

Definitional Changes in the United States Capital-Stock Accounts, 1925–2026

A source dossier on the Bureau of Economic Analysis's own written justification
for capitalizing research and development, software, and data

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What this document is. A dated, sourced record of what the U.S. Bureau of Economic Analysis (BEA) has published, and what it has written directly to Anwar Shaikh, about the concept of the capital stock: what the stock was in the vintage on which the *Measuring the Wealth of Nations* apparatus was built, how the concept has changed since, and what BEA says it is asserting when it treats research and development, software, entertainment originals, and now data as fixed assets.

What it is not. It contains no ruling on whether any of these belong in constant capital, in the value of labour power, in unproductive expenditure, or nowhere. Section 5 states the classification question and the specific questions whose answers are the reader's to give. Every magnitude below is reproduced only where a source publishes it, and is footnoted to the table or section that publishes it. Where a source contradicts itself, the contradiction is reported as such and the value in the published table is the one carried forward.

1 The capital stock the classical apparatus was built on (through 1995)

The measurement world in which *Measuring the Wealth of Nations* was constructed is documented in BEA's own wealth volume, *Fixed Reproducible Tangible Wealth in the United States, 1925–79*.¹ Four features of that vintage matter, because each was later lost, narrowed, or superseded.

1.1 Three simultaneous valuations, all published

Chapter 1 of the volume treats *historical cost*, *constant cost*, and *current cost* as three parallel valuation concepts, each with its own published table family.² This is visible in the table map and not only in the prose: fixed nonresidential private capital appears three times over — Table A1 (constant cost), A2 (current cost), A3 (historical cost) — and residential capital appears three times over twice, at A8/A9/A10 and A11/A12/A13. The investment series are published in constant-cost and historical-cost pairs (B1/B2 and B3/B4).³

A researcher who needed a valuation basis other than the one BEA currently featured did not have to impute it. For 1925–79 it was on the page.

1.2 Gross stock and net stock as separate published concepts

Chapter 1 treats *gross stock* and *net capital stock and depreciation* as distinct concepts, with *age of capital stock* as a third.⁴ Every cell of the A-family carries “annual estimates of gross and net stocks, depreciation, discards, ratios of net to gross stocks, average ages of gross and net stocks, 1925–79.”⁵ Service lives and retirement patterns are separately documented estimating inputs,⁶ and BEA published explicit depreciation and service-life *variants* in all three valuations (Tables A5, A6, A7).

The gross/net distinction, the discard series, and the net-to-gross ratio were therefore first-class published objects. A measure keyed to gross stock — capacity in place rather than depreciated value — had a direct source. Section 4.3 records what happened to that capability.

1.3 Sector, legal form, industry, asset type

Nonresidential private capital is published by legal form of organization and major industry group (A1–A3) and by type of equipment and structures (A4). Government capital (A18–A20), government-owned privately-operated

¹U.S. Department of Commerce, Bureau of Economic Analysis, *Fixed Reproducible Tangible Wealth in the United States, 1925–79* (Washington, D.C.: U.S. Government Printing Office, 1982). Citations below are to the printed table of contents (pp. i–iv), which gives the chapter and table structure; the estimating chapters themselves are not reproduced here.

²*Fixed Reproducible Tangible Wealth*, ch. 1, “Valuation,” p. T-4, with subsections “Historical cost,” “Constant cost,” “Current cost.”

³*Ibid.*, “Tables,” pp. ii–iv. The volume contains 40 published tables in three families: A1–A22 (capital stocks and related measures), B1–B14 (investment series), C1–C4 (fixed reproducible tangible wealth by sector).

⁴*Ibid.*, ch. 1, pp. T-2 to T-3.

⁵*Ibid.*, “Tables,” family A header, p. ii.

⁶*Ibid.*, ch. 2, “Service Lives,” pp. T-13 to T-21, and “Retirement Patterns,” p. T-21.

capital (A21–A22), consumer durables (A16–A17), and residential capital by tenure group (A11–A13) are separate published stocks.⁷ The legal-form axis — corporate against noncorporate — and the tenure axis are the raw material of any “profit-making business sector” capital stock. In the modern accounts the same aggregate has to be assembled by subtraction; see §4.4.

1.4 Quality change was already a declared problem in 1982

“Treatment of quality change” is a named subsection of the chapter-1 valuation discussion, sitting directly beneath historical, constant, and current cost.⁸ The valuation dispute that becomes an explicit impasse between BEA and Shaikh in 2007 (§4.2) is not an artefact of 1990s computer deflators. It is the question BEA had already flagged in its own conceptual chapter.

2 The definitional drift, dated

2.1 January 1996 — the chain-index break

The tenth comprehensive revision, released January 1996 with estimates from 1959, introduced “improved chain-type measures of real output and prices that eliminate the overstatement of real GDP growth for periods after the base year and the understatement of real GDP growth for periods before the base year.”⁹

The mechanical consequence is stated by BEA without hedging:

Because the formula used to calculate the improved measure of real output uses the geometric mean of weights of more than one period, the corresponding chained-dollar estimates are not additive. Consequently, most NIPA tables that show these estimates also show a new line item termed “residual,” whose value is equal to the difference between the major aggregate in the table and the sum of the most detailed items presented in that table.

SCB, January/February 1996, “Improved chain-type measures of real output and prices,” point *Second*.

Chained (1992) dollars replaced constant (1987) dollars for every series previously in constant dollars, and implicit price deflators were redefined as current-dollar output divided by chained-dollar output times 100.¹⁰

Magnitude. For 1959–94 revised real GDP growth averages 3.2 percent per year against 3.0 percent previously published on fixed 1987 weights; for 1987–94 the revised rate of 2.3 percent is 0.1 percentage point lower than previously published.¹¹

The consequence for any aggregate built by summing real components — a real constant-capital total, a real capital stock by industry — is that it stops being exactly reproducible from published chained dollars. The residual is a published line item, not rounding noise.

2.2 January 1996 — depreciation: straight-line cohorts replaced by geometric profiles

BEA calls this “the most important change in methodology in terms of the magnitude of the revisions.”¹² The prior method divided investment flows into “cohorts representing the retirement pattern around each asset’s average service life,” applying a straight-line pattern to each cohort under the assumption that an equal amount of value is lost each year — an assumption BEA states plainly “is not based on empirical evidence.”¹³ The replacement rests on resale-market price studies showing that “prices of used equipment tend to decrease by an equal percentage rather than by an equal dollar amount.”¹⁴

Two features of the replacement deserve emphasis, because they are stated in the same passage:

- Coverage is “investment flows for about 50 types of assets for about 60 industries.”
- Empirical profiles were available for *two* asset classes only. “BEA’s revised estimates of private CFC are based on actual empirical profiles for automobiles and computers . . . For the other types of assets, the revised and

⁷*Ibid.*, “Tables,” pp. ii–iii.

