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Research on Data Asset Valuation Methods and Their Financial Applications

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Abstract

In 2020, it was decided that data would be an additional "factor of production" of China, and in the following four years, it was a series of policy actions that turned this abstract idea into a real accounting and financing practice. The focus of this review is to explore the perspectives on the valuation of data assets in China and the impact of such valuation on financial decisions. We structure the literature by the three questions below: What makes a data asset awkward to value? What are the methods or approaches the appraisal profession employs? Where does valuation fit in with real transactions? The three classical methods (cost, income and market) are still the basis of practice, although each of them only partially fits into the peculiar economics of data. The cost approach is most predominant in corporate filings, as it is more audit friendly than economic accurate. On the application side, more than 130 listed companies have been covered by the Ministry of Finance rules for recognizing the balance-sheet, and data-asset financing is growing fast, although most of it remains based on traditional credit. We argue that the gap between recognized book value and actual economic value is the central unresolved problem, and that the most promising way to close it is through composite and scenario-based methods of valuation.

Keywords

Data assets, valuation methods, cost approach, income approach, balance-sheet recognition, data-asset financing.

1. Introduction

Throughout the digital age, the information that companies collected sat apart from the accounts. It powered operations and informed strategy but did not appear as an asset that could be read from a balance sheet. China was determined to change that. In 2020 the State Council formally added data to its established factors of production, land, labor, capital and technology, making it the first major economy to grant data that status in policy [1]. Two years later, the "Data Twenty Articles" set out to develop a property-rights architecture that separates three rights: the right to hold data, the right to process and use it, and the right to operate data products [2]. The institutional arrangements were completed swiftly thereafter: the China Appraisal Society issued valuation guidelines, and the National Data Administration was established in 2023, and the accounting rules for enterprise data resources put in place by the Ministry of Finance came into force on 1 January 2024 [3, 4].

Recognition created an instant, practical need for numbers. Once a firm can place data on its balance sheet, someone must decide what it is worth; once a lender accepts that data as collateral, the same question becomes a credit decision. By April 2026, over 130 companies listed on the stock exchange had reported information on capitalized data assets, with hundreds of other companies (many state-owned) following suit [5]. In other words, valuation

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in China no longer a mere exercise for academic purposes, it is a pivot on which recognition, financing and capital contribution are all pivoted.

2. From Data Resource to Data Asset

Not all data is a data asset. The accounting literature distinguishes between a data resource, simply the raw or processed data a firm happens to hold and a data asset, which must be controllable by the firm, reliably measurable, and expected to generate economic benefit [6]. The Ministry of Finance rules route recognized data resources into one of two existing buckets: inventory, when the data is held for sale, and intangible assets, when it is used internally [4]. The choice matters, because it determines whether the item is carried at the lower of cost and net realizable value or amortized over a useful life.

The difficulty of valuing data is not the accounting wrapper but the underlying economics. Several features set data apart from machines or buildings. There is no natural depreciation through wear, since data is non-rival — the same dataset can be used many times, by many users, without being consumed [7, 8]. Its value is very situational: the value of a customer dataset for one company can mean the difference between life and death for another, and the same asset can have multiple defensible values based on its "highest and best use" [9]. Also, data degrades over time: You can lose value very quickly due to timeliness, and there are many sources of varying quality. Indeed, Laura Veldkamp and co-authors have formally demonstrated that as data becomes more relevant in prediction and decision making the value of that data grows, which is why a fixed, cost-based number is likely to underestimate the value of data [10].

Rights ambiguity adds a further layer. Under the three-rights model, the holder, processor and operator of a dataset may be different parties, which means more than one bundle of rights can attach to a single valuation; the appraiser must therefore specify which rights are being valued before any number is meaningful [2, 11]. This landscape is the product of the institutional sequence outlined in Figure 1.

