

DWELLING ON CHINA'S HOUSING RISKS



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HIGHLIGHTS

- China's housing market generates a remarkable 19% of the country's economic output, and has been the subject of bubble worries.
- It merits close examination given stress testing that shows even a moderate housing correction would halt the country's economic progress.
- The near-term outlook is fairly benign, with the pace of home building arguably running slightly below steady-state demand.
- Medium-term risks are quite negative, revolving around the fact that 29% of China's housing stock is vacant.
- In contrast, long-term risks are more positive given what appears to be an inadequate number of homes relative to the number of urban households.
- Affordability is atrocious on the surface, but much more nuanced beneath it.
- Overall, Chinese housing still warrants a place in our pantheon of risks, but in a location of slightly diminished prominence relative to our prior assumptions.

China now commands the world's attention, having transformed itself into an economic superpower after decades of remarkable growth. Recently, the market's interest has ratcheted even higher due to the country's decelerating growth trajectory and skittish financial market performance. But for all of this new attention, it is still a difficult country to properly evaluate, shrouded as it is in a mist of economic transformation, myriad risks and outright uncertainty.

In response to China's great importance and the many question marks attached to it, we are producing a series of Economic Compasses that tackle key Chinese macroeconomic issues. This is the inaugural report, with a focus on the sustainability of the country's precarious-looking housing market. In it, we:

- Estimate the importance of China's housing market to the broader economy, stress-testing what a major housing market correction would do to Chinese GDP growth
- Evaluate whether Chinese home construction is outpacing steady-state demand
- Track the near-term outlook for housing based on the momentum demonstrated by key variables
- Estimate the number of vacant homes in China and construct a medium-term scenario in which the vacancy rate descends to a more normal level

Exhibit 1: Chinese housing scorecard

Housing issue	Worrying?	Weight
Centrality of housing contribution to GDP	Yes	10%
Pace of home construction vs. steady-state demand	No	15%
Short-term outlook (housing momentum)	No	5%
Medium-term scenario (high housing vacancies)	Yes	15%
Long-term scenario (too few homes vs. households)	No	15%
Housing affordability	Somewhat	15%
High and rising household debt	Somewhat	5%
Sustainability of artificial inducements to buy Chinese housing	Somewhat	10%
Linkage between housing and other China debt issues	Somewhat	10%
OVERALL	Somewhat	

Source: RBC GAM

- Evaluate a long-term scenario that imagines a gradual reduction in the sizable excess of Chinese households relative to the number of occupied homes
- Assess the sustainability of home prices in China via a variety of affordability and household leverage metrics
- Consider the artificial supports that have made China’s housing market so attractive to investors, and whether these might fade with time

Getting to the truth on these matters is not an easy task, nor one that we can claim to have achieved with laser-like precision. The effort demands more guesswork, extrapolation and reliance on third-party estimates than would be ideal.

Nevertheless, the effort pays dividends, securing several useful findings that aid in understanding China’s housing market, and by extension providing a yardstick for the risk that it poses to the country’s broader economy and debt markets, as well as to investors globally.

In the end, we emerge with a healthy respect for the importance of China’s housing market and a number of worrying factors to monitor, but ultimately with the impression that China’s housing market is not quite as riddled with problems as we had expected (Exhibit 1).

The importance of Chinese housing

A logical starting place for any investigation into China’s housing market is to properly gauge its overall heft. This turns out to be quite impressive, having risen significantly since the turn of the millennium.

The single largest constituent of the housing market – residential construction – has expanded to represent 10.6% of the country’s overall economic output all by itself (Exhibit 2). This contribution has lately begun to ebb, but only after 13 years of relentless growth.

But housing’s impact on GDP includes more than just the construction of new buildings. Many other activities are indelibly linked to the housing market, such as the services provided by real estate agents, mortgage lenders and real-estate lawyers. Upstream industries include cement and steel production. Downstream linkages include the furniture and appliances sectors. Loosely, the relevant portions of these “related industries” contribute another 7% of GDP.¹

A final economic contribution comes from the housing wealth effect – the additional consumer spending motivated by rising real-estate wealth in the hands of households.² At the current pace of Chinese home price gains, this explains another 1.3% of Chinese economic activity.

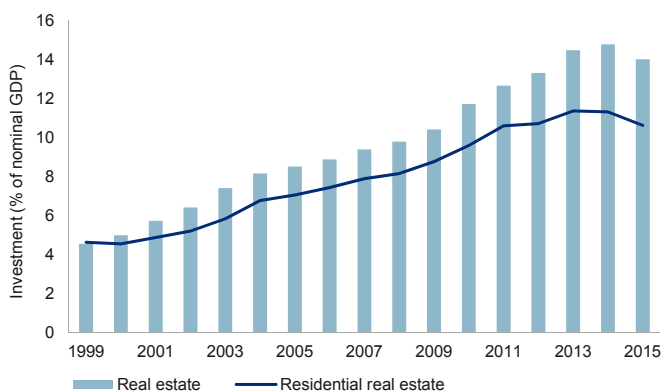
Altogether, these three factors provide a net housing market contribution worth a muscular 19% of GDP (Exhibit 3).³ In other words, nearly one-fifth of China’s economy is tied to housing.

¹ Wall Street Journal, “China Housing Slows, Ripples Follow”, June 19, 2014.

² We assume a housing wealth effect of 5%. In other words, the Chinese consumer immediately spends 5% of any increase in their housing wealth.

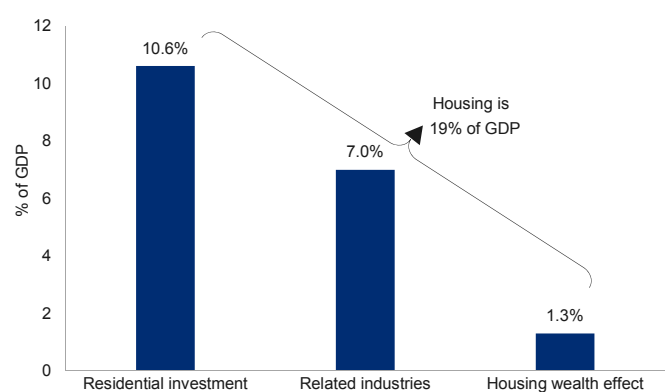
³ Third-party estimates are roughly in line with our calculation, ranging between about 15% and 30%. In our view, the more expansive definitions constitute something of a slippery slope – does the farmer that feeds construction workers also warrant inclusion in this calculation? What about the car maker that enables homebuyers to commute to their new home? At the broadest definition, every worker and industry in a country has some connection to every other. But this is hardly a viable basis for calculating how central the housing market is to China’s economic growth.

