

## APPENDIX

# Capital in the American Economy: Kuznets Revisited

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This Appendix is designed to illustrate one of the central claims of the book—that net private investment has been declining in importance for almost a century, even as economic growth as occurred. Steve Roth has prepared graphic depictions of that trend, and meanwhile explained how to read the stocks and flows measured in the National Income Accounts from which the graphs are derived.

The introductory purpose here is to suggest that there are alternatives to the mainstream of economic theory and its built-in assumptions about the importance of investment (or capital formation) in determining rates of growth. These alternatives accord with, and speak to, the graphic depictions of investment trends that follow. They show that the “myth of investment” in Chapter 3 makes perfect sense—but only if you understand the roles (and sources) of government and residential investment.

Investment is investment, you might say, but the revenue source of the government component is federal, state, and local taxes, not corporate profits; in this sense cutting taxes on profits starves investment. And of course the residential component of investment as such contributes to the

housing stock, but it doesn't increase the productive capital stock unless we turn homes into factory barracks overnight.

Famous and influential economists like Larry Summers and Martin Feldstein have strenuously argued that more investment as such is crucial to growth, and that lower taxes on corporate profits are conducive to investment, but they've never bothered to make these distinctions. So they perpetuate the myth of investment. They're not venal servants of power; they're captives of an ideology or a paradigm, call it what you will, which assumes that more private investment is an inviolable imperative if our common goal is economic growth. Even so, their arguments obscure, deny, or obliterate the economic realities, which are that net private investment has atrophied over the last hundred years (as shown here, not because government spending has "crowded out" private spending), while economic growth has nonetheless happened.

There's been resistance to this investment-driven ideology or paradigm from within the precincts of mainstream economic theory for a half century at least. Here we'll just mention the sources of that resistance, as a way of suggesting that the rudiments of theoretical alternatives are already in place.

The detonating event was the so-called Cambridge capital controversy started by Joan Robinson in 1954, amplified by Piero Sraffa in 1960, and addressed by eminent theorists such as Paul Samuelson, L. Pasinetti, A. Bhaduri, Maurice Dobb, and Ian Steedman. This trans-Atlantic debate, pitting economists at MIT against those trained at Cambridge, turned on the utility of "production functions"—those equations that seem self-evidently useful in explaining the different "factors," including labor, that variously contribute to growth as such. The question that never got settled was how to measure the marginal productivity of capital. One side held that the equations posited what they were supposed to prove. The other held that they worked as heuristic devices, in effect admitting that the empire of neoclassical theory was a nudist camp. Either way, the importance of capital, and thus of investment, was already a question in the 1950s.

Meanwhile Moses Abramovitz, Simon Kuznets, Robert Solow, Solomon Fabricant, Kenneth Kurihara, Anatol Murad, Harold Vatter, Burton F. Massell, Harry T. Oshima, and others were suggesting either that capital formation contributed very little to growth, or that net private investment was declining as a percentage of GNP, even while growth continued apace.

For these economists, technological change had made labor and capital so productive that both were being displaced: the labor-saving machinery that had once caused “technological unemployment” was now supplemented by capital-saving techniques that made all “factors” of production mere watchmen and regulators. The implications were recognized early on by the arch-Keynesian Alvin Hansen, but best summarized by Edmund S. Phelps, a Nobel Prize winner, in 1962: “technical progress is organizational in the sense that its effect on productivity does not require any change in the quantity of the inputs.” Again, the contribution of capital formation and private investment to economic growth had become a question.

At the same time, Eastern European economists such as Istvan Friss, Wladczmier Brus, Radovan Richta, and Radoslav Selucky noticed that in the West, “extensive” growth fueled by expenditure on capital goods was giving way to “intensive” growth fueled by demand for consumer goods. The Prague Spring was already waiting beneath the frozen ground of The Plan and its priorities. And here, too, the question raised was, what role does investment in non-consumable goods—capital formation—actually play in economic growth?

The final piece of the new puzzle was the emergence of “human capital” as a concept and a category of investment, at precisely the same moment, between the mid-1950s and the mid-1960s. Its advocates were pro-market theorists like Gary Becker, but their findings were consistent with Solow’s startling conclusions, and they suggested, accordingly, that public investment in education and technological change driven by extra-market forces were more significant than investments driven by traditional profit motives in making the labor force a new “factor” of production. So once again the question became, what exactly is it that capital does, or rather, what are capitalists for?

That’s one of the questions this book raises. In an effort to provide an empirically grounded answer to that question, the rest of this appendix provides an overview of capital in the American economy since 1930.