⁸*Ibid.*, ch. 1, p. T-4.

⁹“Improved Estimates of the National Income and Product Accounts for 1959–95: Results of the Comprehensive Revision,” *Survey of Current Business*, January/February 1996, summary of major improvements.

¹⁰*Ibid.*, points *First* and *Fifth*.

¹¹*Ibid.*, introductory summary of the comprehensive revision. BEA attributes the direction and size of these revisions “largely” to the change in the featured measure, which eliminates the substitution bias of a single-weight index.

¹²*Ibid.*, “Changes in methodology: Consumption of fixed capital (CFC).”

¹³*Ibid.*

¹⁴*Ibid.*

new government CFC estimates are calculated under the assumption that depreciation occurs at a constant percentage rate.”¹⁵

The geometric profile is therefore a *default* applied on grounds of data absence to all but two asset classes. Pre-1996-vintage and post-1996-vintage net stocks embody different assumed decay paths for the same historical investment.

2.3 January 1996 — government investment recognized

“Government consumption expenditures and gross investment” replaced “government purchases,” recognizing government expenditures for structures and equipment as investment and including the services of government fixed assets — measured as depreciation — as expenditures.¹⁶ BEA reports that the two definitional changes in this revision (this one and the redefinition of federal retirement contributions) “account for almost two-thirds of the revisions for all years”; the 1994 revision to the level of GDP is 2.9 percent, of which 1.0 percent is due to statistical changes.¹⁷

From this vintage forward the published capital stock and published consumption of fixed capital include a government component that did not previously exist as investment.

2.4 1996 — quality-adjusted prices extended; structures remain a hybrid

BEA introduced quality-adjusted annual price indexes for memory and microprocessor chips for 1974–94, memory adjusted on price per bit of storage capacity, microprocessors by a matched-model approach with some hedonic regressions.¹⁸ **Magnitude:** the revised export price index for semiconductors declines at an average annual rate of 26.8 percent from 1981 to 1994, against 0.9 percent per year in the previous index.¹⁹

The hybrid treatment of structures persists into the current handbook: for some nonresidential structures “quality-adjusted output price measures, such as PPIs, are not available, and BEA uses combinations of input-cost measures and output-cost measures in an effort to capture productivity and quality changes.”²⁰

2.5 1998/1999 — software becomes a fixed asset

The standing statement of record is that software “has been treated as a fixed asset since the 1999 comprehensive NIPA revision.”²¹ BEA’s own recent retrospective dates the episode to 1998 and pairs it with the practice of publishing experimental statistics first: “BEA has used experimental economic statistics in the past when capitalizing other intellectual property products (IPPs), such as software in 1998 and research and development (R&D) in 2013.”²² *The 1998 versus 1999 dating is not reconciled in the sources consulted for this dossier*, and the natural reconciliation — experimental estimates in 1998, incorporation at the 1999 comprehensive revision — is not stated by either source and is therefore not asserted here.

Method as it now stands: purchased (prepackaged and custom) software is estimated by commodity flow from Economic Census receipts; own-account software is “measured as the sum of production costs, which include compensation (wage and nonwage) of employees, the costs of intermediate inputs, and a BEA-derived measure of capital services (including depreciation).”²³ Wages are reduced by “occupation-based time-use factors ... under the assumption that these occupations spend only a portion of their time working on the development of new or enhanced own-account software.”²⁴

This is the first asset in the stock with no physical substance and, on the own-account side, no market transaction. Its magnitude is a cost imputation governed by a judgemental time-use factor.

¹⁵*Ibid.* Emphasis added by this dossier only in the sense of extraction; the sentence is reproduced verbatim.

¹⁶*Ibid.*, “Government consumption expenditures and gross investment.”

¹⁷*Ibid.*, “National income and product — GDP.”

¹⁸*Ibid.*, “Changes in methodology: Semiconductor prices.”

¹⁹*Ibid.*

²⁰Bureau of Economic Analysis, *NIPA Handbook: Concepts and Methods of the U.S. National Income and Product Accounts*, ch. 6 “Private Fixed Investment,” updated December 2024, “Quantity and price estimates.”

²¹*NIPA Handbook*, ch. 6, “Definitions and Concepts,” capitalization-rules paragraph.

²²José Bayoán Santiago Calderón, *Toward Economics Statistics On: Own-Account Data and Databases Assets for 1997–2024*, BEA Working Paper WP2026–4, March 2026, §1. The reference cited there is Robert P. Parker and Bruce T. Grimm, *Recognition of Business and Government Expenditures for Software as Investment: Methodology and Quantitative Impacts, 1959–98* (BEA, May 2000).

²³*NIPA Handbook*, ch. 6, Technical Note, “Own-account software.”

²⁴*Ibid.*

2.6 2013 — research and development capitalized; “intellectual property products” created

The fourteenth comprehensive revision recorded private and government expenditures for R&D as investment, presented “along with investment in software and in entertainment, literary, and artistic originals in a new asset category entitled ‘intellectual property products,’ beginning with 1929.”²⁵ BEA’s stated justification is that R&D expenditures “have long been recognized as having the characteristics of fixed assets — defined ownership rights, long-lasting, and repeated use and benefit in the production process.”²⁶

Four method decisions are on the record and matter downstream:

Output measurement.

“Conceptually, the value of an enterprise’s R&D is equal to the present value of the future benefits that the company derives from the R&D. In practice, because future benefits are not observable and most R&D is produced on own-account, the standard approach is to measure the activity as the sum of production costs.”²⁷

Ownership.

BEA classifies *the funder* as the owner, for two stated reasons: funders typically reserve rights and receive economic benefits, and the allocation between funder and performer cannot be distinguished in the survey data. Federal purchases *and* grants are both treated as federal investment.²⁸

Depreciation.

For business, a forward-looking profits model in which “each period’s R&D investment contributes to the profits in later periods but at a geometrically declining rate”; for federal government, service lives derived by function (defense, health, space, energy).²⁹

Prices.