Exhibit 2: Chinese real estate investment has grown significantly



Source: Haver Analytics, RBC GAM

Exhibit 3: Housing sector is crucial to China’s GDP



Note: Current (2015) contribution to GDP of the housing sector in China. Source: China National Bureau of Statistics, WSJ, Haver Analytics, RBC GAM

Stress testing Chinese housing

What would happen if the country's housing market faltered? Clearly, the effect would be material. But would it trigger an economic collapse or merely turbulence?

Before crunching the numbers, let us properly understand that it is *not* so simple as assuming that each 10% hit to Chinese housing subtracts 1.9 percentage points (10% of the sector's 19% GDP share) from that year's GDP growth. There are two complications.

First, the housing market "hit" needs to be better defined. We undertook two stress tests. A 10% stress test imagines that residential investment and home prices both fall by 10% over the next year, as opposed to housing activity rising in line with the broader economy at 6.25% per year and home prices continuing to rise at their current rate. A 20% stress test assumes a 20% decline in both residential investment and home prices.

Second, and counterintuitively, the response of each housing input needs to be considered separately. To illustrate, the 10% stress test subtracts a total of 16.25% from residential investment relative to the status quo, removing 1.8 percentage points from the next year's GDP growth rate.

In contrast, the "related industries" component would be unlikely to shrink to the same extent since some furniture and appliance purchases are unconnected to new home buying, most people would continue to service their mortgages, and resale home transactions would not necessarily fall to the same extent as new construction. We assume the GDP hit from "related industries" is diluted to four-sevenths of the full impact, making for 0.8% of GDP.

Finally, the housing wealth effect wouldn't just shrink in its contribution to GDP: it would transform from a positive number (enabled by rising home prices) to a negative one (imposed by falling home prices). In the 10% stress test, the housing wealth effect reverses course from +1.3% of GDP to -1.2%. That constitutes a huge 2.6-percentage-point reduction in the growth of economic demand relative to the status quo.

Combining these three drivers, the 10% stress test subtracts 5.2 percentage points from Chinese GDP growth over the following year. The bigger 20% stress test subtracts 7.8 percentage points over the subsequent year. Both thus constitute extremely serious economic shocks, with the more aggressive scenario potentially pushing the Chinese economy into outright decline (Exhibit 4).

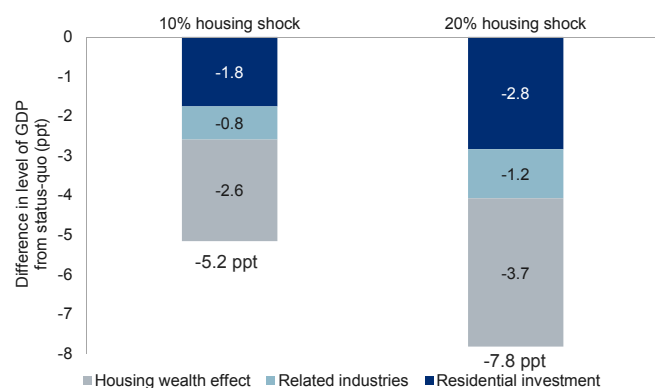
We should be clear that neither of these stress tests represents our forecast for Chinese housing. But they do help to calibrate the risks.

The near-term housing outlook

Let us now turn to the way forward for Chinese housing. We begin with a near-term outlook based primarily on our assessment of momentum, before progressing into medium- and long-term scenarios informed by more fundamental factors.

As we consider the interconnected links of China's housing market supply chain – starting with land acquisitions and progressing through new construction and completed construction before alighting on home sales – a generally tame picture reveals itself (Exhibit 5). Most of these

Exhibit 4: Stress testing Chinese housing



Note: Impact on level of Chinese GDP of a 10% and 20% decline in housing activities and home prices versus our base case scenario. Source: RBC GAM

Exhibit 5: Chinese housing activity appears tame

	Versus sustainable demand	Momentum
A) Land acquisition	Slightly below	Slowing
B) New construction	Slightly above	Slowing
C) Completed homes	Below	Slowing
D) Home sales	Below	Steady
Overall	Slightly below	Slowing

Note: Land acquisition is for all forms of construction, not just residential. Home sales is for both new and existing units. Momentum colour coding is based on whether momentum is taking activity toward sustainable demand or away from it. Source: Haver Analytics, RBC GAM

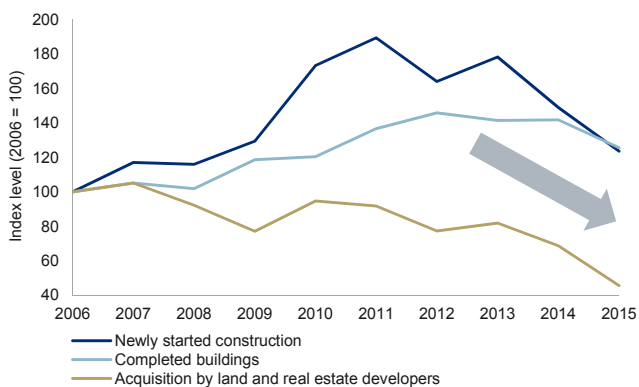
indicators are slowing slightly (Exhibit 6), and the bulk are in fact running marginally behind sustainable demand rather than ahead of it.

Only new construction is operating a little ahead of where we think it should sustainably be, though it has been slowing lately.

On the price side of the ledger, home prices are rising at a robust but not extreme – by Chinese standards – rate of 9% per year, and on a slightly decelerating trajectory (Exhibit 7).