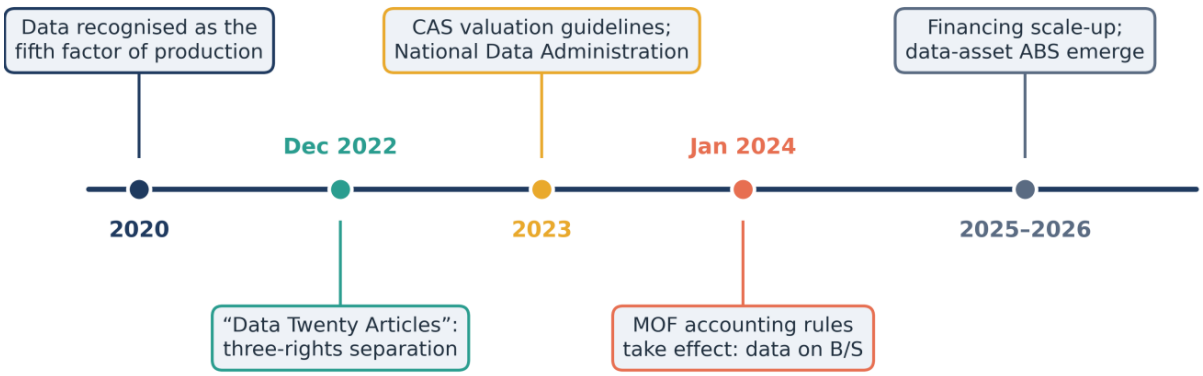


Figure 1. Institutional and market timeline of data-asset formation in China, 2020–2026. Source: compiled by the author from State Council, China Appraisal Society and Ministry of Finance documents [1-4].

3. Data Asset Valuation Methods

Chinese practice inherits the three approaches that asset appraisal has long relied on cost, income and market and the China Appraisal Society guidelines endorse all three, leaving the choice to professional judgement [3, 12]. Each rests on a different logic, and, as we will see, each captures only part of what makes data valuable.

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3.1. The Cost Approach

The cost approach values a data asset at the outlay required to reproduce or replace it, less an allowance for obsolescence. In its replacement-cost form it can be written as:

$$V = (C_1 + C_2 + C_3) \times (1 + r_c) \times (1 - d) \quad (1)$$

Where C_1, C_2 and C_3 are the costs of data collection, storage and processing, r c is the cost mark-up rate, and d is the rate of value loss from technical or economic obsolescence [3]. The method's strength is that it is practical: cost records are available, they are auditable, and they suit early-stage data for which no income history exists. Its weakness is conceptual. The cost of assembling a dataset bears little necessary relation to how useful it is a cheaply scraped dataset can be priceless in the right context, and an expensive one can be worthless. For internally generated data the rules also require that only costs incurred after technical and commercial feasibility is established may be capitalized, which keeps recorded amounts conservative [4, 9].

3.2. The Income Approach

The income approach values data by the future economic benefit attributable to it, discounted to present value:

$$V = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} \quad (2)$$

Where CF_t is the cash flow attributable to the data asset in period t and r is the discount rate, with n the number of periods over which benefits are projected [3, 12]. In practice appraisers isolate the data's contribution using one of several techniques multi-period excess earnings, which strips out the returns owed to other assets; relief-from-royalty, which values the data at the license fees avoided by owning it; and incremental-income methods that compare outcomes with and without the data [5, 12]. Conceptually this approach is the most faithful to data's economics, because it is forward-looking and benefit based. The difficulty is the isolation problem: separating the share of a firm's profit that the data alone produces, as opposed to its people, brand or software, is genuinely hard, and the result is sensitive to assumptions about the discount rate and the projection horizon [5, 10].

3.3. The Market Approach

The market approach reads value off comparable transactions:

$$V = P_{comp} \times \prod_{j=1}^{m} K_j \quad (3)$$

Where P_{comp} is the price of a comparable transaction and the K_j are adjustment coefficients for differences in quality, scale, timeliness and applicability, and m is the number of such coefficients [11]. Where an active market exists, this is the most objective method. For data, that market is still thin. China's data exchanges have grown fast, the Shenzhen Data Exchange and Guiyang Big Data Exchange recorded roughly RMB 5 billion and RMB 2 billion of trading in 2023, and the Shanghai Data Exchange listed more than 2,700 products by mid-2024 but most listings are bespoke, and genuinely comparable, arm's-length transactions remain scarce [9]. As a result, the market approach is often used to corroborate a value rather than to set it.