To begin with, a little historical background:

“The estimation of national income was initiated during the early 1930s, when the lack of comprehensive economic data frustrated the efforts of Presidents Hoover and Roosevelt to design policies to combat the Great Depression. In response to this need, the De-

partment of Commerce commissioned Simon Kuznets of the National Bureau of Economic Research (NBER) to develop estimates of national income. ... The estimates were presented in a report to the Senate in 1934, *National Income, 1929–32.*” — Bureau of Economic Analysis (BEA), *A Guide to the National Income and Product Accounts of the United States*

The system of national accounts that Simon Kuznets developed in the 1930s—now called the National Income and Product Accounts (NIPAs)—is today used by almost every country in the world. Methodologies have changed—data gathering, measurement, estimation, statistical adjustment, and reporting—but the accounts themselves, and their relationships, are largely unchanged from those that Kuznets put in place.

Kuznets made a point in his work to emphasize that the accounts report *estimates*; no method could track each and every transaction in detail. He also emphasized that smaller slices of the data could be quite innacurate. But in aggregate, the accounts provide an at-least consistent, and at best very accurate, representation of the state of, and change in, the American economy.

In 1961 Kuznets published *Capital in the American Economy: Its Formation and Financing*, an effort to discern, understand, and explain long-term trends in this essential component of the economy: fixed capital (which by his methods includes structures and equipment; software has since been added). He chose this subject because in his words, “[fixed] capital formation...represents the real savings of the nation.” (p. 391) He gathered and regularized the best data that he could acquire and assemble, covering the years 1869-1955.

The book’s goal was to look at long-term trends; Kuznets actively sought to exclude the effects of short-term changes such as natural disasters (“Manna from heaven and fire from hell, fortuitous legacies of nature”), business cycles, etc. Within that view, he sought to deduce the causes and effects driving—and driven by—changes in capital, both the flows and the stocks. He is almost uniformly quite cautious and tentative in those conclusions. But his assembly and presentation of the fundamental facts and trends provided the best basis then available for analyzing the long-term role of fixed capital in the American economy.

This chapter extends that presentation forward in time, covering the eight decades from 1930 (hence overlapping with Kuznets) to 2009. (At this writing the NIPA fixed-asset annual tables cover 1929 through 2009.)

For whatever reasons, Kuznets' presentations were almost completely non-graphical—all tables of data. The data in this chapter is presented in graphical form, in the belief that it makes the long-term trends more easily and immediately apprehensible and understandable.

## **A Note on Fixed-Asset Accounting**

Before presenting the data, it's worth explaining a bit about how the NIPA tables account for fixed assets.

The first thing to understand is the difference between fixed capital and financial capital (the stocks), and between savings and investment (the flows).

Financial capital is, roughly, financial assets—cash, money in bank accounts, stocks, bonds, etc. While storing your money in these things is popularly thought of as “investment,” in the NIPAs this is called Saving. When you save money—no matter where you store it—you are increasing the stock of financial assets.

“Investment,” on the other hand, means spending money to produce—create—fixed capital: houses, factories, airports, amusement parks, machines, software, etc. (Purchases of fixed capital—equipment, for instance—at least to some extent spur its creation.) Fixed capital or fixed assets, as defined in NIPAs, consists of three things.

- Structures
- Equipment
- Software

These categories exclude huge categories that can reasonably be construed as being major parts of a country's assets, including:

- Knowledge, skills, ideas, and technical methodologies (developed through education, training, research, and development)
- “Social capital”: people's trust in each other, in businesses, and in government; their willingness to conform to the rule of law; their diligence, work ethic, and trustworthiness, etc.

- Natural resources
- “Organizational capital”: the whole body of business and government procedures, policies, management systems, and the ever-mysterious “good will” that constitute most of the value of many organizations—the things that make these organizations “going concerns.”

Those things are all very difficult to measure (how much do people “pay” for trust?), which explains why fixed capital is measured based on the three fairly tangible—and purchaseable—categories that are used in national accounts. While they don’t present anything like a complete picture of a nation’s “capital,” various measures of fixed capital are nevertheless crucial tools for judging a nation’s economic condition and direction.

The NIPA tables also break out fixed capital in two other major ways:

- Private vs. government
- Residential and nonresidential (almost all regarding structures, though there is a quite small category of residential equipment). Note that residential investment is money spent to build and remodel houses and apartments. Purchases of existing residences are essentially financial “investments,” or asset swaps, and have no direct effect on measures of fixed investment flows.

So to speak about the U.S. business capital base (for instance) in NIPA terms, you would say “private domestic nonresidential fixed capital.”

A final note: “domestic” fixed assets are those located in the United States, with the exception of U.S. military installations, embassies, and consulates abroad, which are included in government domestic assets.