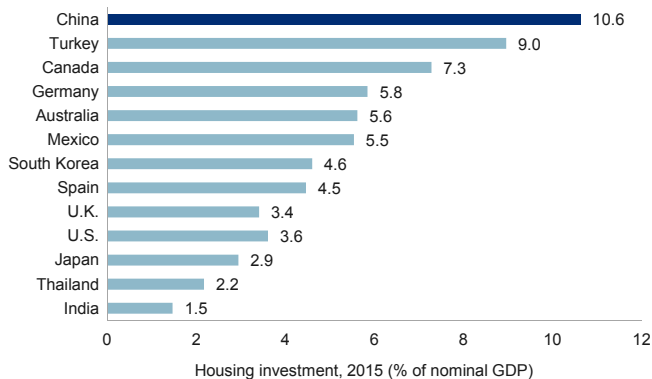
These findings constitute mixed news. From a short-term growth perspective, this is not a great development: a tame and slowing housing market promises less economic support. But from a far more important perspective – evaluating the Chinese housing market for signs of a bubble – it is reassuring that the housing market is not obviously overheating or set for near-term trouble.

Exhibit 6: Chinese housing activity metrics now cooling



Note: Series measured in square meters per urban household and indexed. Source: Haver Analytics, RBC GAM

Exhibit 8: Housing investment in China leads the way



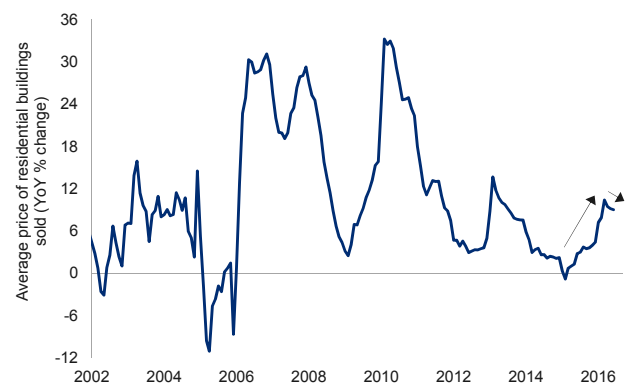
Note: Private and public residential investment for China, Mexico, Spain, South Korea and Turkey; private investment only for all other countries. RBC GAM estimates for India and Mexico. Source: Haver Analytics, RBC GAM

Too many homes?

We now turn to the medium- and long-run outlook, each of which is grounded in the fundamental issue of whether China has too many homes relative to its needs.

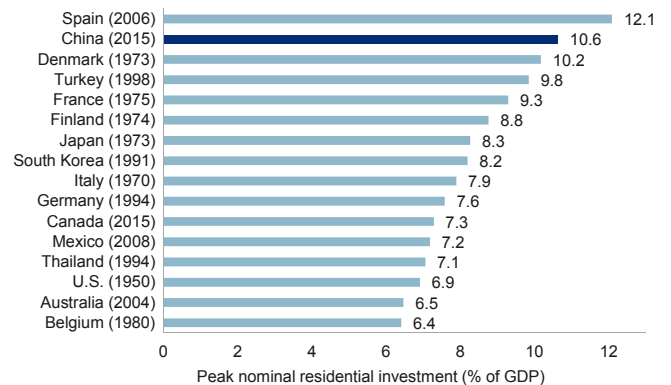
International comparisons make for a concerning starting point. The Chinese economy remains unusually dependent on construction, not just in the context of its own history, but also internationally. Of the major nations we examine, China is today more dependent on residential investment than any other (Exhibit 8). For context, the U.S. reliance is nearly three times less. While not quite record-setting, China's current emphasis on home building places it only slightly behind

Exhibit 7: Chinese home prices rebound, but pace is slowing



Note: As of June 2016. Unweighted average of YoY percent change of home prices in cities surveyed. Source: China Index Academy, Soufun, RBC GAM

Exhibit 9: Chinese residential investment exceeds most historical peaks elsewhere



Note: Historical data used for individual countries may vary due to data availability. Private and public residential investment for Belgium, China, Denmark, Finland, France, Italy, Mexico, Spain, South Korea and Turkey; private investment only for all others. Source: Haver Analytics, RBC GAM

Spain's 2006 peak⁴ and well ahead of the Japanese and South Korean pinnacles attained during their own “economic miracles” (Exhibit 9).

As such, China is sporting a classic hallmark of housing excess. This certainly isn't justified by China's overall demographic landscape, which is defined by a working-age population already in outright decline.

Fortunately, three other factors justify at least part of China's construction boom. First, private home ownership in China is still a recent phenomenon – home ownership was legalized fewer than 20 years ago – and after multiple generations of prior underinvestment, there is understandably a great deal of catch-up demolition, construction and renovation.

Second, China has become rapidly wealthier, creating the financial capacity for a significant amount of home upgrading even had there not been prior underinvestment.

Third, urbanization remains a powerful force in China. While the overall population is experiencing no significant growth, urban populations are rising at around 3% per year. This is the demand that Chinese builders are responding to.

These mitigating factors do not completely eliminate our concern that China is overinvesting in real estate, but they do help to temper it. Additional insight can be gleaned by digging into just how many new homes China theoretically needs on a steady-state basis each year, versus how many it is getting.

⁴ Spain's residential construction boom was at least partially supported by strong demand for vacation properties from other European nations, but nonetheless represented a considerable bubble that culminated in a massive housing bust. China lacks significant property demand from foreigners.

Sorting out Chinese housing supply/demand

We figure China is completing 6.7 million new urban housing units per year.⁵ This seems like a heady pace when contrasted against the piddling 1.2 million per year in the U.S. and around 200,000 per year in Canada. However, adjusted for China's gargantuan population, the assessment changes considerably. By that metric, China is producing around 30% more homes per person than the U.S., and slightly less than Canada.

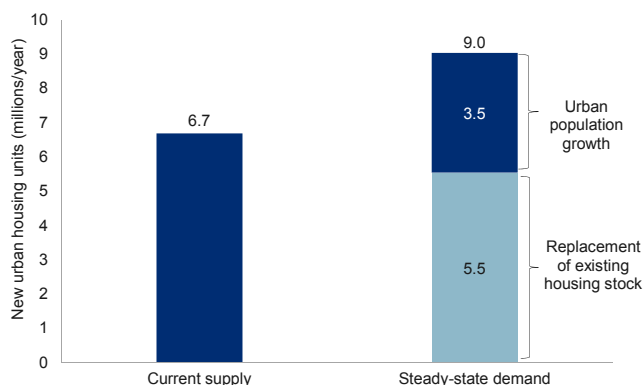
Of course, the most important determinant is whether China is producing too many new homes relative to its steady-state demand. Our conclusion is surprising. We figure China actually needs around 9.0 million new urban housing units per year – more than it is currently getting. If anything, the country is *underbuilding* (Exhibit 10).