3.4. Composite and Emerging Methods

Because no single approach fits data cleanly, recent Chinese work increasingly favors combinations. One strand weights the three classical results, letting each correct the others'

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blind spots; another applies analytic-hierarchy or fuzzy-comprehensive scoring to grade data quality first, then feeds that score into a base valuation [9, 13]. A third strand borrows real-options thinking, treating a dataset as an option whose value rises with the number of future scenarios it might serve an idea that fits data's non-rival, reusable nature well, even if it is harder to audit. Table 1 compares the three core approaches, and Figure 2 shows how value drivers map onto them. Figure 3 then profiles the approaches across the practical dimensions an appraiser weighs in choosing among them.

Table 1. The three core data-asset valuation approaches compared.

Approach	Core logic	Main strength	Main limitation
Cost	Reproduction / replacement outlay less obsolescence	Auditable; suits early-stage data with no income record	Cost weakly linked to economic benefit; tends to understate
Income	Discounted future benefit attributable to the data	Forward-looking; closest to true economic value	Isolating data's contribution is hard; sensitive to assumptions
Market	Adjusted prices of comparable transactions	Most objective where a real market exists	Comparable, arm's-length deals remain scarce

Source: author's synthesis of China Appraisal Society guidelines and the appraisal literature [3, 11, 12].

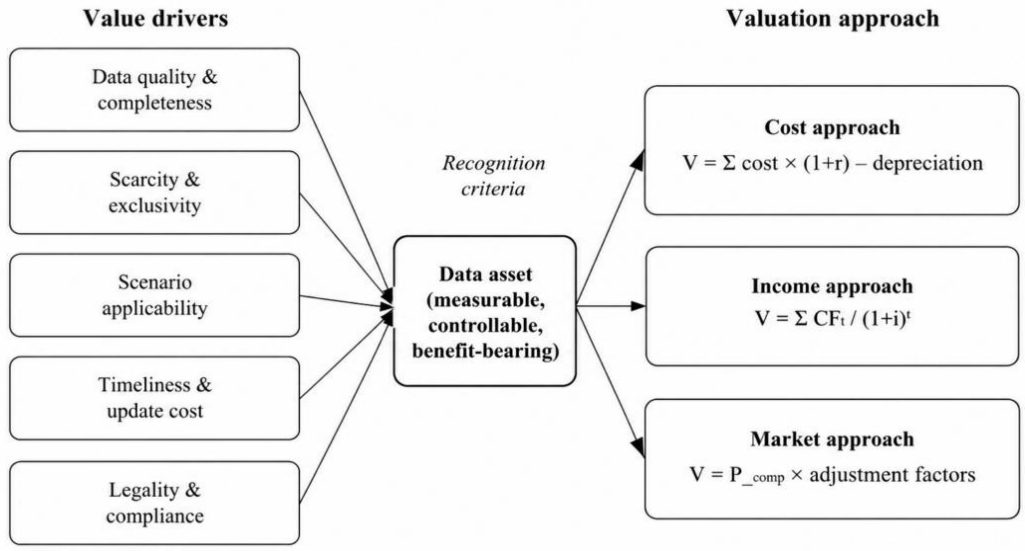


Figure 2. Conceptual model linking data-asset value drivers, recognition criteria and the three valuation approaches.

Source: author's construction.

