CAN THE BUILDOUT BECOME LASTING PROSPERITY?

A RESEARCH MONOGRAPH
AND EMPIRICAL ATLAS



ARTIFICIAL INTELLIGENCE AND DURABLE AMERICAN GROWTH

INVESTMENT, DIFFUSION AND LIMITS

Productivity and the resource constraints behind the boom

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300 PAGES · 24 CHAPTERS · 31-SERIES DATA ATLAS

RESEARCH MONOGRAPH AND EMPIRICAL ATLAS

Artificial Intelligence and Durable American Growth

Investment, productivity diffusion and the resource constraints behind the boom

Can the artificial intelligence buildout become a lasting engine of American prosperity? An empirical investigation using audited public data, executed econometric models and transparent scenarios.

Edition	Research scope
Language	English
Date	November 2026
Length	300 pages, including all appendices
Evidence	24 chapters, 148 figures and numerical tables
Methods	Conditional projections, Bayesian VAR, nested forecasts and capital scenarios

READER INFORMATION

Scope and publication status

This manuscript studies the American AI buildout through a deliberately broad digital investment basket, construction, production, labor and price indicators. Its main question is whether an investment episode can become sustained productive growth.

The data snapshot was retrieved on November 3, 2026. GDP and investment end in 2026 Q3; nonfarm business productivity ends in Q2. Monthly industrial and price evidence mainly ends in September. No missing productivity quarter is invented.

Thirty-one FRED series are archived with source metadata, together with Census construction and adoption workbooks. The adoption snapshot is dated by the source publication calendar. Historical survey definitions are not silently spliced.

Pages 9-152 contain the main chapters. The remaining pages provide the data atlas, annual records, horizon evidence, mathematical methods, sources and glossary. All are included in the 300-page count.

Abstract

Hardware and software investment account for 4.046 percent of nominal GDP in 2026 Q3. Data-center construction reaches a preliminary $96.462 billion annual pace in September. These are observed broad categories, not an official all-AI investment total.

A share-weighted approximation gives a 0.950 percentage-point gross hardware-plus-software expenditure contribution to annualized quarterly growth. It includes non-AI activity and omits an import allocation. Hardware quantities exceed two pre-2020 trend extrapolations by about 2.11-2.55 times, while software quantities lie much closer to those baselines.

Conditional local projections associate a one-residual-standard-deviation digital investment movement with 0.434 log-percent more GDP at horizon four. The corresponding productivity estimate is -0.051, with a pointwise interval spanning both signs. Bayesian models expose recursive-order sensitivity. Richer retrospective forecasts fail to beat historical-mean benchmarks over the full evaluation.

National price associations are imprecise. Capital scenarios show that deployment, utilization and replacement govern net resource requirements. At 30 percent depreciation and a 2 percent operating-cost rate, the narrow service-yield threshold is 32 percent before financing. Durability is therefore conditional on useful diffusion and net benefits, rather than implied by capital expenditure alone.

READING GUIDE

How to interpret the evidence

Evidence type	Meaning
Observation	An archived source number with units, frequency and vintage.
Accounting approximation	A declared expenditure calculation; not a causal AI contribution.
Conditional projection	A historical association after lagged controls.
Bayesian response	A posterior conditional on prior, variables and recursive ordering.
Forecast test	A held-out retrospective prediction exercise using revised data.
Scenario	Exact arithmetic conditional on assumed parameters.

Log percent means 100 times a natural-log ratio. Percentage points apply to rates or contribution arithmetic. SAAR is a seasonally adjusted annual rate. A horizon-four outcome ends four quarters after the investment observation and begins one quarter before it.

Sampling intervals do not include proxy validity, omitted variables, source revisions or every model choice. Broader uncertainty is discussed in the text.