Granted, there are a number of assumptions and estimates that go into this assessment. The first is the size of the existing urban housing stock, which we peg at 233 million units in 2015 (Exhibit 11).⁶ The second is an assumption about the rate of growth in the urban population, and how

⁵ The number of new urban housing units is estimated by dividing the urban residential floor space completed in 2015 by the size of an urban housing unit (the product of the average urban household size and living space per capita in square metres), with the assumption that urban housing completions represent 90% of the national total.

⁶ We estimated the size of China's urban housing stock in a variety of ways (perpetual inventory calculations; extrapolating from dated private-sector and academic estimates; estimating based on the number of urban households and known vacancy rates). Some of these provide radically different conclusions, ranging from a mere 136 million urban housing units up to an enormous 351 million units. We are most comfortable with a simple average of the various estimates, which conveniently also aligns with the single most plausible of the individual estimates.

Exhibit 10: China is not overbuilding relative to steady-state demand



Note: RBC GAM estimate of urban housing supply and demand in China. Source: Haver Analytics, RBC GAM

Exhibit 11: Chinese housing stock estimates

Methodology	2015 (million units)
Perpetual inventory method	136
Credit Suisse	174
CHFS	231
CICC	272
Urban household and vacancy data	351
Average	233

Note: 2015 housing stock derived using methodologies shown in table: perpetual inventory method; extrapolation from Credit Suisse, China Household Finance Survey (CHFS) and China International Capital Corp. Ltd. (CICC) calculations; and estimation based on urban demographic and housing data. Source: CHFS, CICC, Credit Suisse, Haver Analytics, RBC GAM

that maps onto steady-state housing demand.⁷ We calculate that the influx of migrants to Chinese cities requires 3.5 million new units per year. Finally, most importantly and alas most speculatively, at least 2% of China’s existing homes are torn down each year,⁸ necessitating replacement construction of another 5.5 million units. This adds up to steady-state demand for 9.0 million new urban housing units per year. We do not wish to attribute any great precision to this figure – it may well prove off by a few million in either direction. But the main point is that the flow of new residences is not obviously outpacing demand. If anything, it is running slightly short, at least on a steady-state basis.

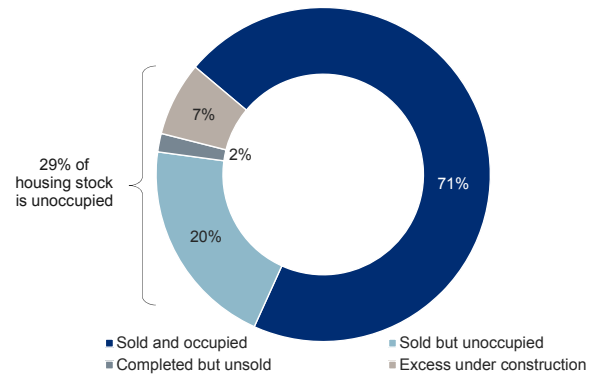
While reassuring, this is hardly the end of the debate. Aligning the flow of housing supply and demand is one thing, but it does not eliminate the possibility of a persistent mismatch in the underlying level of housing supply and demand.

Pessimists can point to China’s high housing vacancy rate, concluding that the country’s pre-existing urban housing stock is much too large and necessitates a deceleration in the pace of construction. Optimists can focus on the fact that there are far fewer homes than households in China’s cities – a matter presumably requiring redress at some point. In our opinion, both arguments are correct, with the pessimistic interpretation of greater relevance over the medium run and the optimistic interpretation effectively neutralizing this downside risk over the long run. Let us look at each in turn.

Bad news: housing inventories

Arguably the single greatest threat in the Chinese housing system is the sheer number of unoccupied properties. This is striking, at 75 million units, or 29% of the 2015 urban housing stock (Exhibit 12).⁹ The number continues to rise. See Textbox A for a discussion of the different types of housing vacancies.

Exhibit 12: Many vacancies in Chinese housing stock



Note: Share of Chinese housing (in units) by status in 2015. Completed but unsold unavoidably includes both new and existing units for sale. Excess under construction (in units) measured as floor space under construction less floor space completed estimated based on the historical relationship of housing under construction relative to completions. Source: China Household Finance Survey, Credit Suisse, CICC, Haver Analytics, RBC GAM

This inventory glut could suddenly become a problem if

- property speculators were to flee, either because they detect softness in the housing market, they become risk averse, or because they warm to other forms of investment
- builders respond to elevated inventories by curtailing construction in the future.

What would be a normal level of housing inventories?

Arguably there should be no “excess under construction” whatsoever, the “completed but unsold” fraction should fall from 2% to 1% of the housing stock to align with the historical norm, and the “owned but unoccupied” fraction should fall from 20% to around 12%.¹⁰ When combined, this argues China’s housing inventories may eventually need to fall from 29% of the housing stock to just 13%.

For the housing market to reach this target (our medium-term scenario), builders would need to dial back their pace of housing completions from 6.7 million units per year to just 4.0 million per year and keep it there for a decade. This would necessitate a 40% decline in the pace of construction, and means that China’s urban housing stock would shrink slightly over time.¹¹

⁷ The 3% population growth in China’s cities exaggerates the true incremental housing need as we figure only around half of newly urban residents actually move to the cities, whereas the other half have remained in their home region but have been reclassified as urban as they are swallowed into nearby expanding cities. Nevertheless, 1.5% true urban population growth is strong by international standards, and this is the figure we use in our calculations.

⁸ The IMF pegs the teardown rate at a higher 3%, so we may be conservative in the number of new replacement homes China needs each year.

⁹ For these inventory calculations we use a more expansive definition of the housing stock than the 233 million urban housing units cited earlier. This definition includes unsold but completed homes and the excess inventory under construction, summing to 256 million urban housing units for 2015.

¹⁰ The U.S. vacancy rate – including both “sold but unoccupied” and “completed but unsold” homes – is 13% of the housing stock. Subtracting out the 1% “completed but unsold” rate results in a 12% figure. This figure can sustainably be above 0% because there are always some housing speculators in the market and also because some households own vacation properties (these count as “vacant” if not occupied full-time).

¹¹ Since 5.5 million new units are required each year to replace teardowns.