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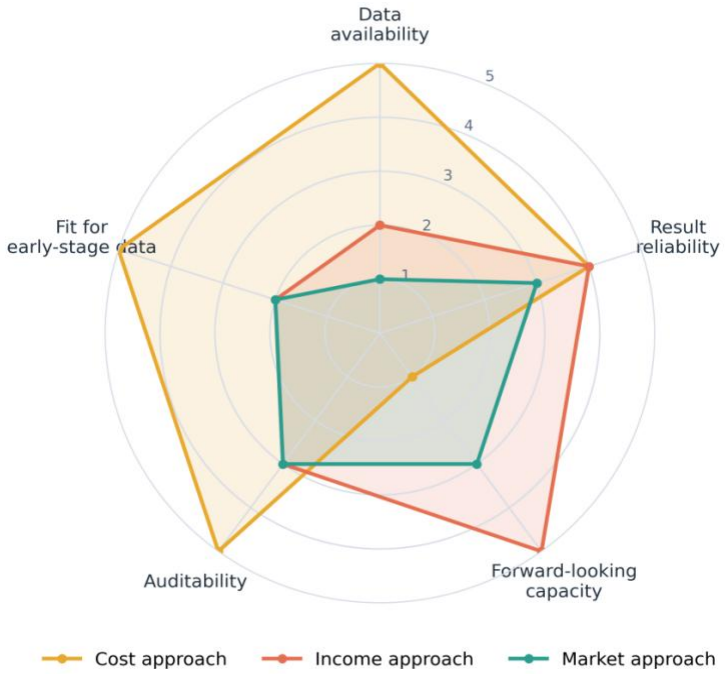


Figure 3. Comparative profile of the three valuation approaches across five practical dimensions.

Source: author's qualitative synthesis (1 = weak, 5 = strong), based on the literature reviewed in Section 3 [3, 5, 10-12].

4. Financial Applications in China

Valuation only matters because it enables transactions, and the market for data elements is now large enough for those transactions to carry real weight: revenue from China's data-elements market was projected to reach about RMB 198.9 billion in 2025, growing by more than 25 per cent a year across the 14th Five-Year Plan period. Three applications now dominate Chinese practice: placing data on the balance sheet, borrowing against it, and contributing it as capital [14].

4.1. Balance-Sheet Recognition

The Ministry of Finance rules that took effect in 2024 gave companies a route to recognize data resources as inventory or intangible assets a move some scholars read as a partial reconstruction of the corporate balance sheet for the digital economy [15] and uptake has been brisk in terms of the number of firms involved [16]. The amounts, however, are modest. China Mobile reported the single largest recognized data-resource figure in its 2024 annual report, about RMB 6.16 billion, yet that sum was only 0.03 percent of its total assets; China Telecom's reported figure of RMB 3.71 billion amounted to 0.04 percent of its assets [13]. Across the wider sample, most recognized data assets account for less than 0.1 per cent of total assets, with only a handful of firms exceeding five per cent [9]. The reason is the dominance of the cost approach: because most firms value recognized data at the cost of producing it, capitalized amounts run from a few million to a few tens of millions of yuan [16]. Recognition has spread fastest among information-intensive sectors. As Figure 4 shows, IT services, software and telecommunications led the 2024 annual-report cohort, with transport and logistics firms beginning to follow [13].

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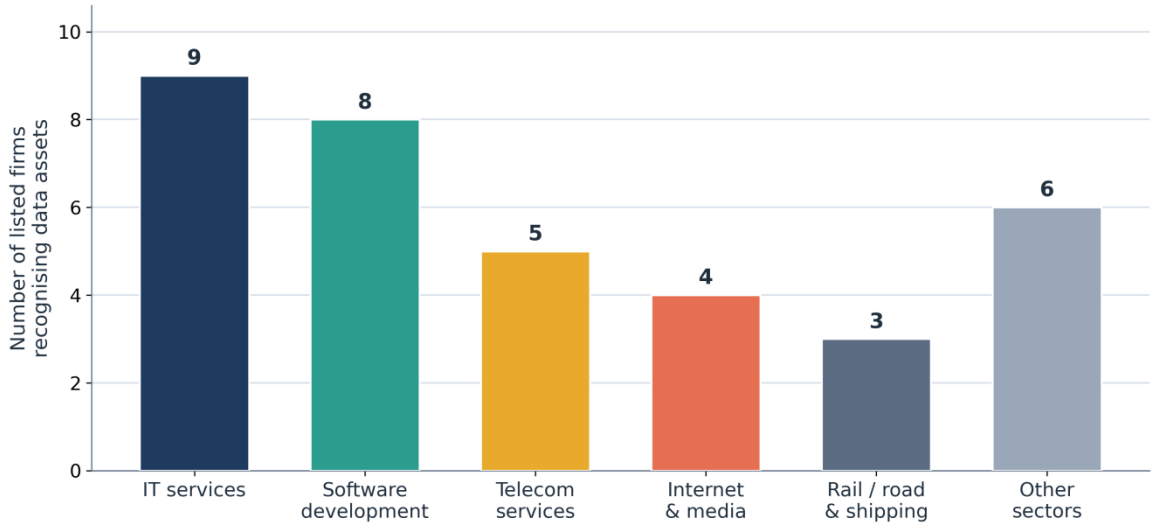