## Stocks and Flows

The next key distinction is between flows and stocks. The stock of fixed assets is pretty self-explanatory. How much stuff do we have at any given time—buildings, machines, highways, etc.—and what’s it worth?<sup>1</sup>

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<sup>1</sup> Note that this national stock of fixed assets is sometimes referred to as “national savings,” even though it has nothing to do with the stock of financial assets. It’s nevertheless a reasonable term, because unlike an individual, a nation builds or “saves” for the future by building its stock of productive assets—the stock that it will consume to create and provide future prosper-

The key fixed-investment flows are 1. investment and 2. capital consumption. Investment in fixed assets—often referred to as “investment spending” to distinguish it from “consumption spending”—increases the national stock of fixed assets. Capital consumption (depreciation/obsolescence/wearing out) decreases the national stock.

Gross investment minus capital consumption equals net investment. In theory, net investment should equal the change in the capital stock, or “capital base”:  $\text{Year1Stock} + \text{NetInvestment} = \text{Year2Stock}$ . But it doesn’t, because of revaluation.

Businesses in particular are constantly replacing older capital stock with newer, better, more valuable and productive capital stock. (Imagine a computer-driven lathe replacing a manual one.) To account for this, the economists at the BEA re-estimate the value of the existing capital stock each year. (In the course of things, also adjusting for general inflation.) The change due to net investment plus the change due to revaluation equals the total change:

$$\text{Year1Stock} + \text{NetInvestment} + \text{ChangeDueToRevaluation} = \text{Year2Stock}$$

It’s crucial to understand that revaluation in the NIPAs involves re-estimating the value of the whole existing capital base—not just this year’s investment. So a small percentage difference in new estimates can have major effects on the size of the nation’s capital base.

Another crucial fact: even with zero net investment (gross investment = capital consumption), the capital base can grow, and along with it the nation’s productive capacity. If the consumed capital is just being replaced with better capital at the same or lower prices, both the capital stock and productive capacity increases. (Since the nation’s population is growing, one would generally expect the capital base to increase at least at the same speed—probably faster, because new fixed stock is generally cheaper and/or better.)

Fixed capital stock and productive capacity can even increase when net investment is negative (gross investment < capital consumption). As Kuznets notes, this happened at times during The Great Depression, when

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ity. We “spend” or “consume” that national savings to produce goods and services (business and government assets) and by living in it (residential structures).

troubled businesses were investing little, but because of technological improvements, the new equipment (in particular) that they did invest in was vastly more valuable and productive.

To summarize: in this chapter we'll be looking at three different measures of fixed investment:

- Gross investment. Total dollars spent on fixed assets, including replacement of consumed assets.
- Net investment. Investment spending above and beyond capital consumed.
- Change in capital stock. The change resulting from both net investment and revaluation of the stock due to better stock being brought into service, and lesser stock being retired.

We'll also look at the total stock, both in nominal (current-dollar) terms as a percentage of GDP, and in "real" terms—with the value of the stock adjusted for inflation to allow for "absolute" year-to-year comparisons.

## **Fixed Assets in America, 1930–2009**

With those explanations as backdrop, what have been the major trends in fixed capital since the 30s? We'll start with the investment flows, displayed as percentages of Gross Domestic Product (GDP). If the economy is growing, one would expect fixed investment to grow as well. The question is, how is fixed investment changing *relative to the economy*. This method also obviates the need to correct for inflation (a somewhat contentious estimate, especially when trying to equate values over many decades through compounding or "chaining").

First, let's look at total national investment in fixed assets (Figure 1). In this graph and all the others, the depression and war years, not surprisingly, display very large variations (the annual numbers often jump around quite wildly). While those variations can be illuminative, the Kuznetsian emphasis on long-term trends prompts us rather to look to the right side of the graphs, at the postwar years that are not skewed by such world-apocalyptic events—the six decades from the 50s through the 00s.



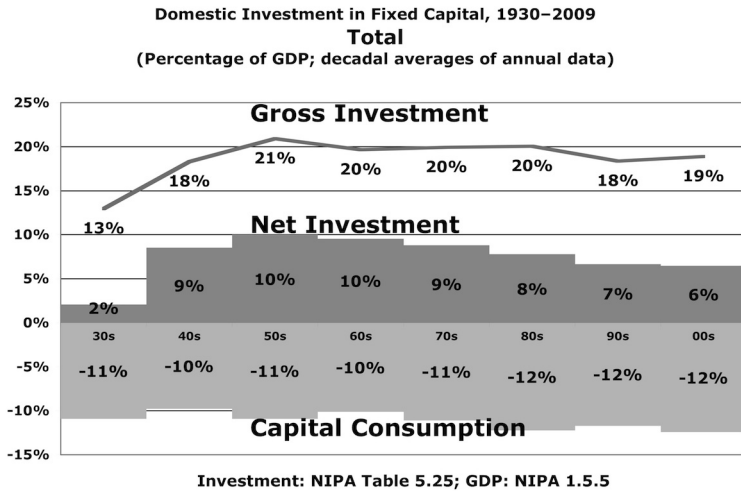


Figure 1.