TEXTBOX A : HOUSING INVENTORY COMPOSITION

We identify three types of vacant housing in China: any excess that may exist of homes under construction relative to the pace of completions, all homes that have been completed but not yet sold, and all residential properties that have already been sold but sit unoccupied.

1) Excess under construction

We estimate the number of excess homes under construction based on whether the number of Chinese homes currently being built is unusually high relative to the number of homes being completed each year. Technically, all homes under construction are vacant, but we focus on the “excess” since unlike the rest they have a much diminished chance of being absorbed into the market upon completion. By this measure, we find there are now 18 million too many homes under construction in China (Exhibit A). This constitutes a non-trivial 7% of the Chinese housing stock. For context, there was no such construction excess as of 2009. It has formed entirely since then.¹

2) Completed but unsold

The next category of Chinese housing inventories is homes that have been completed but sit unsold. We calculate roughly 5 million such properties, equivalent to 2% of the housing stock.²

This measure of inventories is also growing quickly, and now perches at almost four times the 2009 level. Reflecting this, Chinese homes now take longer to sell than they did several years ago (Exhibit B).

In the grand scheme, however, this is only a small contributor to China’s housing inventory problem. Helping to explain why this type of inventory remains so tame, 78% of Chinese housing units are sold before completion.

3) Owned but unoccupied

Easily the largest source of unoccupied housing in China is the stock of dwellings that has been sold but then remains unoccupied. This is a startling 52 million homes – 20% of China’s housing stock. We imagine this is composed mostly of property speculators, though a fraction would also represent families with vacation properties.

These tens of millions of empty apartments square with anecdotal reports of vacant buildings and even “ghost cities.” This category of inventories is dramatically higher than it was in 2009 but has stabilized over the past few years.

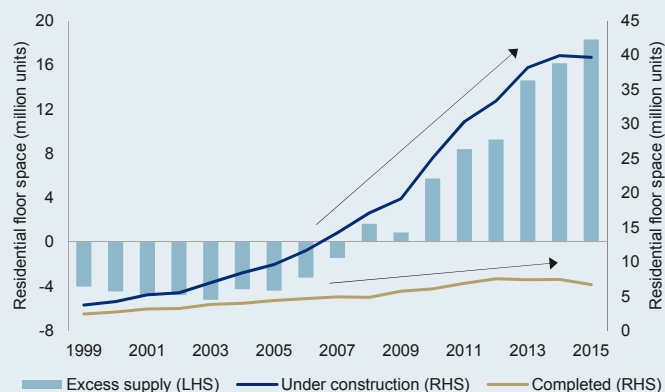
Inventories in context

All three types of housing inventories sit above normal levels, with two of the three categories continuing to rise (Exhibit C).

¹ An alternative interpretation of the unusually large number of homes under construction is that it may now take longer for buildings to be constructed due to increasing size and/or quality. But we have no evidence of this, and do not assume it.

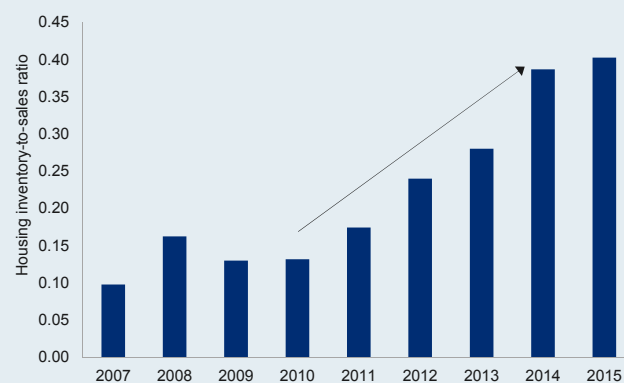
² Unavoidably, this figure includes all homes for sale, both newly constructed and existing dwellings. Many of the existing dwellings are presumably occupied, meaning that this figure overestimates the true stock of new unsold homes for sale.

Exhibit A: Chinese excess housing under construction is a recent phenomenon



Note: Excess supply measured as floor space under construction less floor space completed estimated based on the historical relationship of housing under construction and completion. Source: Haver Analytics, RBC GAM

Exhibit B: Completed Chinese homes taking longer to sell



Note: Current completed but unsold housing inventory (unavoidably including existing homes for sale) relative to the annual rate of home sales. Source: Haver Analytics, RBC GAM

Exhibit C: Chinese unoccupied housing: signs of excess

	Versus norm	Momentum
A) Excess under construction	Above	Rising
B) Completed but unsold	Above	Rising
C) Owned but unoccupied	Above	Steady
Overall	Above	Slightly rising

Note: Excess under construction measured as floor space under construction less floor space completed estimated based on the historical relationship between housing under construction and completion. Completed but unsold unavoidably includes both new and existing units for sale. Source: China Household Finance Survey, Credit Suisse, CICC, Haver Analytics, RBC GAM

From an economic standpoint, this adjustment would subtract 6.5% from Chinese GDP.¹² If the construction slowdown was achieved within the span of a single year, the Chinese economy would essentially stagnate for that year. If the construction deceleration was more gradual – spanning four years before reaching the new 4.0 million pace – then the Chinese economy would grow by 1.6 percentage points less than normal in each of the four years. Whether abrupt or more incremental, this medium-term scenario has serious consequences.

Clearly, then, China’s high housing vacancy rate constitutes a key risk.

However, we are inclined to think of this as a mid-sized threat rather than a large one. After all, these elevated vacancies have endured for quite a number of years, demonstrating some degree of sustainability. And it is heartening that the great bulk of these unoccupied houses – almost 70% – are the most benign form of vacancy: homes that have been purchased, if then left vacant by their owners. Something would have to abruptly change the value proposition for those investors to upset the applecart.

It is also worth noting that China can tolerate higher housing vacancies and excess capacity than most other countries. Ghost cities and their associated vacancies are a real thing, and likely an unavoidable aspect of a central planning system that is fundamentally a) less responsive to market forces and b) unusually forward-looking. Many of the original ghost cities that captured the attention and scorn of the world have since filled up.