An input-cost approach with a productivity adjustment, because the input-cost method “is less appropriate for R&D output because it does not account for productivity growth; it assumes that real output grows at the same rate as real inputs.”³⁰

Magnitude (previewed). “Based on preliminary estimates for 2007, this change will boost the level of GDP by about 2 percent, or about \$300 billion, with about two-thirds coming from private fixed investment and the remainder primarily coming from government consumption expenditures.”³¹

Magnitude (published levels, realized). BEA’s own subsequent briefing publishes business R&D investment excluding software development and its associated consumption of fixed capital:

Billions of dollars	2008	2009	2010	2011	2012
Business R&D investment	224.5	214.0	223.6	235.3	248.7
Consumption of fixed capital on R&D	182.5	185.4	193.2	202.8	215.3
GDP with capitalized business R&D	14,720.3	14,417.9	14,958.3	15,533.8	16,244.6
GDP with expensed business R&D	14,495.8	14,203.9	14,734.7	15,298.5	15,995.9

Source: Dylan G. Rassier, “BEA Briefing: Treatment of Research and Development in Economic Accounts and in Business Accounts,” *Survey of Current Business*, March 2014, table 3. BEA’s own locators for that table: line 1 from NIPA table 1.1.5 line 1; lines 2 and 5 from fixed assets table 2.7 line 83; line 4 from NIPA table 1.10 line 9; line 6 from fixed assets table 2.4 line 83.

Backcast dependence. For periods before the National Science Foundation surveys, the R&D estimates rest “primarily on research from *The Formation and Stocks of Total Capital* by John Kendrick and *Research and Development: Its Growth and Composition* by Nestor Terleckyj and on estimates from BEA’s 1994 R&D satellite account.”³² The pre-1953 segment of the R&D stock is therefore a reconstruction from secondary scholarship, not a survey measurement — and from 1929 forward the *entire* published fixed-asset history now contains an R&D stock that no vintage before 2013 contained.

²⁵Bureau of Economic Analysis, “Preview of the 2013 Comprehensive Revision of the National Income and Product Accounts: Changes in Definitions and Presentations,” *Survey of Current Business*, March 2013, “Capitalization of research and development expenditures.” Note that this is the *preview* article; its magnitudes are stated prospectively.

²⁶*Ibid.*

²⁷*Ibid.*, “Measuring R&D output.”

²⁸*Ibid.*, “Sector assignment.”

²⁹*Ibid.*, “Depreciation of newly recognized assets.”

³⁰*Ibid.*, “Prices,” and footnote 17.

³¹*Ibid.*, “Effects on the accounts.”

³²*SCB*, March 2013, table 3, NOTE row. The same table records that survey data cover business R&D from 2008 forward, with 1953–2007 based on the NSF Survey of Industrial Research and Development.

2.7 2013 — entertainment, literary and artistic originals

For 1929 forward BEA capitalizes theatrical movies, long-lived television programs, books, music, and miscellaneous entertainment originals. Because production-cost data are unavailable for most of them, BEA estimates their value “based on the NPV of expected future royalties or other revenue obtained from these assets, net of any associated sales costs,” assuming “a 7 percent real discount rate for all asset types.”³³

Magnitudes. Private investment in entertainment originals for 2007 is estimated at about \$70 billion, roughly one-third theatrical movies, one-third television programs, one-third other.³⁴ Geometric depreciation rates: movies 3.8 percent, television programs 16.8 percent, music 26.7 percent, books 12.1 percent, theatrical play scripts / greeting-card designs / stock photography 10.9 percent.³⁵

This is the first asset class in the stock valued by discounted expected future revenue rather than by cost or by observed price. Its magnitude moves with an assumed discount rate and with revenue forecasts.

2.8 2013 — residential ownership transfer costs; an 80-year horizon cut to 12

All nonfinancial ownership transfer costs (title insurance; title, abstract and attorney fees; documentary and stamp taxes; surveys and engineering) are recognized as capital investment for 1929 forward, where previously only brokers’ commissions on structures were capitalized.³⁶ Depreciation now follows “the typical holding period of the asset — estimated to be 12 years — rather than the average life of the structure, estimated to be 80 years.”³⁷ BEA states that under the old treatment “BEA’s estimates of residential fixed assets have been overstated . . . and CFC has been understated.”³⁸

Magnitude. Newly capitalized acquisition and disposal costs for 2007 total approximately \$60 billion; already-capitalized brokers’ commissions on structures approximately \$85 billion; total ownership transfer costs for 2007 about \$145 billion.³⁹

2.9 2018 — an imputed return to capital enters own-account investment

As part of the 2018 comprehensive update, BEA began including the value of the return to fixed capital (that is, capital services) into estimates of private fixed investment in own-account software and in own-account R&D beginning with 2007. The improved treatment is consistent with international standards and will provide more complete estimates of the opportunity costs of own-account investment, provide improved measures of the sources of economic growth and productivity, and contribute to the literature on measuring own-account investment and intangible assets.

NIPA Handbook, ch. 6, “Definitions and Concepts.”

From 2007 forward, own-account intellectual-property investment therefore contains an imputed return on capital; before 2007 it does not. This is a break *within* a series that runs from 1929. A reader treating own-account investment as a cost outlay is, after 2007, reading a cost outlay plus an imputed profit component.

2.10 2024 — the standing boundary, and two acknowledged defects

As of the current handbook, private fixed investment comprises structures, equipment, and intellectual property products; the last comprises software, R&D, and entertainment/literary/artistic originals. Own-account software and R&D are measured as the sum of production costs; entertainment originals by net present valuation.⁴⁰ Two boundary defects are stated by BEA itself:

- “In principle, mining exploration should be classified as part of intellectual property products, but currently these expenditures cannot be separately identified due to source data limitations.”⁴¹
- BEA publishes no chained-dollar measure for computers, “which are affected by highly volatile changes in prices and quantities.”⁴²

³³SCB, March 2013, “Capitalization of entertainment, literary, and other artistic originals”; the method is restated as standing practice in *NIPA Handbook*, ch. 6, Technical Note, “Entertainment, literary, and artistic originals.”

³⁴SCB, March 2013, “Effects on the accounts.”

³⁵*Ibid.*, “Depreciation of newly recognized assets.”

³⁶SCB, March 2013, “Capitalization of ownership transfer costs of residential fixed assets.”

³⁷*Ibid.*, “New treatment.”

³⁸*Ibid.*, “Current treatment.”

³⁹*Ibid.*, “Effects on the accounts.”

⁴⁰*NIPA Handbook*, ch. 6, “Definitions and Concepts” and Technical Note, “Intellectual property products.”

⁴¹*Ibid.*, footnote 11. Mining exploration, shafts and wells is accordingly carried inside nonresidential structures.

⁴²*Ibid.*, footnote 27.

Data is not in this boundary. Section 3 records where it stands.