The most notable and consistent postwar trend is the decline in net investment, even while gross investment remained mostly flat with slight decline, and capital consumption increased slightly. Those two small trends compound to result in the quite large (35%) decline in net investment as a percent of GDP from the 50s to the 00s.

Before taking a detailed look at the sectors comprising that total, it's worth looking just at gross investment for those sectors (Figure 2). The big postwar trend is the rise in the level of business investment, and also its share of total investment—from 45% of the total in the 50s to near or above 60% from the 70s through the 00s. By contrast, in 1961 Kuznets identified the increasing share of government investment as a or perhaps the dominant trend in the decades he was examining. The long-term postwar trend has moved in the opposite direction.

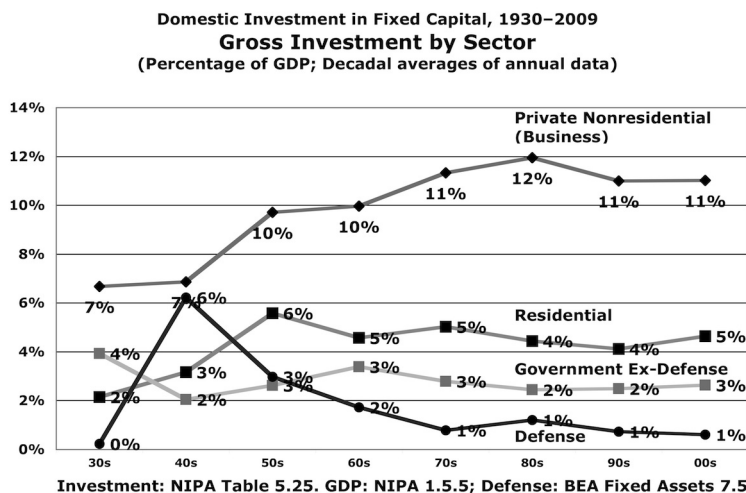


Figure 2.

Government gross investment as a percent of GDP (not including defense) has declined or been flat since the 50s; the decline is significantly more pronounced if you include government defense investment.

The change in defense investment as a percent of GDP has been an almost mirror image of business investment, declining 53% from the 50s to the 60s alone, and 80% from the 50s to the 00s. (Since it's so much smaller than business investment, the smaller absolute decline yielded a far more profound proportional decline.)

Also perhaps surprising given recent events in the residential real-estate market, the share of gross residential investment has been mostly flat or declining since the 60s, following a postwar surge in the 50s.

The trend for private-sector investment (residential and non-residential, Figure 3) is similar though somewhat less pronounced than the trend in total investment: a decline in net investment, effected by both a decline in gross investment and a somewhat larger increase in capital consumption.

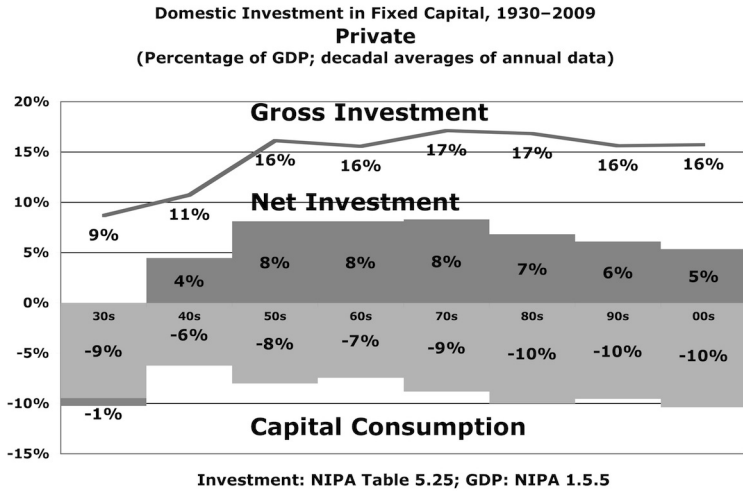


Figure 3.

This brings us to the largest and arguably most important investment segment: private non-residential, a.k.a. business investment (Figure 4). These assets are important because they're used to produce other assets and consumption goods. They are a crucial component of the national engine of production and prosperity.