Figure 4. Leading industries recognizing data assets on the balance sheet, 2024 annual reports.

Source: adapted from the 2024 annual-report sample reported in Statistics and Application (2025); "other sectors" aggregates the remaining industries [13].

4.2. Data-Asset-Backed Financing and Securitization

Data that sits on the balance sheet can, in principle, be pledged. Early cases are concrete but small: one firm whose data asset was valued at RMB 10.9 million obtained a RMB 5 million financing line from the Bank of Communications against it [9]. The market has since grown quickly. By the middle of 2026 cumulative issuance of data-asset financing had reached about RMB 16.3 billion, more than three times the level recorded for the whole of 2025 [16]. Figure 5 places that growth alongside the trading volumes of the data exchanges, which provide the price signals such financing relies on.

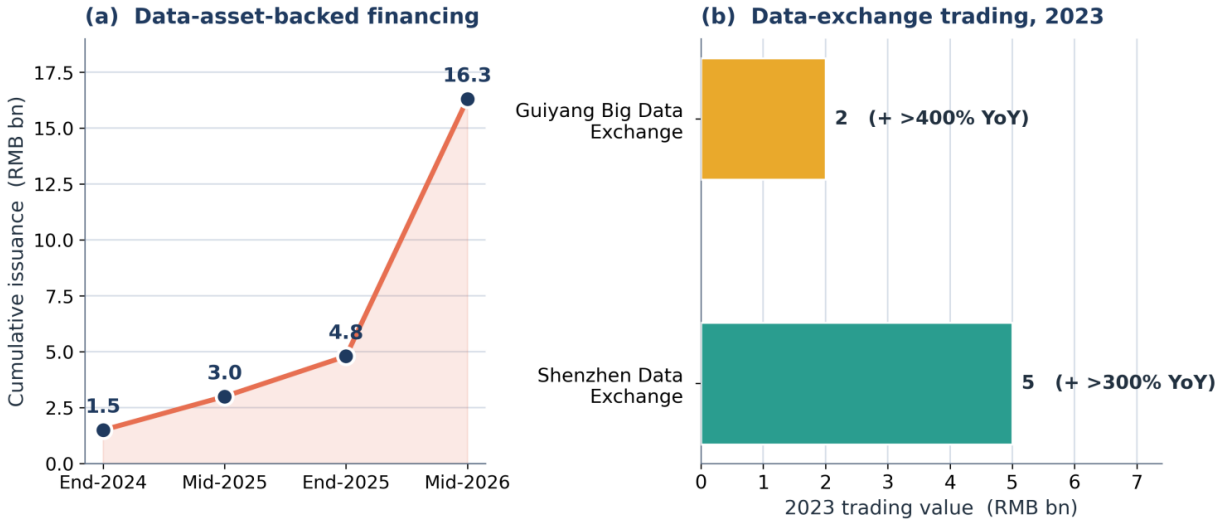


Figure 5. The scale of data-asset financialization in China: financing issuance and data-exchange trading.

Source: financing totals from Caixin / Wind tallies [16]; 2023 exchange trading values from Grant Thornton China [9]. Intermediate financing points are an interpolation consistent with the reported "more than threefold" one-year growth.