3 Data as capital: the experimental programme, 2019–2026

3.1 The inherited inconsistency

The 1993 *System of National Accounts* contains “only a brief paragraph” including “large databases that the enterprise expects to use in production over a period of time of more than one year” in the computer-software category of capital formation; “there is no mention of embedded data in *SNA 1993*.”⁴³ The Canberra II Group considered including the information content and recommended against it, for a reason that is the hinge of the entire subsequent debate: doing so would “open the door to the capitalization of knowledge.”⁴⁴

SNA 2008 then produced an acknowledged inconsistency, stated by BEA as follows:

If a database is developed for own use, SNA 2008 recommends a sum of costs approach to value the database. The sum of costs includes the cost of preparing data in a format that conforms to the database but excludes the cost of acquiring or producing the data. . . . If a database is developed for sale or for license, the value should be determined by the market price, which includes the value of the information content. Thus, SNA 2008 recommends an inconsistent treatment for data in capital formation depending whether a database is developed for own use or for sale or license.

Rassier, Kornfeld and Strassner (2019), §2.1.

United States practice as of 2019 inherits that asymmetry directly: “The value of any data included in purchased software is included in measures of investment and capital stock. The value of any data in own-account software is excluded from measures of investment and capital stock.”⁴⁵ Data is therefore *already* inside the published capital stock, silently, through one channel, and *already* outside it, silently, through another. Neither including nor excluding data today produces a clean boundary.

3.2 The 2019 framework: a data boundary, and a warning against over-inclusion

The 2019 paper proposes a *data boundary* intersecting the SNA’s asset and production boundaries into four areas: data outside the SNA entirely (A), non-produced assets (B), produced assets (C), and non-asset production inputs (D).⁴⁶ The authors are explicit that the framework is not an argument for capitalization:

Not all data in the data boundary are eligible for inclusion in the national accounts framework and not all data that fit within the framework should be treated as capital formation or as assets at all.

Rassier, Kornfeld and Strassner (2019), §3.1; repeated at §5.

Two further conceptual statements from that paper bear directly on the classification question. On whether data is knowledge:

A point that is illustrated by the pyramid is that knowledge is embodied by humans, but data cannot be embodied by humans. Thus, data cannot be a knowledge asset but may become an information asset. Knowledge is generally outside the scope of the SNA asset boundary.

Ibid., §3.2.

On depreciation, stated as a problem in advance of any measurement: data “do not necessarily experience wear and tear but can become obsolete,” and, like cultivated assets early in their service lives, “may experience appreciation until they reach their peak point of production, so their depreciation profiles may not follow a typical pattern assumed by national accountants.”⁴⁷

Magnitudes, with BEA’s disclaimer attached. The 2019 paper publishes what it calls cursory measures. Total 2012 Economic Census receipts for NAICS 518 on four directly data-related products were \$21.6 billion,

⁴³Dylan G. Rassier, Robert J. Kornfeld and Erich H. Strassner, “Treatment of Data in National Accounts,” paper prepared for the BEA Advisory Committee, May 2019, §2.1, citing *SNA 1993* ¶10.93.

⁴⁴*Ibid.*, §2.1, quoting Nadim Ahmad, “Follow-Up to the Measurement of Databases in the National Accounts” (2005), p. 2.

⁴⁵*Ibid.*, §2.2.

⁴⁶*Ibid.*, §3.1 and figure 1.

⁴⁷*Ibid.*, §3.3. Note also, in the same section: data “are non-rival but excludable,” which BEA identifies as posing “a risk of multiple counting.”

“which is treated as intermediate consumption in BEA’s accounts.”⁴⁸ Indirect data-related product receipts for NAICS 518 and own-account data-related production costs for private industries other than NAICS 518 are published as follows:

Billions of dollars	2012	2013	2014	2015	2016	2017
Indirect data-related receipts, NAICS 518	57.7	60.0	60.9	62.1	69.3	78.1
Own-account data-related production costs	52.8	55.3	58.7	63.5	71.1	74.9

Source: Rassier, Kornfeld and Strassner (2019), figures 5 and 6 (numeric labels on the figures).

The disclaimer travels with the numbers, in BEA’s words: “We estimate cursory measures that are incomplete and cannot be used to compare against published measures in the U.S. national accounts, such as GDP and investment. Our approach is conservative and we do not assert that the resulting measures are reflective of the actual value of data stocks and flows in the U.S. economy.”⁴⁹ These are not a data capital stock and should never be used as one.

3.3 The international decision, and its date

The Advisory Expert Group guidance note DZ.6, “Recording of data in the National Accounts,” was endorsed at the group’s 22nd meeting on 31 March 2023.⁵⁰ The *2025 System of National Accounts* (pre-edit version, 7 March 2025) “updated the treatment of own-account data to capitalize it, that is, to treat spending in data as an investment rather than an expense,” at §§22.21–22.32, and BEA records that “The United Nations guidance for national statistical offices to implement the changes has a target window of 2029–2030.”⁵¹

The decision is therefore made internationally and dated, but it is *not* in the United States core accounts. Any series through 2026 that includes data capital is ahead of the accounts.

3.4 The 2026 experimental estimates: definitions, method, magnitudes

BEA’s status statement is unambiguous: “To position itself to implement the upcoming change to the national accounts framework, BEA is developing experimental economic statistics to preview the proposed methodology and collect feedback on it and the associated estimates.”⁵² The conclusion repeats that the design is unsettled: “Important ongoing discussions include the methodology choices for the asset boundary, occupation involvement rates, and the decisions made regarding pseudo-output prices and depreciation profiles.”⁵³

Definition of the asset.

For the purposes of national accounts, data are digital records of information on observable phenomena, and databases are organized collections of data that enable resource-efficient use. . . . Data and database assets, by definition, must be repeatedly or continuously used in production for economic benefit (e.g., selling, licensing, self-use) for more than a year. Furthermore, the economic benefit must not serve another specific purpose or process, such as R&D, mineral exploration, or entertainment, as otherwise it would be captured under that corresponding account. . . . analog recordings are not considered data until they are “produced,” such as through digitization. Lastly, data assets from data exhaust . . . are limited to data that are intentionally stored or organized for use in other contexts.

Santiago Calderón, WP2026–4, §1.1.

Valuation chain. Sum of costs, as for own-account software, “because there is no market transaction for own-account data.”⁵⁴ Labour cost is the number of employees times average wage times an *occupation-specific involvement rate*, scaled to total production cost by a *blow-up factor* equal to the ratio of gross output to labour

⁴⁸*Ibid.*, §4.5, “Purchases.”

⁴⁹*Ibid.*, §4.5, “Valuing Data for the U.S. Economy.”

⁵⁰Advisory Expert Group on National Accounts, “DZ.6 Recording of data in the National Accounts,” 22nd Meeting, 31 March 2023, as cited in Santiago Calderón, WP2026–4, References.