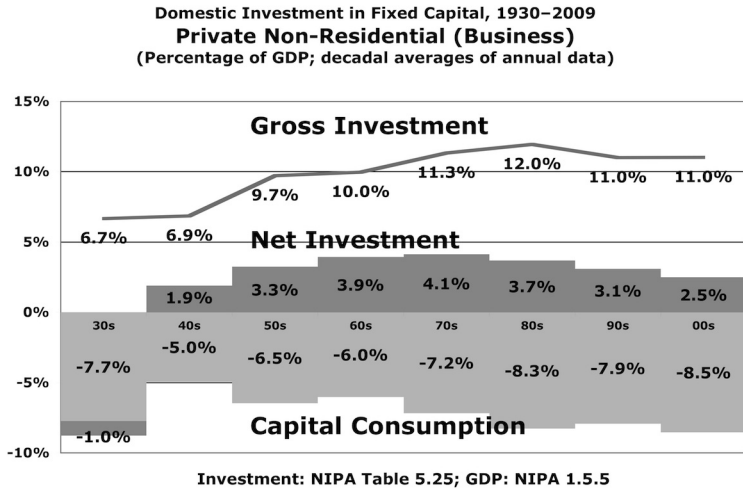


Figure 4.

Again we see a familiar trend, but more pronounced. Gross investment rises into the 80s and dips slightly thereafter, but net investment, dragged down by faster capital consumption, declines significantly from the 70s on. The net investment level in the 00s is 40% below the 70s.

It's useful here to break out gross investment in the two main components of business investment—structures and equipment/software—to see how those might have effected capital consumption in this sector. (Figure 5) This graph is rather self-explanatory, and does much to explain the increase in capital consumption: equipment and software depreciate faster than structures, and an increasing share of business investment has gone into equipment and software (a 72% share in the 90s/00s, compared to 61% in the 50s). This explains some, though not all, of the decline in net business investment.

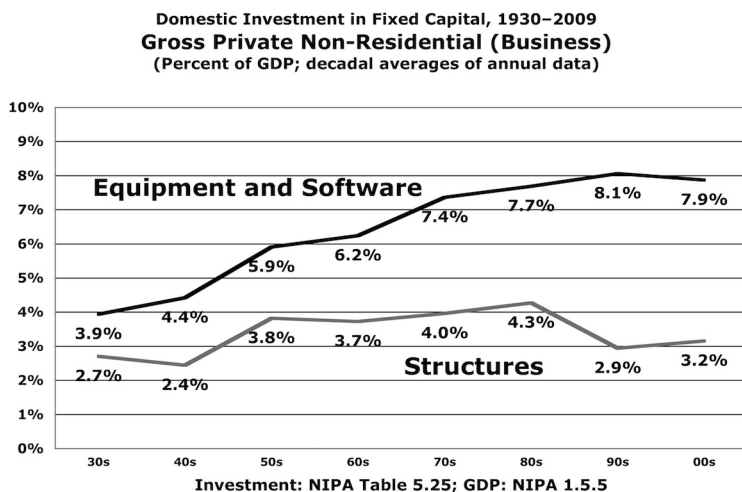


Figure 5.

The residential component of private investment (Figure 6) again shows a familiar pattern: increasing capital consumption and decreasing gross investment yielding declining net investment. (The upturn in the 00s, small as it may look here, represents a major absolute-dollar increase, and does much to explain ensuing events—especially given the amount of that investment that was generated by new credit issuance.) Note that capital consumption consistently represents a relatively small portion of gross

investment compared to other sectors; this because structures, as noted earlier, depreciate more slowly than equipment and software.

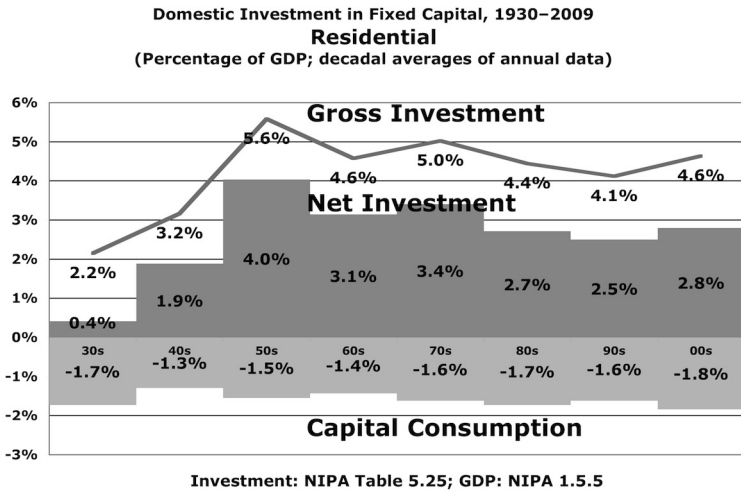


Figure 6.

The trends in government investment are best understood by looking at three graphs, representing total government investment, government investment excluding national defense, and defense investment (Figures 7, 8, and 9).