The headline growth, however, masks the underlying reality. The first widely recognized data-asset-backed security was rated AAA mainly because China Bank provided a financing guarantee; the pledged data served only as auxiliary credit enhancement, and repayment still

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depended on the borrower's creditworthiness rather than on cash flows generated by the data itself [16]. In other words, data is not yet the primary basis for repayment, it is a supporting feature within credit structures that are already in place. Table 2 summarizes the leading applications and their current state of maturity.

Table 2. Financial applications of data assets in China and their maturity.

Application	Representative evidence	Maturity
Balance-sheet recognition	130+ listed firms by April 2026; most below 0.1% of total assets	Spreading, but small in value
Pledge financing	Bank loans against valued data, e.g. RMB 5m against RMB 10.9m of data	Early, credit-dependent
Securitization (ABS)	First AAA deal relied on a bank guarantee, not data cash flows	Nascent
Capital contribution	Data valued and injected as registered capital in new ventures	Experimental

Source: author's compilation from [9, 13, 16]

4.3. Capital Contribution and Data Capitalization

The third application is the conversion of data into equity. According to Chinese company law, a shareholder can inject non-cash assets valued and transferable, and several companies have injected appraised data as registered capital into joint ventures and subsidiaries. The route is still being tried and requires a big defensible valuation, as the contributed amount ensures that the contributor has a certain percentage of ownership. The weaknesses of the cost approach are most evident here: a conservative cost-based value can significantly undervalue a founder's interest, a reason why cases involving capital contribution are more likely to be decided in favor of the income or composite approach, which are more subjective [13].

5. Challenges and Research Gaps

The only big issue on its way through both valuation and application is the discrepancy between book value and economic value. Since the cost is the primary component of filings, the balance sheet represents the cost of producing data, which is too small to show the strategic value data has for many of these companies [13, 16]. It is not just a matter of accounting. If recognized values underestimate the economic value, then lending is based on the wrong value, and this is why lenders rely on guarantees and borrower credit, instead of on the data.

There are three other gaps that warrant consideration. First, the ambiguity about rights is not completely resolved; the three rights rule is a step forward, but a system for valuing each right alone is not settled, and the absence of clarity about the rights bundle reduces the value of any number attached to it [2, 11]. Second, that the comparables market is not sufficiently developed to be relied upon for the market approach; the exchange market is not sufficiently standardized and transparent for the market approach to be the primary approach used for valuation [9, 11]. Third, because of the isolation problem and the reliance on the choice of discount rate, the same asset could be appraised very differently by different appraisers, so it is corrosive of a measure that financial decisions rely upon [5, 10].

Such gaps highlight a research agenda. Each of these sector-specific valuation guides, verifiable data-quality requirements and disclosure formats would help to reduce the variation of valuations. So would empirically evidence from which to test how well-known data values are correlated with firms' later performance and financing terms, which only now will be available with the expanded disclosure record starting from 2024.

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6. Conclusion

Intriguingly, China has advanced further and faster than any other major economy in the process of placing data on the balance sheet as an asset that is recognized, measurable and can be valued and financed, and the institutional progress being made holds a mirror up to the rest of the world to make the valuation question more urgent. There is nothing new about this methodological support, which is the same as that used by the appraisers in this particular profession but data's non-rival nature, its scenario dependent nature and its quick ageing gives rise to none of the inextricable models and it is best read as a transitional feature of the demand of numbers that can be audited than as a final answer, as it is currently, the dominance of the cost approach.

The use is real, albeit immature. Balance-sheet recognition has become large in number and small in volume, data-asset financing has multiplied many times over and relies on traditional credit, while capital contribution and securitization are just on the experimental side. A common theme in all of them is the same valuation issue, and the most hopeful solutions are provided by the composite and scenario-based approaches that are being introduced in the Chinese literature, which seek to merge the usefulness of cost, the economy of income and the discipline of market evidence. The next step of data assetisation in China will be whether they can bridge the gap between the book value and the economic value of data.

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