⁵¹Santiago Calderón, WP2026–4, §1.

⁵²*Ibid.*, §1.

⁵³*Ibid.*, §9.

⁵⁴Jon D. Samuels, José Bayoán Santiago Calderón and Corby Garner, *The Impact of Capitalizing Data on Productivity Growth in the U.S.*, BEA Working Paper WP2026–7, March 2026, §2.

compensation for two representative industries (ILPA 514 and NAICS 5415), applied as a ten-year lagged simple moving average.⁵⁵

Where the involvement rates come from. O*NET content models plus expert judgement to preselect occupations, then machine learning on the Lightcast online job-advertisement dataset to estimate the share of job advertisements listing identified skills. “The estimated involvement rates are then rounded to the nearest 5%, with values below 10% set to 0, and estimates above 90% capped at 90%.” Explicit multiple-counting deductions are made against R&D (using the National Survey of College Graduates) and against software.⁵⁶

Depreciation. “The depreciation profile for the new asset class was set to a geometric depreciation rate of 1/3, based on an average service life of five years and a declining rate of 1.65, which is also used for software.” Net stock is built by perpetual inventory with a 1997 seed equal to initial investment divided by the depreciation rate.⁵⁷

Published magnitudes.

Measure	Value (source locus)
Gross fixed capital formation, nominal	\$205bn (1997) rising to \$875bn (2024); positive nominal growth every year except 2009 (§7.3)
Volume, 2017 dollars	\$239bn (1997) to \$816bn (2024); average log growth 4.5% (§7.5)
Current-cost net stock	\$710bn (2002) to \$1,966bn (2024); real average log growth 4.6%; first five years excluded to allow one full average service life after initialization (§7.6)
Consumption of fixed capital over GDP	2.3% (2006) to 2.64% (2020); 2.51% in 2002, 2.54% in 2024 (§7.7)
Share of private nonresidential fixed-asset investment	11.5% to 16% (§8.1)
Share of private IPP investment	falls from about 36% to 32% (§8.1)
Net-stock shares	26.4% → 22.6% of private IPPs; 21.7% → 18.3% of government IPPs; 2.69% → 1.77% of government fixed assets; near 4% of private nonresidential fixed assets, reaching 4.23% in 2024 (§8.1)

Source: Santiago Calderón, WP2026–4, sections as marked.

On growth, the published tables give: GDP 2.21 percent adjusted against 2.14 percent published, a delta of +0.07 percentage points; government 0.68 against 0.57, delta +0.11.⁵⁸ Private-sector value added 2.61 against 2.56, delta +0.06, with the largest industry effects in management of companies and enterprises (+0.29), educational services (+0.14), finance and insurance (+0.10) and professional, scientific and technical services (+0.09).⁵⁹ Compound annual growth of gross fixed capital formation, 1997–2024, adjusted against published: private IPPs 5.61 against 5.85; private nonresidential fixed assets 4.04 against 3.80; government IPPs 3.41 against 3.47; government fixed assets 2.16 against 2.00.⁶⁰

Coverage limits BEA states. No investment in own-account data assets by farms, because the Occupational Employment and Wage Statistics programme does not cover wage and salary workers in farm establishments; the OEWS series is cross-sectional and is used as a time series only under an assumption of equal hours worked by occupations within an industry; and the historical series before 1997 is not yet estimated — “A subsequent release will expand the time coverage to include the historical time series.”⁶¹

⁵⁵Santiago Calderón, WP2026–4, §§2–4, equations 1–5.

⁵⁶*Ibid.*, §3.2.

⁵⁷*Ibid.*, §6.

⁵⁸*Ibid.*, table 6.

⁵⁹*Ibid.*, table 5.

⁶⁰*Ibid.*, table 4.

⁶¹Samuels, Santiago Calderón and Garner, WP2026–7, §3; Santiago Calderón, WP2026–4, §§1.2, 3.1, 9.

3.5 The productivity companion, and what BEA says it means

The companion paper rebuilds the BEA–BLS Integrated Industry-Level Production Account with ten asset classes (four intellectual property products including own-account data, five equipment types, structures) across 63 industries.⁶²

Composition. The share of capital services attributed to own-account data averages 7.85 percent over 2002–2024, with a low of 6.79 percent in 2010, a high of 8.63 percent in 2022, and 8.01 percent in 2024. The intellectual-property share of capital rises from 17 percent to 23 percent (6.4 percentage points); on an information-and-communications-technology definition the share rises from 11.58 percent to 18.33 percent (6.75 percentage points).⁶³

Sources of growth, 2002–2024 (published table).

Contribution to GDP growth, percentage points	Adjusted	Published	Delta
Capital	1.076	0.964	+0.112
of which IT capital	0.513	0.380	+0.133
of which own-account data and databases	0.153	0.000	+0.153
of which software	0.182	0.194	−0.012
of which R&D	0.159	0.166	−0.007
Labor	0.594	0.610	−0.017
Total factor productivity	0.605	0.629	−0.024
Total	2.275	2.203	+0.071

Source: Samuels, Santiago Calderón and Garner, WP2026–7, table 1. Every asset class other than own-account data is revised *down*.

BEA’s own interpretation is stated plainly and is the strongest official statement available that measured capital composition is method-dependent: including data as an asset “correctly reallocates gains from TFP to capital accumulation,” and industries with the largest negative productivity revisions “could have relied on OAD to increase their production capacity, but the mismeasurement of their capital inputs led to the effect being misattributed to productivity gains.”⁶⁴

3.6 An internal contradiction in the published magnitude, reported as such

The two papers do not agree with each other’s prose, and one paper does not agree with its own table.

Quantity (2002–2024 average)	WP2026–7 narrative	WP2026–7 table 1	WP2026–4
Effect on GDP growth	8.2 bps	+0.071 pp = 7.1 bps	+0.07 pp (table 6); “seven basis points” (abstract)
Capital contribution	+12 bps	+0.112 pp = 11.2 bps	—
Own-account data contribution	+15.8 bps	+0.153 pp = 15.3 bps	—
Total factor productivity	−2.1 bps	−0.024 pp = −2.4 bps	—
Labor	not stated	−0.017 pp = −1.7 bps	—

Narrative sources: WP2026–7 §1 (“the increased 8.2 basis point faster average growth is attributed to more rapid growth in capital (12 bps) . . . and a lower observed productivity growth (2.1 bps)”) and §5.3. Table source: WP2026–7 table 1. Companion source: WP2026–4, table 6 and abstract.

