings with retrofitted elevators and 305 did not, found that 77.5 percent of respondents identified easier vertical movement and more chances to leave the building as the main benefit of installation [1]. The same survey measured neighbourhood relations on a five-point scale, and the gap between the two groups is consistent across every item, as Figure 3 shows. The same study also reports that 36 percent of residents in buildings without elevators said they were willing to take part in community governance, against close to half of residents in buildings with them [1].

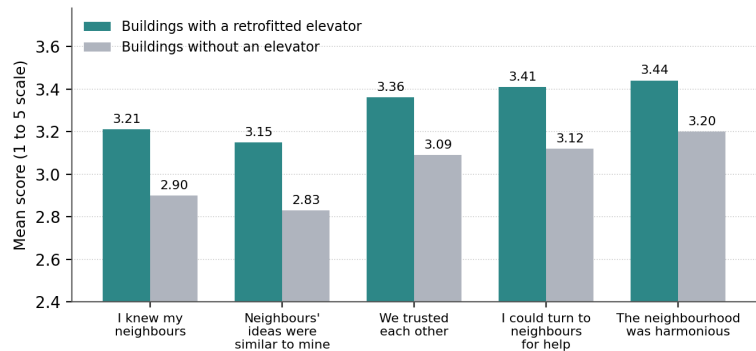


Figure 3. Mean neighbourhood relationship scores in buildings with and without retrofitted elevators, Guangzhou REF_Ref237114680 \r\h [1]

These differences are modest and come from a cross-sectional survey, so they cannot be read as causal. Buildings that succeeded in installing elevators may already have had better neighbour relations, since agreement among owners is itself a sign of cohesion. The association is nonetheless consistent across all five items.

4.2. The floor gradient predicted by the model

Equation 2 predicts that gains rise with floor number. Housing markets give an indirect but sharp test, because buyers capitalise expected benefits into prices. Dai, Yu, Ma and Zheng study 879 second-hand transactions across 18 Hangzhou compounds using a difference-in-differences design, comparing buildings that installed elevators with nearby buildings that did not [7]. Panel (a) of Figure 4 reports their estimates.

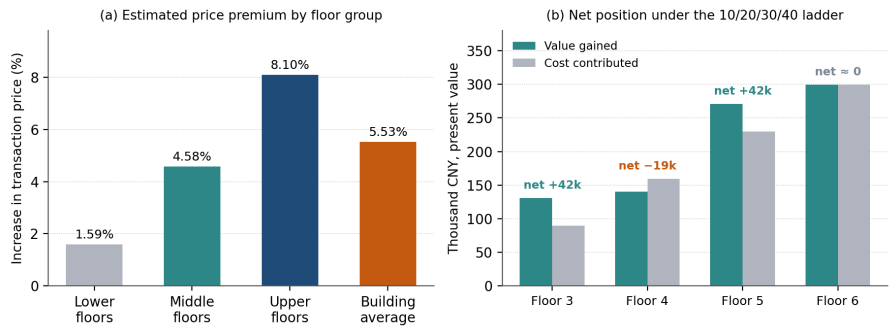


Figure 4. Panel (a): estimated price premium by floor group. Panel (b): author's calculation of value gained against cost contributed on each paying floor, using the reported floor areas of the case compound, the control-group average price of 50,356 CNY per square metre, the premium rates in panel (a), and the 10/20/30/40 ladder described in the same study

The gradient is steep. Upper floors gain 8.10 percent, middle floors 4.58 percent and lower floors 1.59 percent, against a building average of 5.53 percent. This ordering is what equation 2 implies, since the top floor had the highest stair cost and the most to recover. A second result matters politically: lower floors do not lose value, so the assumption that ground-floor owners are made worse off is not supported here.