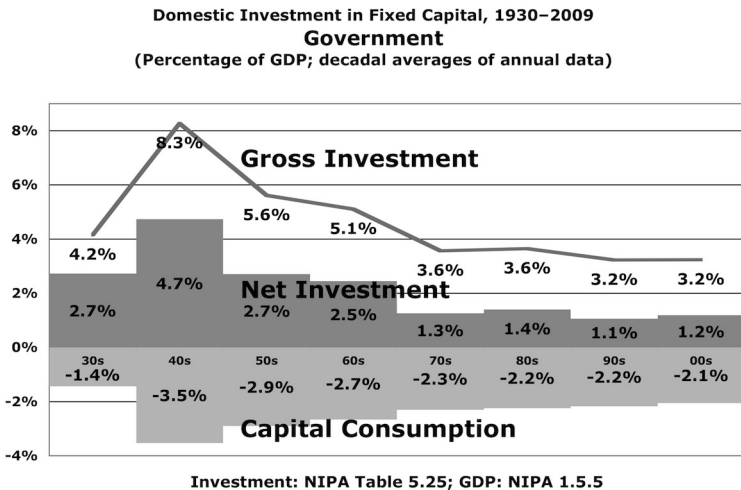


Figure 7.

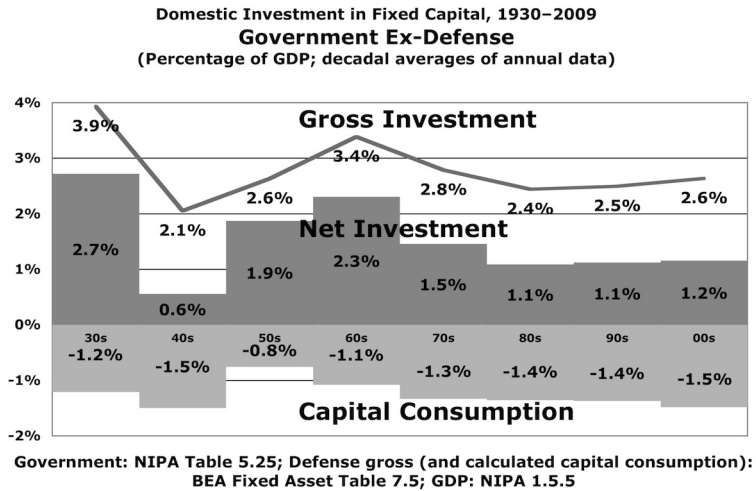


Figure 8.

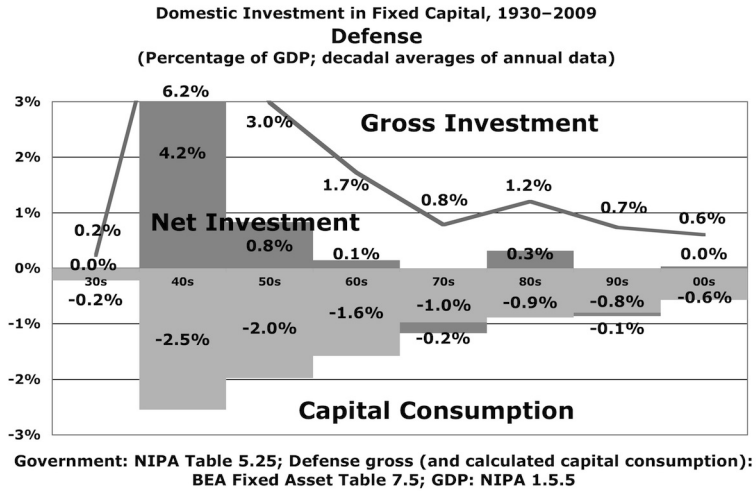


Figure 9

As we saw in Figure 5, defense investment since the 50s has constituted a moderate to (increasingly) miniscule portion of both government and total investment. But its proportional changes have been massive, so it’s worth looking at first. Remember here that unlike the definition of “domestic as-sets” for other sectors (only those assets located in the United States), gov

ernment domestic investment/assets include U.S. military installations, embassies, and consulates abroad.

Not surprisingly, gross defense investment declined rapidly after World War II. But it continued to decline at about the same rate even into the 70s. From the 60s to the 70s alone, it fell 54%. Despite an uptick (quite large in absolute-dollar terms) in the 80s, it has been largely flat since. Even with rapidly and steadily declining capital consumption, gross defense investment declined even faster, so net investment was actually negative in both the 70s and the 90s. Gross defense investment in the 00s was only 1/200th of the American economy, and net investment was effectively zero.

As with business investment, it's useful to look deeper here—at structures versus equipment/software—in an attempt to discern what drove those declines (Figure 10). While the proportional declines for the two segments have been similar (an 81% drop from the 50s to the 70s for structures versus 72% for equipment and software), the absolute decline in structures has been far greater. This perhaps reflects the worldwide construction of military bases, embassies, and consulates in the 50s and 60s, which was largely complete by the 70s.