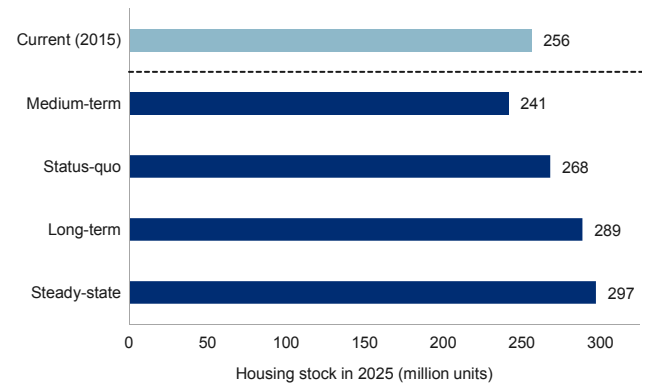
Good news: underserved households

In sharp contrast to the bad news inventory story, optimists will note that China’s cities have far fewer occupied homes (181 million) than there are households (269 million). Granted, a mismatch of this size is not unusual in poorer countries. Frequently, multiple households¹³ cram into what would normally be a single dwelling. Many manufacturing employees live in corporate dorms.

¹² This calculation demands assumptions about the share of residential investment that is oriented toward new builds (we assume 75%), the extent to which renovations would also be impacted (we assume at only half the magnitude of new builds), the hit to related industries (we assume this is at four-sevenths of the magnitude of the new build impact) and the impact on the wealth effect (we assume no impact at all – while less housing activity is usually associated with lower prices, technically this effort would help to reduce the supply excess in the market and so could alternately result in the opposite impact).

¹³ Note that the definition of a household in this context is quite expansive, including families, individuals, and tallying individuals who live with roommates separately.

Exhibit 13: Chinese housing market could go in multiple directions



Note: Projections of Chinese housing stock in 2025. Medium-term scenario assumes that vacancy rate returns to normal level in 2025; status-quo assumes current construction rate of 6.7M units per year continues through 2025; long-term scenario assumes convergence to higher 0.8:1 home-to-household ratio with normal vacancy rate in 2025; steady-state demand assumes construction runs at theoretical demand of 9.0M per year. Source: Haver Analytics, RBC GAM

But this housing mismatch is probably not sustainable indefinitely. As China grows wealthier, the incidence of multiple families per dwelling should abate, and the phenomenon of dormitory living should also fade.¹⁴ For comparison, whereas China has 33% fewer occupied homes than households, the U.S. figure is a smaller 20%.

Accordingly, in our long-term scenario, we presume not only that China’s housing vacancy rate shrinks to a more normal level (as per the medium-term scenario) but also that more of China’s urban households secure their own dwelling over the next decade, reaching the U.S. fraction. This turns out to almost perfectly offset the hit from housing vacancies: residential construction needs to come in at just under 9 million units per year for a decade to achieve this – higher than the current rate.

The construction and related activities necessary for such an accomplishment would add 3.4% to the level of Chinese GDP for the decade across which the construction catch-up occurred.¹⁵

Summarizing China’s housing supply and demand

We do not actually assume that China will succeed in squaring its number of households with its number of homes anytime soon, just as we are not sure that China’s housing vacancy rate will actually descend to 13% with any

¹⁴ As China’s manufacturing clout drops, given dissatisfaction with the dorm system, and as hukou reform proceeds.

¹⁵ Of course, any such ramping up to the higher level of construction would likely take years, meaning that the economy would hardly grow by an extra 3.4 percentage points in the first year.

haste. Other more simplistic scenarios are no less likely, such as the assumption that construction remains at 6.7 million units per year indefinitely (status-quo scenario) or that construction rises to the level of steady-state demand (9.0 million units per year) and remains there (Exhibit 13).

The medium-term and long-term scenarios can best be thought of as possibilities for China's housing outlook, not as base-case forecasts (Exhibit 14). That said, we are on guard for any indication that one or the other of these tendencies might begin to assert itself, as this would be highly consequential for the Chinese housing market and beyond.

Resolving the high vacancy rate strikes us as a medium-term (multi-year) risk, while resolution of the inadequate number of homes relative to households seems more of a long-term (multi-decade) risk, hence their titles.

Meanwhile, in the near term, the fact that new residential construction is moderately underpacing steady-state housing demand suggests no great problems are imminent.

Are Chinese home prices too high?

Chinese home prices are unquestionably high, but it is necessary to chip away at the veneer of the subject for a proper assessment.

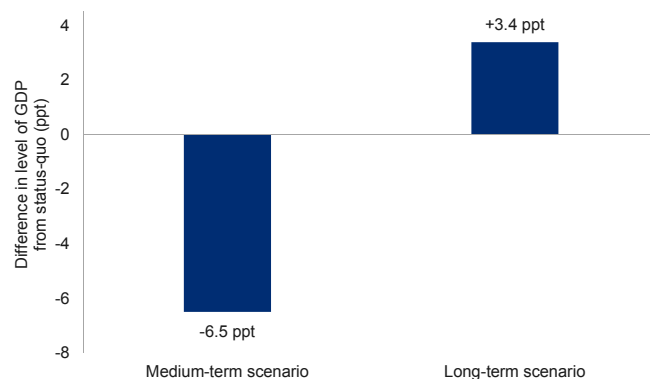
The standard – and indisputably most exciting – approach to China's housing affordability examines the home price-to-income ratios for the country's largest cities. These are off the charts relative to other countries (Exhibit 15). Shenzhen homes require an average of 25 years of income to purchase, with Beijing and Shanghai not too far behind. For perspective, other relatively expensive international cities such as London and New York land at just 9 years and 6 years, respectively.

Similarly, Chinese household debt has increased significantly over the past decade, and is now higher than the U.S. as a share of income (Exhibit 16).

The toxic combination of poor affordability, high household leverage and significant speculation (recall all of those purchased but vacant properties discussed in the prior section) points toward the undeniable possibility of a Chinese housing bubble.