5. Does the project pay for itself

Whether retrofitting is affordable can be settled with a net present value calculation. Write K for construction cost, O for annual running cost, T for service life, i for the discount rate, n for the number of apartments, A for average floor area, P for price per square metre, and r for the price premium. Then

$$NPV = nAPr - K - \sum_t O_t / (1 + i)^t \quad (3)$$

Setting equation 3 to zero gives the break-even premium, that is, the smallest price increase at which the project just covers itself:

$$r^* = [K + \sum_t O_t / (1 + i)^t] / (nAP) \quad (4)$$

Table 2 lists the parameters that Dai, Yu, Ma and Zheng report for a typical Hangzhou six-storey unit with two apartments per floor [7]. Applying equation 3 to those parameters, the author obtains a lifetime cost of about 778,000 yuan and a net present value of about 1.70 million yuan, against published figures of 781,900 and 1,691,300. Gaps of 0.6 and 0.3 percent are consistent with rounding and with discounting conventions, so the calculation below reproduces theirs closely enough to build on.

Table 2. Parameters and results for one retrofitted unit block

Indicator (2021 to 2025)	Figure	Note
Old urban communities renovated	over 240,000	roughly 110 million residents
Households benefiting	over 40 million	reported by MOHURD
Elevators retrofitted	129,000	about 14,000 in 2025 alone
Communities given age-friendly or barrier-free upgrades	56,000	ramps, handrails, lighting
New community service facilities for elderly and child care	64,000	canteens, day-care rooms

Source: Rows one to seven are reported by Dai, Yu, Ma and Zheng [7]. The final three rows are the author's calculations using equations 3 and 4, shown against the published figures where these exist. The break-even premium is not reported in the original study.

The break-even figure is the useful one. The market needs to value the elevator at only about 1.8 percent of the building's price for the project to justify itself, while the estimated premium is 5.53 percent, roughly three times as much. Panel (a) of Figure 5 plots the relationship, with the shaded band covering construction cost varied by 15 percent either way, service life from 10 to 20 years, and the discount rate from 1.5 to 3.5 percent. Across that whole range the break-even premium stays between about 1.5 and 2.1 percent.

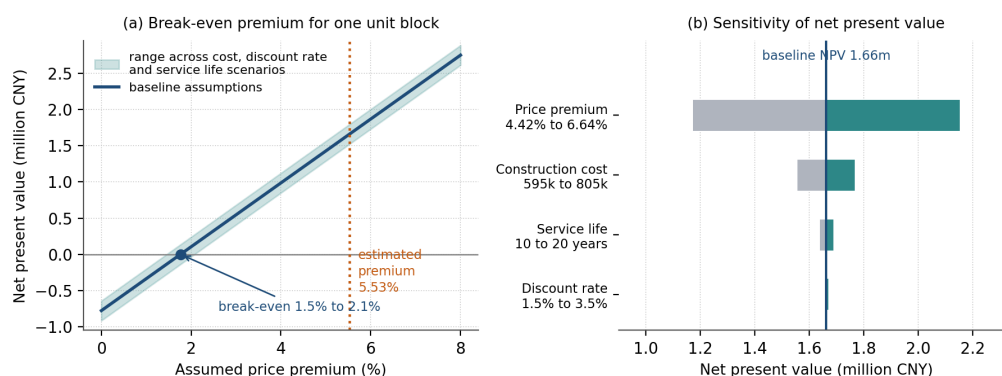


Figure 5. Panel (a): net present value as a function of the assumed price premium. Panel (b): tornado chart showing how net present value responds to each parameter across the ranges tested. Author's calculations using equations 3 and 4 and the parameters in Table 2

Panel (b) shows which assumption matters. Discount rate and service life barely move the result, because running costs are small next to construction cost. Construction cost matters moderately. The price premium dominates, which is also what the original authors conclude. Arguments about interest rates or elevator lifespans are therefore largely beside the point, and the real question in any city is whether buyers there will pay for vertical access at all.

Three qualifications apply. Hangzhou prices exceeded 50,000 yuan per square metre, so absolute uplift elsewhere would be smaller, although the break-even premium is a ratio and travels better than absolute figures. The estimates cover six-story buildings only. And appreciation is not cash, since an owner who never sells cannot spend it.