The table is internally additive: $0.112 - 0.017 - 0.024 = 0.071$. The narrative figures are not reconciled to it anywhere in either paper, and the companion paper’s own table and abstract agree with the table, not with the narrative. **This dossier therefore carries the table value — 7.1 basis points — and records the narrative’s 8.2 basis points as unreconciled.** A reader citing “8.2 basis points” from the abstract or conclusion of WP2026–7 is citing a number that paper’s own table does not produce.

4 What BEA told Shaikh directly, 2006–2010

The following four findings come from correspondence between Anwar Shaikh and David Wasshausen of BEA. They are cited here as correspondence, not as BEA publications, because that is what they are; in one case

⁶²Samuels, Santiago Calderón and Garner, WP2026–7, §3.

⁶³*Ibid.*, §5.1.1.

⁶⁴*Ibid.*, §§5.3, 6.

(§4.4) BEA states in the same breath that no published documentation of the point existed.⁶⁵

4.1 The construction chain, and BEA’s licence for an aggregate reconstruction

Wasshausen’s 2006 description of how the stock is actually built is the vintage description of record:

Detailed fixed-cost net stocks are derived by accumulating, through the perpetual inventory method, real investment. At the most detailed level, there is no distinction between “fixed-cost” and “real” chain-type measures since there is no aggregation at this point. Detailed fixed-cost net stocks are reflated using detailed end-of-year price indexes (not investment deflators, which reflect investment throughout the year) to a current-cost basis. Historic-cost, fixed-cost and current-cost net stocks are aggregated across asset types, industries and legal form by straight addition. Quantity indexes for net stocks are estimated using the Fisher chain-type formula.

D. Wasshausen to A. Shaikh, 2006 (message 133607, lines 3–15).

Shaikh’s difficulty was the one §2.1 records at the level of the accounts: “with chain aggregates the detailed procedures do not ‘scale up’, since chain measures are not additive. Even applying a recursive summing rule to sub-aggregates, as has traditionally been done with Laspeyres aggregates, does not carry over to chain aggregates.”⁶⁶ Wasshausen’s answer grants a reconstruction and states its cost in the same sentence:

Certainly whatever you do at an aggregate level would be a rough approximation. Given that, I think you could impute aggregate depreciation rates (one for equipment and one for structures) and using published investment flows and deflators attempt to derive historical-cost, fixed-cost and current-cost net stocks and then aggregate.

D. Wasshausen to A. Shaikh, 2006 (message 133606, line 101).

And, for the reflation step: “if the chain aggregate is denominated in chain-dollars then you could construct an end of year reflator by taking a moving average of the investment deflator and apply that to the chain-dollar stock to get a rough estimate of the current-cost stock. If the chain-aggregate is only available in index form, then you would need to scale it to chain-dollars somehow and the historical cost measure would not be suitable for this.”⁶⁷

Two things follow. BEA’s own reflator is a set of *detailed end-of-year price indexes*, not the investment deflator; any aggregate reconstruction substitutes the latter, and Wasshausen’s phrase “a rough approximation” is part of the licence, not decoration.

4.2 The valuation and quality-adjustment impasse (unresolved)

BEA’s position:

Assuming there is a difference in quality of a given asset in time ‘t-n’ to time ‘t’, then I do not believe it is accurate to value the units of all stock in ‘t’ (which reflects assets purchased in t-n) with an observed price from time ‘t’ because that price is not consistent with older models in the stock.

D. Wasshausen to A. Shaikh, 2007 (message 132284, lines 6–19).

Stated fairly, and against the reading that BEA was defending the perpetual-inventory method as such:

Also, let me reiterate that I am not against the enumeration method nor do I believe that only the PIM is required to estimate capital stock. My point is that you have to be consistent in your application of QA. You cannot ignore QA in the enumeration method and then back into a real stock estimate based on a QA price and expect the two measures to be consistent with one another.

D. Wasshausen to A. Shaikh, 2006 (message 132284, lines 145–150).

Shaikh’s counter, in two parts: first, that old machines can be upgraded, so there is no quality difference across machines at a moment, only *over time* — “THIS IS THE CLASSIC CASE OF AGING OF WINE, CHEESE ETC.”⁶⁸ Second, that BEA’s construction presupposes a particular price:

⁶⁵Correspondence citations below give the archived message file and line range. Quotations are verbatim, including original spelling and capitalization; Shaikh’s messages are partly in upper case in the source.

⁶⁶A. Shaikh to D. Wasshausen, 2006 (message 133606, lines 33–41).

⁶⁷D. Wasshausen to A. Shaikh, 2006 (message 133606, line 115).

⁶⁸A. Shaikh to D. Wasshausen, 2006 (message 132284, lines 74–84).

IT ALSO FOLLOWS FROM WHAT YOU ARGUE THAT IF THE OBSERVED PRICE IS NOT THE PCPK PRICE THAT THE TWO METHODS WILL STILL DIFFER. THIS COULD HAPPEN BECAUSE OF DISEQUILIBRIUM CONDITIONS, MONOPOLY, ETC. IF THAT THIS THE CASE, THEN THE PROBLEM RETURNS. SO EITHER BOTH METHODS GIVE THE SAME RESULT, OR THEY DO NOT. IN EITHER CASE, FOR ME THE ONLY CORRECT ANSWER CAN BE THE ENUMERATION METHOD, SINCE THE PIM IS MERELY A VALID SHORTCUT IF IT GIVES THE SAME ANSWER.

A. Shaikh to D. Wasshausen, 2006 (message 132284, lines 120–131).

The exchange closes without resolution: “Anyhow, while I have enjoyed our discourse on this topic I fear that we may have reached an impasse.”⁶⁹ Nothing later in the correspondence reopens it. Any measure that takes BEA’s current-cost net stock as an input inherits a valuation convention that the responsible BEA analyst declined to defend as correct in general and that Shaikh declined to accept.

4.3 The gross-stock capability was lost, not discontinued

Shaikh’s standing request is on the record: “I have long wanted to produce gross stock estimates using the old BEA methodology. It is ‘grossly’ unfair to those of us who need such estimates that the BEA no longer produces them.”⁷⁰ The answer:

Unfortunately it is not quite so simple as resurrecting and running the old programs (for one thing, these programs were written in Fortran which we no longer use and were phased out over 10 years ago. Nobody working on capital stocks back then is still working for BEA.)

D. Wasshausen to A. Shaikh, 2008 (message 132050, lines 3–10).

The capability was therefore gone before roughly 1998, with complete staff discontinuity by 2008. The gross stock published for 1925–79 (§1.2) is not merely unpublished today: BEA could not reproduce the counterfactual in 2008 on the old assumptions. Any comparison of a classical-era gross stock against a modern net stock has to be constructed externally, and cannot be sourced from the agency.