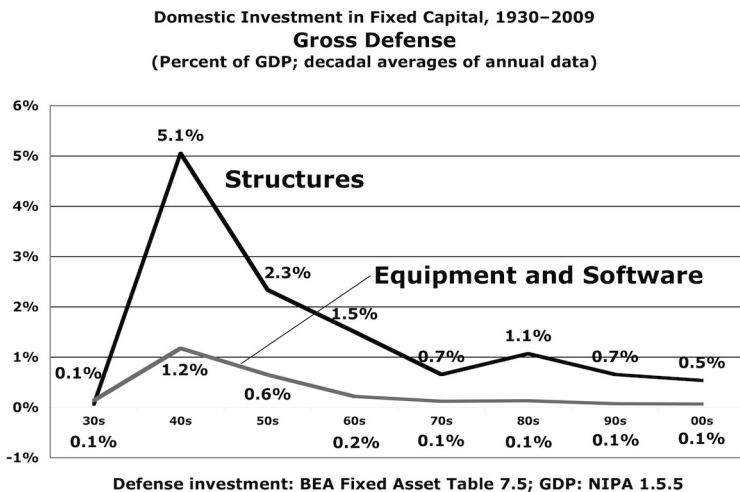


Figure 10.

The inclusion of the defense sector makes the decline in total government investment (both gross and net) look especially precipitous, but the net-investment trend since the 60s for government ex-defense, after a pro-

nounced rise from the 50s to the 60s (both gross—28%—and net—23%), is similar to total government investment—a 53% decline in net from the 60s to the 80s, and generally flat thereafter. Increasing government ex-defense capital consumption (up 25% from the 60s to the 80s) was a significant contributor to that net-investment decline, but gross investment/GDP also fell by 28% over that two-decade period.

Turning to the stocks of fixed assets and the changes in those stocks, we will look at them in two ways: as a percentage of GDP, and in real (inflation-adjusted) dollars per capita, and per member of the work force. GDP has grown much faster than population since 1930, and the work force has grown faster than the population (largely as a result of women entering the workforce), so while the two methods tell somewhat similar stories, they tell it to different degrees.

In considering these graphs, remember that the changes in stock represents both the effects of net investment, and the effect of newer, more valuable stock replacing older stock, and the resultant revaluation of the total capital stock. Since revaluation affects the total stock, the resultant changes are often much larger and more volatile than what we've seen from net investment.

The stock of fixed assets relative to GDP (Figure 11) has been pretty flat since the 40s, meaning that the stock (the numerator) and production (the denominator) have grown at essentially the same pace. Both have grown much faster than the population and the work force, however—since the 50s/60s, by a factor of 2.5 for the work force, and 4.1 for the population.



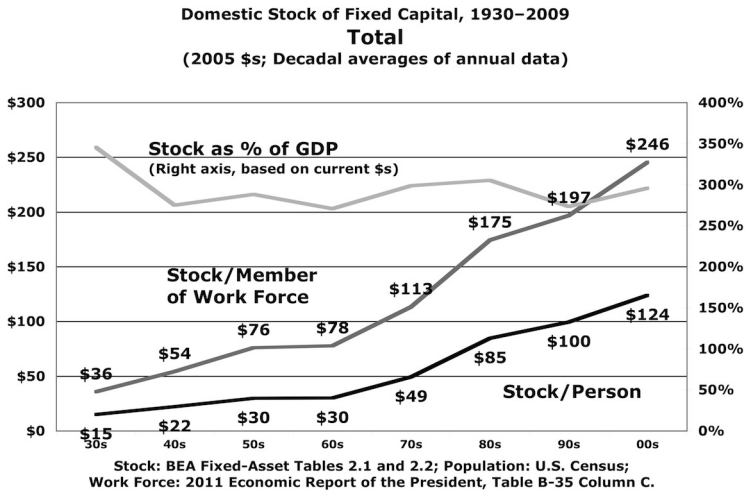


Figure 11

The proportion of fixed assets in the major sectors (Figure 12) has also remained fairly constant since the 40s, with the exception of defense. That sector's steady decline has been matched by increases in the other three sectors.