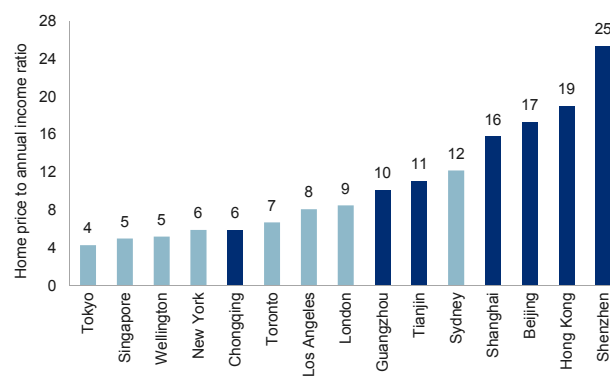
But several additional considerations dial back our affordability worries somewhat. First, Chinese homes on the whole are not quite as wildly expensive as they first look. Whereas some cities do have exceedingly high home

Exhibit 14: Housing scenarios point in opposite directions for Chinese GDP



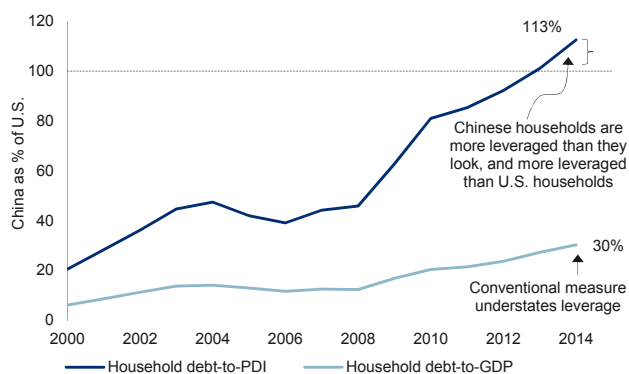
Note: Impact on level of Chinese GDP versus our base case scenario. Medium-term scenario assumes that vacancy rate falls to normal level from current elevated level over multiple years; long-term scenario based on projection of higher residential investment to normalize ratio of homes to households over the long run (and normalization of vacancy rate). Source: RBC GAM

Exhibit 15: Chinese home price-to-income tops charts



Note: Dec 2015 data for Chinese cities, Q3 2015 data for all others. Source: Economist Intelligence Unit, Demographia International Housing Affordability Survey, RBC GAM

Exhibit 16: Chinese households have become heavily leveraged



Note: As of 2014. Comparison of China and U.S. household debt-to-personal disposable income (PDI) and household debt-to-GDP ratios. Calculated as China's ratio as % of U.S. corresponding ratio. Source: Haver Analytics, RBC GAM

price-to-income ratios, the national average is a much lower (though hardly low) 8.6 times income.

Second, other affordability measures indicate that Chinese dwelling costs are much saner. Chinese households manage to allocate a smaller portion of their budget toward dwelling costs than American households, and the Chinese wallet share has been falling for several years (Exhibit 17).¹⁶

Helping to explain this apparent contradiction, China's housing market is not a homogenous lump. Second and third tier cities tend to be somewhat cheaper and have generally enjoyed a declining price-to-income ratio over the past several years.¹⁷ Sliced along a different axis, the luxury housing reflected in international home price-to-income ratios does not reflect the entire market: a non-trivial share of China's housing market is government-constructed affordable housing. Similarly, many urban dwellers live with extended family, other families, roommates or in company dorms, reducing their housing costs.

When we calculate our own Chinese affordability index based on imputed mortgage payments relative to income, the conclusion – due in part to falling Chinese borrowing costs – is that affordability has been improving in recent years rather than deteriorating (Exhibit 18).

Third, Chinese households are renowned for saving nearly 40% of their after-tax income. This enables them to make much heftier home down payments than those in other countries, and even to purchase properties with cash. With the aid of such a strong start, the subsequent carrying cost of a home is much cheaper.

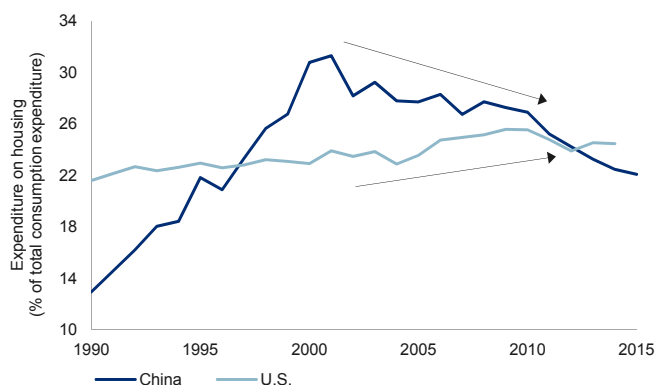
Fourth, Chinese household incomes continue to rise robustly, meaning that households can sustain higher initial debt-to-income ratios since these will tend to decline rapidly over time as the denominator grows.

None of these considerations completely absolve China of its high home prices and rising household debt. We do ultimately believe that Chinese property is more expensive than it should be. But the affordability story has some nuance to it, and it is not quite as bad as it first looks.

¹⁶ The method of calculation is admittedly not identical for the two countries, with mortgage payments explicitly factored into the U.S. survey, versus a sort of "imputed rent" concept used in China. Theoretically, the results should nevertheless be similar.

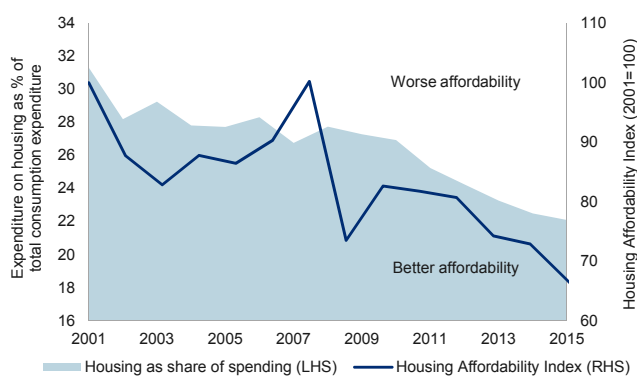
¹⁷ Though some maintain that the greatest housing risks are nevertheless centered around these smaller markets, due mainly to fewer urbanization tailwinds, but also to a smaller pool of wealthy residents and these cities' lesser importance to policymakers.

Exhibit 17: Chinese households spend less on dwellings than U.S.



Note: Housing expenditure includes shelter, utilities and fuels.
Source: BLS, CNBS, Haver Analytics, RBC GAM

Exhibit 18: Chinese housing affordability getting better



Note: Expenditure based on per capita data. Affordability index calculated as fraction of average household disposable income required to service the mortgage on an average house, assuming a 20-year mortgage with 30% downpayment. Source: Haver Analytics, RBC GAM

Exhibit 19: Why is Chinese housing so popular?