The same correspondence closes the obvious substitute. Census book value cannot benchmark BEA stocks, and BEA gives four reasons: it knows of “no proposals or papers that suggest we benchmark or scale to these estimates”; “Census values are gross stock measures whereas the BEA measures are net stock measures so they are not directly comparable to one another”; surveyed capital expenditures are less reliable and less detailed than the supply-side commodity-flow components; and BEA stocks are built by asset type, industry and legal form, so forcing them onto an industry-only Census aggregate would require “a top-down raking . . . that doesn’t sound ideal to me,” quite apart from the fact that “the definition of ‘asset’ is not always consistent between Census and BEA (e.g. only BEA recognizes own-account software as a fixed asset).”⁷¹

4.4 Sector definitions: the profit-making stock, and the “Households” trap

Asked how to extract a profit-making business-sector capital stock, BEA’s answer is a four-term subtraction on Fixed Asset Table 6.1 — private fixed assets less nonprofit institutions, less owner-occupied housing, less tax-exempt cooperatives — and the reason is a definitional divergence between two BEA accounts:

In the fixed assets accounts the “Households” sector includes not only owner-occupied housing, but also tenant-occupied housing so I would think your second approach would be more appropriate. . . . In the NIPAs, “Households” is a bit more specific and excludes tenant-occupied housing. . . . Depreciation associated with tenant-occupied housing owned by “households” is reflected in rental income of persons under other private business.

D. Wasshausen to A. Shaikh, 2010 (message 105659, line 9).

A stock/flow pair assembled by taking the line labelled “Households” from each account is therefore internally inconsistent. As of 2010 none of this was published: “I don’t think we’ve done a very good job documenting this type of information in the fixed assets methodology paper.”⁷²

Two residual limits come from the same exchange. Nonprofits that serve business cannot be separated from the corporate sector at all — “they are simply part of the corporate sector (not even as unpublished underlying

⁶⁹D. Wasshausen to A. Shaikh, 2007 (message 132284, lines 21–24).

⁷⁰A. Shaikh to D. Wasshausen, 2008 (message 132050, lines 28–43).

⁷¹D. Wasshausen to A. Shaikh, 2008 (message 132076, lines 7, 11, 15).

⁷²D. Wasshausen to A. Shaikh, 2010 (message 105657, line 5).

detail...)” — and the identity between fixed-asset current-cost depreciation and NIPA consumption of fixed capital is vintage-dependent, because in the 2010 annual revision “we revised the fixed assets accounts all the way back to 1901, including current-cost depreciation; however NIPA CFC was only revised back to 2007.”⁷³ An identity check that passes in one vintage can fail in the next with no change in method.

5 The classification question, stated neutrally

5.1 What treating data as capital asserts

Three assertions are embedded in the experimental programme, and it is worth separating them because they can be accepted or rejected independently.

- (a) **A production-boundary claim.** Recording and organizing data is production of an output, not an overhead cost of producing something else. Mechanically this is joint production: BEA states that “the same amount of factors of production, including labor and intermediate inputs, is recognized as having produced additional (previously unrecognized) output, which is the same treatment applied to own account software.”⁷⁴ No new inputs are identified; the same wage bill is re-described as producing a second output.
- (b) **An ownership claim.** The unit that funds or performs the recording economically owns the resulting asset. In the R&D case BEA is explicit that the funder is the owner, and that federal grants as well as purchases are federal investment.⁷⁵ In the data case the 2019 paper observes that in the United States “once households knowingly or unknowingly submit personal data such as mobile phone location or internet search, economic benefits attached to the data also shift to the business sector.”⁷⁶
- (c) **A depreciation-of-knowledge claim.** The asset wears out at a definite rate. The rate assumed is one-third geometric on a five-year service life, borrowed from software.⁷⁷ This sits directly against two statements in BEA’s own earlier paper: that data “may experience appreciation” and that their depreciation profiles “may not follow a typical pattern,” and the Canberra II Group’s reason for excluding information content in the first place — that including it would “open the door to the capitalization of knowledge.”⁷⁸

A fourth, quieter assertion is a valuation claim: that a magnitude with no market transaction can be priced by summing imputed costs. In the data case the chain runs from job-advertisement text, through a machine-learning estimate of a skills share, through rounding to the nearest five percent with a floor at ten and a cap at ninety, through a wage bill, through a ten-year moving-average blow-up factor, to a capital stock — deflated by a pseudo-output price index built from input costs minus a five-year moving average of total factor productivity.⁷⁹

5.2 What a Marxian objection would have to engage

Stating the objections is not endorsing them; each of the following is a point at which the accounts’ categories and the classical categories do not line up, and at which a ruling is required.

- **The production boundary is not the productive/unproductive distinction.** BEA’s boundary decides whether an activity is production at all. It does not ask whether the activity produces surplus value. The two cuts can agree, disagree, or cross-cut.
- **Where the measured magnitude comes from.** BEA reports that the occupations contributing most to data capital formation are business and financial operations, computer and mathematical, and office and administrative support, with management a consistent second-order contributor.⁸⁰ These are occupational categories that a Shaikh–Tonak-style classification treats substantially, though not wholly, as unproductive. The capitalization therefore converts a portion of what a classical account may hold as unproductive expenditure — or as variable capital — into an addition to the capital stock.
- **Non-rivalry against value transfer.** Constant capital transfers its value as it is consumed in production. BEA states that data are “non-rival but excludable.”⁸¹ An input that is not used up by being used sits

⁷³D. Wasshausen to A. Shaikh, 2010 (message 104877, line 9). The consequence is stated in the same message: the two tables match for years prior to 2007 before the fixed-asset update, and only for 2007–2009 after it.

⁷⁴Samuels, Santiago Calderón and Garner, WP2026–7, §2.

⁷⁵SCB, March 2013, “Sector assignment.”

⁷⁶Rassier, Kornfeld and Strassner (2019), §4.2.

⁷⁷Santiago Calderón, WP2026–4, §6.

⁷⁸Rassier, Kornfeld and Strassner (2019), §§3.3, 2.1.

⁷⁹Santiago Calderón, WP2026–4, §§3.2, 4.2, 5, equations 1–8.

⁸⁰*Ibid.*, §7.1.

⁸¹Rassier, Kornfeld and Strassner (2019), §3.3.

awkwardly with a transfer-of-value premise, whichever way the question is finally settled.