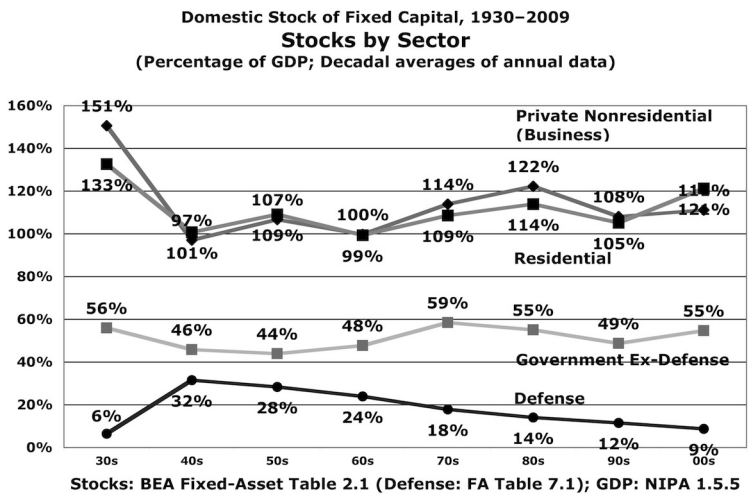


Figure 12

As a result of annual revaluation/re-estimation of the value of fixed assets, changes in the stock of fixed assets (Figure 13) have been highly volatile over the decades (annual changes are even more wildly volatile, ranging up to 60% in some years and sectors). This volatility—especially given its basis in estimated valuations of fixed capital and its sensitivity to overall inflation levels—makes it difficult to discern any persuasive long-term trends from changes in stock.

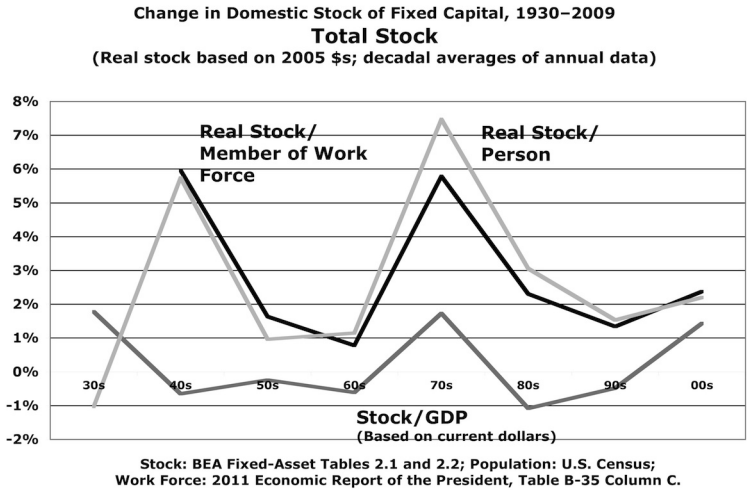


Figure 13

Finally, it's worth combining flows and stocks to look at the constituents of the changes in stock (Figure 14). Net investment has contributed a notably smaller share of the changes since the 60s, while revaluation has accounted for significantly more. The most notable pattern is perhaps demonstrated by the 30s, 70s, and 00s: troubled economic times (depression, stagflation, recession) are associated with notable lows in the net-investment share of the change in stock.

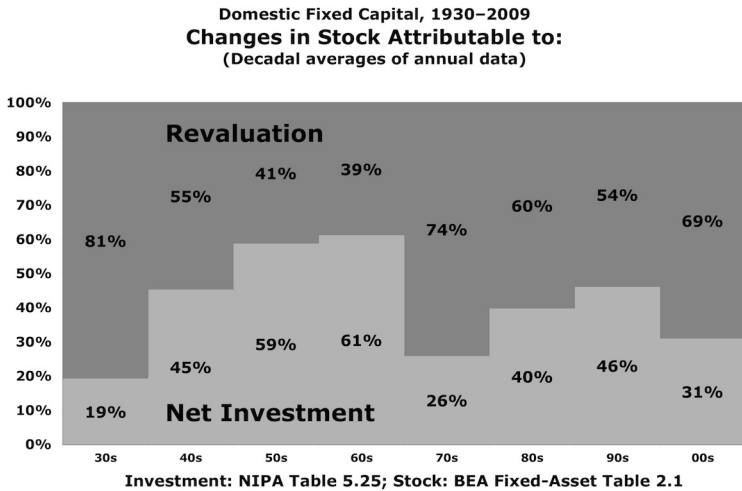


Figure 14.

Overall, the significant postwar trends in fixed capital in the American economy are these:

- More rapid capital consumption in total, and in all sectors except defense.
- Flat to declining gross investment in total, and in every sector except business, which showed a moderate increase.
  - As a result of the preceding two trends, a decline in net investment—total, and in every sector.
  - An increasing share of business and government investment devoted to equipment and software
    - A relative increase in private (especially business) investment and an accompanying (quite large) decline in government investment, especially in the small and rapidly decreasing component of defense investment.
  - An increasing share for revaluation (based on higher value of new assets) in the changes to capital stock, relative to contributions from net investment.

*The Excel spreadsheet from which this appendix's figures were generated, which includes links to the source data, is available for download at [asymptosis.com/kuznetsrevisited.xls](http://asymptosis.com/kuznetsrevisited.xls).*