MAIN STUDY | PART 1 OF 2

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MAIN STUDY | PART 2 OF 2

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NAVIGATION

Map of the empirical appendices

Pages	Contents
153-214	31 source-series profiles and change diagnostics
215-251	37 annual records, 1990-2026
252-276	25 quarterly horizon records, 0-24
277-292	16 technical and replication notes
293-296	Sources, attribution and research position
297-300	Glossary of measurement, methods and scenarios

The numerical atlases are part of the book. They make source coverage, historical episodes and horizon-specific uncertainty inspectable without requiring a reader to rerun the research. The accompanying archive supplies the raw observations and code for independent verification.

Every chapter contains four analytical sections, one figure page and one evidence-table page. Source identifiers remain visible. The source-series atlas uses native monthly or quarterly changes and does not compare their volatility as if the frequencies were identical.

EVIDENCE SUMMARY

Findings that organize the book

Finding	Implication
Buildout is observable	Broad expenditure, construction and production series document real activity.
Attribution remains limited	Hardware and software are not exclusively AI; gross contributions omit imports.
Output differs from efficiency	Positive GDP association coexists with imprecise one-year productivity evidence.
Sophistication is not predictive success	Ridge does not beat the historical mean in the full evaluation.
Net benefits need services	Replacement, operating costs and utilization govern the scenario frontier.
Measurement can improve	Deployment, intensity, trade allocation and incidence remain priorities.

CHAPTER 1 | CAN AN INVESTMENT BOOM BECOME DURABLE GROWTH? | 1/6

The question behind the cranes

The economic promise of artificial intelligence begins with a distinction between building productive capacity and using it well. A server purchase generates an investment transaction today. A reliable improvement in a hospital, factory or legal workflow may generate useful services for years. Those transactions have different timing, owners and measurement problems. They cannot be treated as interchangeable evidence of a lasting improvement in living standards.

This book asks whether the American buildout can cross that distance. Its empirical core tracks hardware and software investment, productive activity, hours, equipment prices and construction. Its scenarios make the replacement and operating requirements explicit. The objective is an auditable test of mechanisms, with conditions under which an optimistic interpretation could fail.

Evidence anchor

Measure	Calculated or verified value
Digital share	4.046%

2026 Q3; hardware plus software

Source: BEA via FRED; Census C30; book calculations

Three distinct growth claims

An expenditure claim concerns the current demand created by investment. A capacity claim concerns the services that installed assets can produce. A productivity claim concerns useful output relative to inputs across the economy. Evidence supporting one claim does not establish the others. An imported accelerator can enlarge a domestic service business while its purchase contributes little domestic equipment production. An idle building can raise construction spending before it provides computing services.

The manuscript keeps those claims separate in its figures and estimates. Hardware and software quantities are combined using expenditure weights, while nominal shares describe scale. Conditional dynamic estimates examine subsequent macroeconomic outcomes. Capital scenarios ask what service yield would cover replacement and operating costs. Reading these results together is more informative than assigning every technology purchase to a single AI contribution and declaring that contribution permanent.

Evidence anchor

Measure	Calculated or verified value
Data-center work	$96.462bn SAAR

September 2026 preliminary

Source: BEA via FRED; Census C30; book calculations

What would count as durability?

Durability requires a stream of useful services that can survive replacement, financing and operating costs. It also requires customers willing to pay, or measurable benefits that extend beyond the owners of infrastructure. These conditions are related but do not coincide. A business can earn rents by redistributing existing income, while a socially useful application can fail to capture enough revenue to finance itself.

The book therefore evaluates a chain of necessary conditions: expenditure becomes installed capital, capital becomes utilized capacity, capacity supports reliable applications, and applications improve net output or welfare. There is no estimated probability that the entire chain succeeds. The available aggregates do not observe every link. Instead, the research identifies observable progress and explicit thresholds. An uncertain answer to the final question is compatible with substantial evidence about the conditions that govern it.