- **The depreciation rate is an assumption, not a measurement.** One-third geometric, borrowed from software, on a service life of five years. Whatever value transfer is attributed to data in a classical account is, if BEA’s series is used, exactly this assumption.
- **An imputed profit inside an investment series.** Since the 2018 update, own-account software and own-account R&D investment include an imputed return to fixed capital from 2007 forward.⁸² A portion of what is added to the stock is therefore an imputation of profit rather than an outlay.
- **A forward-looking valuation already inside the stock.** Entertainment originals are valued at the net present value of expected future royalties at an assumed 7 percent real discount rate. Any aggregate that includes them inherits a forward-looking valuation; any aggregate that excludes them must subtract a separately published series.
- **There is no clean current boundary to defend.** Data embedded in *purchased* software is already inside the published capital stock; data in *own-account* software is already outside it.⁸³ Excluding data today is not a neutral act either.

5.3 What each choice does, mechanically, to a profit-rate denominator

Write the rate as $r = S/K$. The relevant magnitudes are all published.

- Keep the current core-account boundary.** K = structures + equipment + software + R&D + entertainment originals + expanded residential ownership transfer costs. It contains an R&D stock present in every year back to 1929 whose pre-1953 segment is reconstructed from Kendrick and Terleckyj; an entertainment-originals stock valued by discounted expected revenue; and, since 2007, an imputed return inside own-account investment. It contains data invisibly, via purchased software.
- Add the experimental data asset.** K rises by the current-cost net stock of own-account data: \$710bn in 2002 to \$1,966bn in 2024. As a share, that is about 4 percent of private nonresidential fixed assets (4.23 percent in 2024) and 22.6 percent of private intellectual property products in 2024.⁸⁴ But the numerator moves too: capitalizing an own-account outlay of R with return Π and depreciation δ raises output, value added and gross operating surplus by $(1 + \Pi)R$, leaves intermediate consumption unchanged, and raises *net* operating surplus by $(1 + \Pi - \delta)R$.⁸⁵ The sign of the net effect on r is therefore not determined a priori; it depends on the ratio of the added surplus to the added stock.
- Strip intellectual property products entirely.** This restores something closer to the 1925–79 boundary but is not identical to it, because the 1996 depreciation and chaining changes remain. Note the scale of what is being removed: the intellectual-property share of capital services is 17 percent on published data and 23 percent with data included.⁸⁶
- Use a gross rather than a net stock.** No BEA source exists after roughly 1998 (§4.3), and Census book value cannot substitute (*ibid.*). This has to be reconstructed externally or abandoned.

There is one further mechanical fact that constrains all four options. Because the R&D and entertainment-originals capitalizations were carried back to 1929 and the data programme currently starts in 1997, a series for a single historical year computed on a pre-2013 vintage and the same year computed on a post-2013 vintage are *different objects*, before any question of deflation arises. Splicing across those boundaries without annotation manufactures a continuity that the accounts do not have.

6 Questions whose answers are not in the record

The record above settles what BEA did, when, why it says it did it, and how much it says it moved the numbers. It does not, and cannot, settle the following. These are stated as questions rather than options because each requires a judgement about the classical categories that no BEA document makes.

Q1. Is the recording and organizing of data a labour process that produces a commodity? BEA’s answer is joint production: the same labour and intermediate inputs are re-described as producing a second output. If that re-description is rejected, the whole magnitude disappears from output as well as from the

⁸²*NIPA Handbook*, ch. 6, “Definitions and Concepts.”

⁸³Rassier, Kornfeld and Strassner (2019), §2.2.

⁸⁴Santiago Calderón, WP2026–4, §§7.6, 8.1.

⁸⁵Dylan G. Rassier, “BEA Briefing: Treatment of Research and Development in Economic Accounts and in Business Accounts,” *SCB*, March 2014, “Effects of Own-Account R&D on Economic Accounting Measures,” following Hulten and Hao (2008).

⁸⁶Samuels, Santiago Calderón and Garner, WP2026–7, §5.1.1.

stock. If it is accepted, is the resulting product a means of production?

- Q2. If data is capital, is it constant capital?** Does a non-rival, excludable input that is not consumed by use transfer value in the required sense — and if not, what is it?
- Q3. Does the same answer apply to R&D, software, and entertainment originals, or do they separate?** R&D is measured by cost with a productivity adjustment; own-account software by cost with a time-use factor; entertainment originals by discounted future revenue. Three different valuation logics are being carried under one category heading.
- Q4. What depreciation rule should a classical measure use?** BEA’s data rate is one-third geometric on a five-year life, borrowed from software; its own 2019 paper says data may appreciate and that their profiles “may not follow a typical pattern.” Is BEA’s assumption adopted, replaced, or is the asset excluded on the grounds that no defensible rule exists?
- Q5. Does capitalizing own-account data move variable capital into constant capital?** The measured magnitude is by construction a share of a wage bill times a blow-up factor, concentrated in business-and-financial-operations, computer-and-mathematical, office-and-administrative-support and management occupations. If those wages sit in v or in unproductive expenditure in the classical account, capitalization moves the same dollars to the other side of the ratio.
- Q6. Should an imputed return to capital be inside a classical K ?** From 2007 own-account software and R&D investment include one. If not, the imputation has to be stripped, and BEA publishes no series that isolates it.
- Q7. Which boundary should the headline capital stock use?** Four candidates are live: the 1925–79 boundary (structures and equipment); the post-1999 boundary (plus software); the post-2013 boundary (plus R&D, entertainment originals, expanded ownership transfer costs); and the 2026 experimental boundary (plus own-account data). Whichever is chosen, the same choice must govern the historical arm, and the vintage break must be annotated rather than spliced.
- Q8. Gross or net?** The classical apparatus was built when both were published. Only net is available now, and BEA cannot regenerate the alternative. Is a reconstruction attempted — and on whose service-life and retirement assumptions — or is the measure redefined?
- Q9. Which valuation, given that the 2007 impasse was never resolved?** Current-cost, historical-cost, or both arms reported side by side with the disagreement stated at the point of use?
- Q10. Which sector definition?** BEA’s own recommendation is the four-term subtraction on Fixed Asset Table 6.1 — with the acknowledged residual that nonprofits serving business cannot be netted out of the corporate sector at all, “not even as unpublished underlying detail.” Is that residual impurity accepted and declared, or is a different aggregate built?

A note on citation form. Six of the eight BEA documents cited here — the 2013 preview, the 2014 briefing, the 2019 advisory-committee paper, the two 2026 working papers, and the 2024 handbook chapter — do not yet carry structured citation keys in the citation register that governs this project’s series. They are cited above in full bibliographic form, and the register entries remain to be minted. Nothing in this dossier depends on that being done first; every quotation and every magnitude above was read from the source at the time of writing.

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