Factor	To fade with time?
Capital controls limit investment options	Yes
Distrust of other domestic investments	Yes
History of superior price gains	Maybe
Cheap carrying cost	Yes
Government support	Partially
Overall	Housing allure to gradually diminish for investors

Source: RBC GAM

Why is housing so popular in China

We have so far concluded that China's housing market is pushing its luck, but perhaps not as overblown from an activity or price perspective as many fear.

What makes China's housing market so resilient in the face of several challenges? There are several allures specific to China (Exhibit 19).

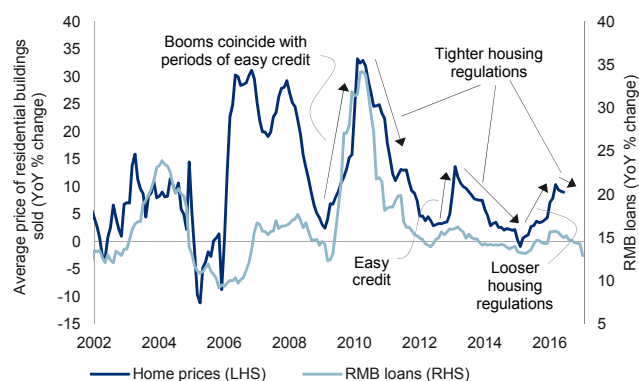
First, the government maintains significant control over Chinese capital flows. Most Chinese money cannot freely leave the country, meaning that the bulk of China's wealth must be invested domestically.

Second, Chinese savers remain distrustful and underwhelmed by other investment options. Whereas the first choice for an investor in the developed world would likely be stocks or bonds, for the Chinese it is hard to resist investing in property given the asset's historical performance, their familiarity with it and its tangibility. In contrast, the country's relatively young stock market has suffered extraordinary swings of fortune, Chinese corporations frequently lack the transparency and the profit-maximizing instinct of their developed-world counterparts and the country's interest rates remain artificially low. Attitudes and practices are slowly shifting on all of these fronts, but the latest turbulence in China's mainland stock markets may delay a wholesale shift away from real estate for some time.

Third, houses are cheap to hold in China. Whereas most countries have property taxes that nibble away at the principal of real-estate investors, such taxes are a rarity in China. Furthermore, because new Chinese apartments come with minimal furnishings – often lacking fixtures such as faucets, lights and appliances – property speculators in China have less to maintain from year to year.

Fourth, the Chinese government has repeatedly backstopped the housing market, delivering waves of targeted support whenever it begins to sputter, and conversely tightening the market when it begins to overheat (Exhibit 20). These government efforts have come in different forms and permutations, spanning lower interest rates, the inducement of more bank lending, and a variety of housing-market rule changes. Recently, the government is even said to have purchased properties from distressed developers (at a discount) and resold them to poor households as affordable housing, killing two birds with

Exhibit 20: Chinese housing cycle influenced by policy settings



Note: As of June 2016. Unweighted average of YoY percent change of home prices in cities surveyed. RMB loans in 6-month lead. Source: China Index Academy, People's Bank of China, Soufun, RBC GAM

one stone. Chinese investors recognize this multi-faceted government protection, and so feel comfortable continuing to invest in real estate regardless of the underlying fundamentals.

A possible reversal

However, several of the housing market's special allures are set to fade with time.

China has made halting progress in reducing the capital controls bracketing the country, and aspires to more over the medium run.¹⁸ This stands to increase the universe of international investment alternatives.

Chinese investors will eventually become more familiar with other forms of investment, even if this shift is likely to be only gradual.

Houses may become less cheap to carry over time, particularly as the government looks at imposing property taxes and potentially enacts other impediments to combat speculation.

The government is increasingly cognizant that there is a cost to all of the support it provides to the economy and housing market via repeated waves of credit. The country's debt load has soared, and the housing market demonstrates pockets of excess. As a result, recent regulatory tweaks have begun to tend toward tighter housing policies as opposed to looser ones, though it has hardly been a one-way street.

¹⁸ Though the country's recent currency depreciation has temporarily halted – or even reversed – that pattern.

There are also fears that China's smaller cities – despite better affordability than the likes of Shenzhen, Beijing and Shanghai – could be on less stable ground given their smaller pool of luxury buyers, less interest among Chinese migrants in moving to these cities, and less backing by the national government.

On all fronts, then, China's property market risks losing some of the special support that has contributed to its great popularity.

Chinese housing bottom line

After examining most of the screaming questions that emerge from China's housing market, our broad conclusion is that Chinese housing is worthy of some concern, but less than we had initially feared (refer back to Exhibit 1).

Let us recap the worrying factors first. The Chinese housing market has an undeniably outsized influence on the country's economy, accounting for a whopping 19% of GDP. Were housing activity and home prices to suddenly plummet by 10%, this would deliver a major blow to the economy worth 5.2% of GDP. The consequences would spill over into Chinese home owners, builders, heavy industry, local governments and domestic banks, and also prove highly consequential for the world economy given China's disproportionate contribution to global growth.

Furthermore, there is the undeniable potential for trouble in the fact that 29% of China's urban residences are vacant. A large-scale retreat by speculators would be frightening. Potentially precipitating this, some of the special factors supporting China's ravenous housing appetite are set to fade over time. It would also be painful if builders opted to

significantly scale back the pace of construction until the existing inventories were more fully absorbed.

Chinese housing affordability is also challenging, at least based on the number of years of income required to purchase a home in a major city and the substantial increase in household indebtedness in recent years.

However, there is a surprising amount of good news to contrast against all of this gloom. Several other housing-affordability measures suggest that Chinese households are not nearly as stretched as they first look.

While there are many vacant Chinese dwellings – a clear medium-term risk – let us not forget that most are willingly owned by investors. Additionally, the short-term and long-term outlooks are much more benign.

The short-term trend fails to excite worries of excess – recent activity is running slightly below steady-state demand and tilts slightly downward. Meanwhile, China might just have too few dwellings over the long run as its population grows wealthier and households begin to balk at accommodating multiple families in a single home.

Finally, even as the Chinese government begins to recognize the danger of serially inflating its economy with credit, it hardly looks set to let the free market wrest complete control. In other words, China's housing market still benefits from something of a government “put” option.

Overall, Chinese housing still warrants a place in our pantheon of risks, but in a location of slightly diminished prominence relative to our prior assumptions and arguably versus the view of the broader financial market.

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