Evidence anchor

Measure	Calculated or verified value
Productivity endpoint	2026 Q2

Earlier than GDP endpoint

Source: BEA via FRED; Census C30; book calculations

A research contract with the reader

Every reported estimate belongs to one of four categories: an archived observation, a historical association, a posterior conditional on a model, or an assumption-driven scenario. Source dates and estimation samples accompany the numerical appendices. No model converts broad computer investment into an observed series of AI investment merely by changing its label.

The reader can reproduce the calculations from the supplied raw files and inspect their metadata. A model that fails to improve historical prediction remains in the results. Confidence intervals that include zero remain visible. The manuscript also acknowledges prior work on general-purpose technologies, measurement and productivity diffusion. Its contribution is a reproducible investigation with a clear boundary between what the evidence measures and what the central question ultimately asks.

Evidence anchor

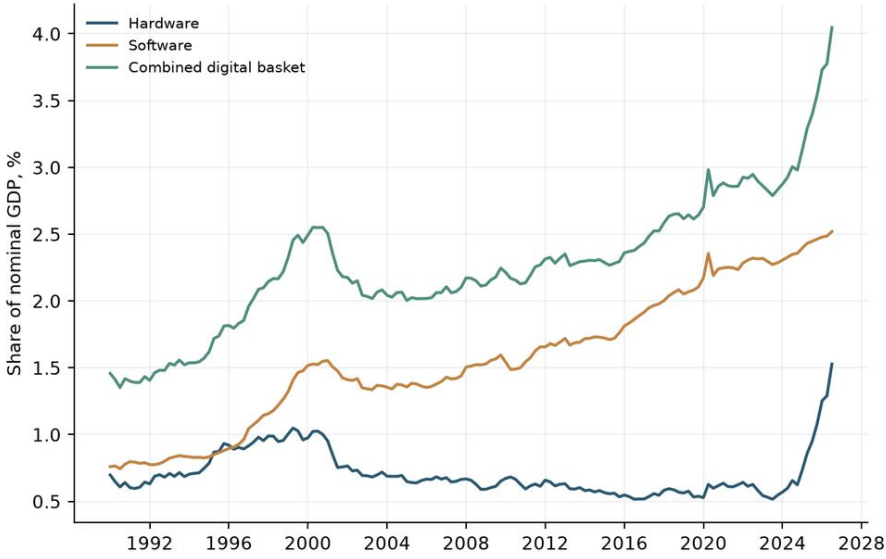
Measure	Calculated or verified value
Investment unit	2.227 log pp

Residual standard deviation

Source: BEA via FRED; Census C30; book calculations

CHAPTER 1 | FIGURE AND INTERPRETATION | 5/6

Can an investment boom become durable growth?



Observed scale and distinct empirical endpoints.

The combined nominal share is a measured broad digital category, not an allocation of spending to AI. The construction number is an annualized pace of work put in place and excludes much equipment installed inside facilities. These distinctions govern the rest of the book: large expenditure is directly observable, while the productive services and technology attribution require additional evidence.

Source: BEA via FRED; Census C30; book calculations

Numerical evidence

Measure	Value	Interpretation
Digital share	4.046%	2026 Q3; hardware plus software
Data-center work	$96.462bn SAAR	September 2026 preliminary
Productivity endpoint	2026 Q2	Earlier than GDP endpoint
Investment unit	2.227 log pp	Residual standard deviation

The baseline projection unit is one residual standard deviation of quarterly digital investment growth after lagged macroeconomic controls. It is not a one-dollar intervention or a one-percent increase in AI capital. The chapter therefore uses the number to describe historical variation while reserving causal claims for evidence the present design does not supply.

Source: BEA via FRED; Census C30; book calculations

END OF FREE EXCERPT

CONTINUE WITH THE FULL 300-PAGE EDITION

The excerpt covers the front matter and Chapter 1. The full edition adds Chapters 2 to 24, the 31-series data atlas, the annual and horizon records, technical notes, sources and glossary.

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