6. Why projects still stall

6.1. The cost-sharing ladder is only loosely aligned with the gains

If the economics work for the whole building, the slow pace of installation must come from how costs and benefits are divided inside it. Hangzhou practice exempts floors one and two and asks floors three to six to contribute 10, 20, 30 and 40 percent of construction cost, with running costs split equally. Panel (b) of Figure 4 sets that ladder against the gains implied by the estimated premiums and the actual floor areas.

The alignment is imperfect. Floors three and five come out ahead by roughly 42,000 yuan each, while floor four is about 19,000 yuan behind and floor six lands near zero. The ladder rises in equal steps of ten percentage points while the premium rises in two jumps, from 4.58 percent to 8.10 percent. Within each band the higher floor pays more without gaining more, so it absorbs the whole increase.

This calculation is deliberately simplified, since it applies one average price to every floor where the original study uses floor-specific prices and finds all four paying floors comfortably in surplus. The disagreement is itself informative: a rule whose fairness flips with the choice of price measure is not a robust rule. A ladder indexed to estimated premiums rather than to floor numbers would be less fragile.

6.2. Bargaining and administrative friction

Beyond arithmetic, the Guangzhou survey finds three recurring conflicts. About 85 percent of respondents expected noise from the new shaft and around 75 percent expected it to block daylight, both concentrated on the lower floors. Money is the third. Administrative friction adds to this: among residents who had been through approval, 34 percent said the paperwork was too complicated and 24 percent said it took too long. Provinces also adopted elevator retrofit policies at very different times, with adoption influenced by the local level of population ageing, by fiscal conditions, and by whether neighbouring provinces had already moved [10].

Arrangements that have emerged from successful cases include the following:

- Cost sharing indexed to estimated floor-level premiums rather than to floor numbers, which removes the misalignment shown in Figure 4.
- Cash or in-kind compensation to ground-floor owners, funded from the larger gains captured above.
- Resident self-governing groups with an elected chair and a recognised organiser inside the building, which replace ad hoc arguments with a standing forum.

6.3. The 2026 subsidy

In December 2025 the National Development and Reform Commission and the Ministry of Finance issued the notice governing the 2026 equipment renewal programme, which for the first time brought elevator retrofitting within the scope of ultra-long special treasury bond funding [11]. The national notice sets the scope, while subsidy amounts appear in city-level implementation notices. Nanjing offers 250,000 yuan per elevator for buildings of four to six floors and 300,000 yuan for seven floors or more, with priority for designs opening directly onto each landing, and several other cities have published the same two figures, though the sources used here cannot confirm that they apply nationally [12]. Set against the 700,000 yuan construction cost in Table 2, a grant of 250,000 yuan would cut the break-even premium from about 1.8 percent to roughly 1.2 percent, bringing weaker housing markets inside the range where the project still pays for itself.

The change is one of kind and not only of amount. Earlier support came almost entirely from local budgets, so cities with the oldest housing and the weakest finances could fund the fewest projects. Central funding weakens that link, though money solves the affordability problem and not the paperwork problem.

7. Limitations and conclusion

The model in Section 3 treats the value of an outing as independent across occasions, ignoring habit formation and the way mobility decays when unused. The price evidence comes from one high-value city and six-storey buildings only, and the survey evidence is cross-sectional. Most importantly, no study reviewed here measures elderly consumption directly before and after installation, so the final link remains an inference rather than a measured effect. A useful next study would apply the same difference-in-differences design to household spending.

China's silver economy is usually discussed in terms of products: robots, health foods, wearable monitors, senior travel packages. This paper has argued that it also rests on something far more ordinary, which is whether an older person can reach the ground floor without help. With 323 million people aged 60 and over and a care model built around staying at home, the staircase in a

1990s walk-up is a gate that determines how much of the neighbourhood economy a resident can reach.

Opening that gate looks affordable by a wide margin. A building needs only about a 1.8 percent price premium to cover installation and fifteen years of operation, and the estimated premium is three times that. The remaining obstacles are questions of division rather than of total value, and both the cost-sharing ladder and the approval process can be redesigned. If they are, an elevator in an old building will do more than carry people down six floors. It will reconnect a large and growing group of consumers to the market waiting for them at street level.

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